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The Influence of Ultrasound for the Protection of Animals on Highways

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ABSTRACT

While driving in regions where animals are regularly present, it's not unexpected to end up in an accident. Both wild and domestic animals might be outside and can keep running into the street. Normally, a driver's first nature is to swerve to abstain from hitting the animal; however, that can have wrecking results, such as losing control of the vehicle and enduring genuine wounds. Swerving can deliver a domino impact, making the driver strike another vehicle or object, which can prompt far more atrocious outcomes, similar to the vehicle moving over or genuine damage to different drivers out on the road. It's essential to avoid such accidents and protect animals as well. To overcome this new method is proposed in this paper which includes a circuit generating Ultrasonic waves. It can be used as pest repellents. For generating ultrasonic waves of high frequency a generator using 555 timers is employed. These waves are designed to produce an extremely high-frequency sound that is beyond what humans can hear. Ultrasound is used to bring about enough irritation in animals and make them stay away from highways.

Keywords-- Animals, Accidents, Humans, Ultrasonic, Waves, Wounds

INTRODUCTION

There are different reasons why people must repulse animals from territories where they can damage people or devastate important goods and stay away from accidents [1, 2, 3]. This objective can be accomplished in various ways utilizing various techniques [4]. We can recognize electrical, chemical, mechanical, optical, reflective bags, acoustical strategies, and so on. The benefit of the acoustical technique contrasting with others is: economical to utilize, not harmful to animals ,and safe for humans utilizing it. This is valid under the presumption that ultrasound is utilized, which is indiscernible for individuals and does not cause any consultation harm, notwithstanding when presented to sound weight levels up to 120dB. At the point when animals hear these sounds they will just sit and gaze at the region where it has all the earmarks of being radiating. Along these lines, a clever hardware framework is essential which can be included vehicles to maintain a strategic distance from the potential outcomes of mishaps [5].

Generally, animal-vehicle crashes [6, 7] have been tended to through signals cautioning drivers [8] of potential animal intersections. In different cases, natural life cautioning reflectors, mirrors, or wildlife fences have been introduced to ward off animals from the street [9]. Nonetheless, regular cautioning signals seem to have just constrained impact since drivers are probably going to habituate to them. Natural life cautioning mirrors or reflectors may not be powerful [10, 11]. Wildlife fencing has been joined with natural life intersection structures to address these impediments [12]; at the same time, fundamentally because of their moderately surprising expense, such intersection structures are constrained in number and width [13, 14].

LITERATURE REVIEW

Various methodologies are overviewed to counteract the animals to come on the street and in influence to stay away from the demise because of mishaps. To limit the occurrences of wild vehicle-animal [15, 16, 17, 18] impact along the state course, the capacity to stay away from an impact is diminished in every one of these circumstances because of decreased permeability and expanded ceasing separations. A framework is intended to create the ultrasonic waves what are more with some wise tasks to detect the traffic of a vehicle [19, 20]. Such animal detecting and ready framework can be mounted on the two sides of the streets. It will remain unusable until any vehicle is recognized over the street. Animals are kept from being controlled via prepares and Crack in the track has distinguished utilizing ultrasonic sensors and send a message to a determined individual with no mediation of the human [21]. The Supreme Court has restricted vehicles in the woods for animal security. Table 1 gives the data about various animals murdered in street mishaps in India from 2010 to 2019

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Multimodal medical image fusion based on yager's intuitionistic fuzzy sets

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Abstract

The objective of image fusion for medical images is to combine multiple images obtained from various sources into a single image suitable for better diagnosis. Most of the state-of-the-art image fusing technique is based on non-fuzzy sets, and the fused image so obtained lags with complementary information. Intuitionistic fuzzy sets (IFS) are determined to be more suitable for civilian, and medical image processing as more uncertainties are considered compared with fuzzy set theory. In this paper, an algorithm for effectively fusing multimodal medical images is presented. In the proposed method, images are initially converted into Yager's intuitionistic fuzzy complement images (YIFCIs), and a new objective function called intuitionistic fuzzy entropy (IFE) is employed to obtain the optimum value of the parameter in membership and non-membership functions. Next, the YIFCIs are compared using contrast visibility (CV) to construct a decision map (DM). DM is refined with consistency verification to create a fused image. Simulations on several pairs of multimodal medical images are performed and compared with the existing fusion methods, such as simple average, discrete cosine transform (DCT), redundant wavelet transform (RWT), intuitionistic fuzzy set, fuzzy transform and interval-valued intuitionistic fuzzy set (IVIFS). The superiority of the proposed method is presented and is justified. Fused image quality is also verified with various quality metrics, such as spatial frequency (SF), average gradient (AG), fusion symmetry (FS), edge information preservation ($Q^{AB/F}$), entropy (E) and computation time (CoT).

Keywords: Image fusion, Intuitionistic fuzzy sets, Multimodal medical images, Intuitionistic fuzzy entropy, Decision map.

1 Introductions

Medical images provide different types of information: CT (computed tomography) images embed with less distortion and provide details regarding dense structures, such as bones, MRI (magnetic resonance imaging) provide information about pathological soft tissues, MRA (magnetic resonance angiography) easily detects abnormalities in the brain, X-ray detects fractures and abnormalities in bone positions, VA (vibro-acoustography), provide the depth and thickness of the disease object, and PET (positron emission tomography) and SPECT (single photon emission computed tomography) provide functional and metabolic data about the human brain. By combining these in multimodal medical image pairs such as CT-MRI [27], MRI-MRA, Xray-VA [18], MRI-PET [6], and MRI-SPECT, additional clinical information can be extracted that is complimentary in nature. Therefore, we can say that a single image will provide all relevant information, and hence multimodal medical image fusion is necessarily required to obtain all possible information in a single composite image called a fused image. Multimodal medical image fusion [12, 31] is the process of combining two multimodal medical images to increase the quality of the output image. Its benefits include the extended range

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Multimodal Medical Image Fusion based on Undecimated Wavelet Transform and Fuzzy Sets

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Abstract*: The ideal objective of combining therapeutic pictures is converging of the numerous pictures acquired from multimodalities into a solitary picture for prevalent sickness analysis. A tale calculation for skillful melding of multimodal restorative pictures is proposed in this paper. For combining of restorative pictures, Undecimated Discrete Wavelet Transform domain (UDWT) and Intuitionistic fuzzy sets are used. Dominant of the available fusion techniques are working in light of Discrete Wavelet Transform (DWT). A slight obscuring is seen when DWT is utilized for image fusion. By using UDWT, this blurring is significantly reduced. There is no decimation process in UDWT. Henceforth, wavelet coefficients are processed for every area permitting better identification of prevailing highlights. It is a non-orthogonal multi-resolution decomposition. In the UDWT domain, the low recurrence sub-groups are combined by the Maximum Selection Rule and the high recurrence sub-groups are intertwined by the Modified Spatial Frequency (MSF). Recreations are carried on different therapeutic pictures and diverged from strategies exist up until now. Predominance of the proposed technique is introduced and supported. Combined picture quality is affirmed with number of value measurements i.e., Entropy (H), Spatial Frequency (SF), Peak Signal to Noise Ratio (PSNR), Mean Square Error (MSE), Edge-based image fusion metric ($Q^{AB/F}$), Correlation Coefficient (CC), Quality Index (QI) and Structural Similarity (SSIM).

Index Terms: ***Image fusion, Fuzzy Set Theory, Discrete Wavelet Transform, Medical Image Processing, Wavelet Transform, PSNR***

I. INTRODUCTION

Various image processing techniques are generally utilized in Medical field for Smart Healthcare Systems. Among the techniques, picture combination is quickly expanding its hugeness in the combination of medicinal pictures X-ray, CT, MRI, MRA, and PET, SPECT pictures. Over the previous decade, gigantic research has been done in preparing and examination of medicinal information for analysis reason. Intertwining of CT and MRI pictures, MR and PET images, MR and SPECT images provide rich data valuable for effective diagnosis since the CT image gives the details of thick structures like bones and implants with little distortion, but cannot identify physiological changes, while the MRI gives typical and pathological soft tissues information. PET images provide help to evaluate functions of Organs and Tissues. SPECT images provide help in diagnosis of stress fractures in the spine, the blood deprived areas of a brain stroke. In extraction of the information from such images, the progression of developing novel algorithms provided major stimulus in image and signal processing. The goal of computer based medical diagnostic system is to empower the quick conclusion of disease, disease monitoring, and healthier treatment of disease. Medical images of various modality provide reciprocal information and this is incorporated for better evaluation. Fusing of multimodality images provide a solitary composite image that is dependable for enhanced investigation of disease diagnosis.

The most imperative research focus is extricating crucial information by fusion of multimodal medical images [1]. Existing exploration techniques are DWT [2, 23], UDWT [3], pixel-based and region-based methods [4, 23], the enhanced image capture [5], the laplacian pyramid [6], the complexity pyramid [7], the proportion of-low-pass pyramid [8], morphological pyramid [10], ripplet change [21] and the DWT technique [11-13]. A serious diagram of therapeutic picture combination strategies are alluded in [14]. The scarcest troublesome system of picture melding is to take pixel by pixel normal of two info pictures that may prompt a complexity decrease. All pyramid techniques fails to display spatial introduction on selectivity in disintegration of the procedure [9], which cause blocking impacts and undesired edges in the intertwined picture. Another strategy of restorative picture intertwining is the wavelet-based technique that utilizes discrete wavelet transform (DWT) in the combination where DWT jelly varied recurrence data in standard structure and permits great limitation in time and recurrence space. The real disadvantage of DWT is that the change would not give move invariance that causes a noteworthy change in the wavelet[16-17] coefficients of the pictures for minor changes in the info pictures. In restorative picture examination, it is critical to know and protect the definite purpose of the data and it is happened which is called as UDWT [15].

II. PRELIMINARIES

2.1. DWT

The DWT is a widely used image and signal processing technique utilizing an alternate set of the wavelet scales and translations agreeing with pre-defined rules. DWT also breakdowns signals into commonly symmetrical group of wavelets, a fundamental contrast from a continuous wavelet transforms (CWT), or its utilization for different time series often labeled as discrete time CWT (DT-CWT).

For getting a two dimensional wavelet transform (WT),

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MULTIMODAL MEDICAL IMAGE FUSION BASED ON TYPE-1 FUZZY SETS

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Abstract. The main objective of image fusion for multimodal medical images is to retrieve valuable information by combining multiple images acquired from different sources into a single image appropriate for better diagnosis. In general, visibility of structural details in medical images is difficult to interpret. Soft computing techniques have been applied to enhance the images and to extract the details from the images. Fuzzy sets are very suitable for medical images, since the images having a lot of uncertainties. A fuzzy set approach is proposed in this paper. Type-1 fuzzy sets are used in this work. The efficiency of the proposed method is demonstrated by applying the algorithm on several pairs of medical images. The fused image is analyzed qualitatively using the attributes like spatial frequency, entropy, feature, mutual information and edge information preservation. Simulated results are also compared with the existing works in the recent literature.

Keywords: Image fusion, Diagnosis, Fuzzy sets, Type-1 fuzzy set, spatial frequency

1 Introduction

Multimodal medical image fusion is the way toward joining a pair of multimodal medical images to expand the perfection of a resultant image. Image fusion systems join different information images of a similar scene or object to get a composite image that is required to be high, useful and appropriate for human visual observation or further image processing contrasted with any of the input images [1– 3]. The medical image pairs that are combining for example, CT-MRI (computed tomography-magnetic resonance imaging), MRI-MRA (magnetic resonance imaging-magnetic resonance angiography), Xray-VA (Xray-vibroacoustography), MRI-PET (magnetic resonance imaging-positron emission tomography), and MRI-SPECT (magnetic resonance imaging-single photon emission computed tomography) [4-7], image fusion is progressively securing importance in human services as well as present day medication. By removing the scientific realities which are complimentary in nature the above arrangements of images should be utilized. For instance, CT image implants is having a few measure which consists of twisting and transfers insights in regards to dense complex like bones, MRI gives compulsive delicate meaty mesh data, MRA faculties effortlessly mind surrenders, X-beam distinguishes cracks and variations breaks in bone location, VA gives

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BOOK OF ABSTRACTS

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Multimodal Medical Image Fusion Based on Fuzzy Sets with Orthogonal Teaching Learning Based Optimization

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The objective of image fusion for medical images is to combine multiple images acquired from different bases into a single image appropriate for better diagnosis. Most of the state-of-the-art image fusing techniques are based on non-fuzzy sets, and the fused image so obtained lags with complementary information. Fuzzy sets are strong-minded to be more appropriate for medical image processing as more hesitations are considered compared with non-fuzzy sets. In this paper, a procedure for efficiently fusing multimodal medical images is presented. In the proposed method, images are initially converted into intuitionistic fuzzy images (IFIs), and a new objective function called intuitionistic fuzzy entropy (IFE) is employed to attain the finest value of the parameter in membership and non-membership functions. Next, the IFIs are compared using the fitness function, entropy. Then, orthogonal teaching learning based optimization (OTLBO) is introduced to optimize fusion coefficients, which will be changed under teaching phase, and learner phase of OTLBO, so that the weighted coefficients can be automatically adjusted according to fitness function. Finally, the fused image is achieved using optimal coefficients. Simulations on several pairs of multimodal medical images are performed and matched with the current fusion approaches. The dominance of the proposed technique is presented and is justified. Fused image quality is also verified with various quality metrics, such as spatial frequency (SF), entropy (E), feature mutual information (FMI), and computation time (CT).

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Multimodal Medical Image Fusion Based on Fuzzy Enhancement and Fuzzy Transform

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Abstract

Multimodal medical image fusion is a process of extracting information from different medical images to obtain a single image called fused image. Fused image analysis is extensively used by clinical professionals for quick diagnosis and treatment of critical diseases. This paper is developed using fuzzy logic enhancement and fuzzy transform (FT) for integrated multimodal medical image fusion. FT based fusion helps in preservation as well as effective transfer of detailed information present in input images into a fused image. The proposed work is effective and generates better fused images compared to existing techniques such as discrete wavelet transform (DWT) and non-subsampled contourlet transform (NSCT). The fused image is also compared with quality metrics such as Entropy (E), Mutual Information (MI) and Edge based quality metric ($Q^{AB/F}$).

Key words – Image Fusion, Fuzzy Transform, DWT, Entropy.

1 INTRODUCTION

The process of combining two or multiple images of same modality or different modalities [1] to produce a single fused image which is more informative than any of the individual input image is known as Image Fusion. The main aim of image fusion is to preserve all salient, interrelated and relevant information present in input images without introducing any variation, noise and artifact in the fused image. Image fusion not only provides better information but also minimize the storage cost by minimizing the memory requirement for storage of multiple input images to that needed for storing only a single fused image. Due to unique and improved representation of information, image fusion is used in many medical applications [2] such as oncology, neurology, cardiology, and radiation therapy.

The main necessity of image fusion [3] is that it must preserve all useful and valid information from the source images without introducing any artefact . To measure the quality of images that is for objective evaluation of image fusion [4] different performance measures like entropy, correlation coefficient, peak signal to noise ratio, root mean square error, standard deviation, structure similarity index, high pass correlation, edge detection, average gradient etc., has been used. Entropy gives a measure of information quantity, correlation coefficient is used to find the similarities between registered and the fused image, average gradient reflects the clarity of the fused image, root mean square error is cumulative error between the fused and the original image whereas peak signal to noise ratio is a measure of image error and so on.

So far, many image fusion algorithms have been developed in literature. These algorithms can be categorized into pixel-level [5], feature-level [6] and decision-level [7] image fusion algorithms. Pixel-level image fusion algorithms fuse directly the raw input images based on their pixel intensities or on arbitrarily small regions of pixels. Feature-level fusion algorithms fuse input images using their salient features [8] such as edges and line segments. The algorithm says that correspondence among features present in input images is usually known and are very much image dependent. A decision-level algorithm fuses image descriptions directly, either in the form of probabilistic variables or in the form of relational graphs to produce a high quality fused image. These methods however completely rely and very much application dependent. Compared to feature-level and decision-level image fusion algorithms, pixel-level algorithms [9] are capable of retaining most of the image information and are not only easy to

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Multifocus Image Fusion based on Segmentation using Stationary Wavelet Transform

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Abstract-Image Fusionis a process of integrating complementary information from multiple images of the same scene such that the resultant image contains a more accurate description of the scene than any of the individual source images. A method for fusion of multifocus images is presented.It combines the pixel-level fusion with some aspects of feature-level fusion. First, multifocus images are decomposed using a stationary wavelet transform (SWT). Then the decomposed coefficients are segmentd using multiscale segmentation and edge features are extracted to guide coefficient combination. Finally, the fused image is reconstructed by performing the inverse SWT. The experimental results on several pairs of multifocus images indicate that the proposed algorithm is superior to an existing algorithm byLiet al., in terms of Peak Signal to Noise Ratio (PSNR), Universal Quality Index (UQI), Structural Similarity (SSIM) and various other image quality metrics. The performance of the proposed algorithm is also compared with discrete wavelet transform (DWT) technique.

Keywords: *Image Fusion; Pixel-Level Fusion; Feature-Level Fusion; Stationary Wavelet Transform*

I. INTRODUCTION

Image Fusion is the process by which multiple images of the same scene are combined to generate a more accurate description of the same scene than any of the individual source images. Fusion process can be performed at different levels of information representation, sorted in ascending order of abstraction: signal, pixel, feature and symbol levels. Pixel-level image fusion refers to process directly based on the pixel information from individual sensors; fusion result is an image, which usually more suitable for human and machine perception, or further image processing tasks such as segmentation, feature extraction and object recognition[1]. Almost all image fusion algorithms developed to day comes into this category.

Pixel-level image fusion has a wide range of applications in military, remote sensing, medical imaging, robots, security and surveillance, etc. pixel-level fusion means fusion at the lowest processing level referring to the merging of measured physical parameters [2].It generates a fused image in which each pixel is determined from a set of pixels in various sources and serves to increase the useful information content of a scene such that the performance of image processing tasks, such as segmentation and feature extraction, can be improved [3].

Feature-level fusion first employs feature extraction, by segmenting the source images separately and then performing the fusion based on the extracted features [4]. Symbol level fusion allows the information from multiple images to be effectively used at the highest level of abstraction [5]. The input images are usually processed individually for information extraction and classification. Many multifocus image fusion techniques have been reported so far. The simplest fusion method just takes the pixel-by-pixel gray-level average [6] of the source images. A proper fusion algorithm must ensure that all the important visual information found in the input images is transferred into the fused image without any artifacts or inconsistencies.

The simplest multifocus image fusion is to take the average of the grey level source images pixel by pixel. This technique would produce several undesired effects and reduced feature contrast. To overcome this problem, multi-scale transforms, such as wavelets, Laplacian pyramids, morphological pyramid, and gradient pyramid have been proposed.

In this paper, an effective multifocus image fusion algorithm is proposed based on the stationarywavelet transform (SWT), which combines aspects of both pixel-level and feature-level fusion. The edge features are separately extracted from each input images wavelet planes and then the decision map is built based on the features of edge information, representing salience or activity to guide the fusion process in the SWT domain. Since edges of objects and parts of objects carry information of interest, it is reasonable to focus them in the fusion algorithm. The visual and quantitative analyses of different fusion results prove that the proposed method improves the fusion quality and outperforms the existing method.

II. STATIONARY WAVELET TRANSFORM

The Discrete Wavelet Transform (DWT) is referred to as Mallat's algorithm [7], which is based on orthogonal decomposition of the image onto a wavelet basis in order to avoid the redundancy of information in the pyramid at each level of resolution. Consequently, Stationary Wavelet Transform (SWT) avoids image decimation which has been developed for image processing applications such as denoising [8], texture classification [9], pattern recognition and fusion. The discrete implementation of SWT can be accomplished by using the 'a trous' (with holes) algorithm, which presents interesting properties such as:

- The evaluation of the wavelet decomposition can be followed from level to level.
- A single wavelet coefficient plane is produced at each level of decomposition.
- The wavelet coefficients are computed for each location allowing a better detection of dominant feature.
- It is easily implemented.

The 'a trous' wavelet transform is a non-orthogonal multiresolution decomposition, which separates the low-frequency information (approximation) from high-frequency information (detail coefficients). Such a separation uses a low-pass filter $h(n)$, associated with the scale function $\varphi(x)$, to

Detection of Lung Cancer Using Binarization Technique

G Mahalaxmi and T Tirupal***

Nowadays, image processing techniques are widely used in several medical areas for image improvement in earlier detection and treatment stages, and the time factor is very important to detect the abnormality issues in target images, especially in various cancer tumors such as lung cancer and brain cancer. The proposed system consists of five basic stages. In the first stage, CT lung image affected with cancer is taken. In the second stage, enhancement technique is applied to get the best level of quality and clarity. In the third stage, segmentation algorithm is applied, and in the next stage, morphological operations erosion and dilation are used to smooth the boundaries of the lung. Finally, in the last stage, feature extraction is applied to obtain the general features from enhanced segmented image which gives indicators of normality or abnormality of image. Simulations are carried out on various lung CT images and are also compared with the existing methods. The superiority of the proposed method is presented and justified. The proposed method gives very promising results of various quality metrics like accuracy, sensitivity, specificity and various other image quality metrics.

***Keywords*:** Cancer tumors, Enhancement, Segmentation, Morphological operations, Feature extraction

Introduction

Lung cancer is the uncontrolled growth of abnormal cells that starts off in one or both lungs, usually in the cells that line the air passages. The abnormal cells do not develop into healthy lung tissue; they divide rapidly and form tumor. As tumor becomes larger and more numerous, they undermine the lungs' ability to provide the blood streams with oxygen. Tumors that remain in one place and do not spread are known as benign tumor, whereas the tumors that spread to blood cells is known as malignant. Lung cancer is a disease of abnormal cells multiplying and growing into tumor. False detection is due to the presence of air in bronchi, presence of ribs and blood vessels (Chaudhary and Singh, 2012; Patil and Kuchanur, 2012; Hadavi *et al*., 2014; and Tirupal *et al*., 2017). In various types of cancers, the rate of lung cancer is increasing gradually. The mortality rate of lung cancer is the highest among all other types of cancers. Lung

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Multi Focus Image Fusion Based On Spatial Frequency and Analysis under SWT Domain

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ABSTRACT

The project presents multi focus image fusion using stationary wavelet transform with local directional pattern and spatial frequency analysis. Multi focus image fusion in wireless visual sensor networks is a process of fusing two or more images to obtain a new one which contains a more accurate description of the scene than any of the individual source images. In this project, the proposed model utilizes the multi scale decomposition done by stationary wavelet transform for fusing the images in its frequency domain. It decomposes an image into two different components like structural and textural information. It doesn't down sample the image while transforming into frequency domain. So it preserves the edge texture details while reconstructing image from its frequency domain. It is used to reduce the problems like blocking, ringing artifacts occurs because of DCT and DWT. The low frequency sub band coefficients are fused by selecting coefficient having maximum spatial frequency. It indicates the overall active level of an image. The high frequency sub band coefficients are fused by selecting coefficients having maximum code value. Finally, fused two different frequency sub bands are inverse transformed to reconstruct fused image. The system performance will be evaluated by using the parameters such as Peak signal to noise ratio, correlation and entropy.

General Terms

Image Fusion, frequency domain, DCT, DWT.

Keywords

DCT, image fusion, multi-focus, spatial frequency.

1. INTRODUCTION

The developments in the field of sensing technologies multi-sensor systems have become a reality in a various fields such as remote sensing, medical imaging, machine vision and the military applications for which they were developed. The result of the use of these techniques is a increaseof the amount of data available. Image fusion provides an effective way of reducing the increasing volume of information while at the same time extracting all the useful information from the source images. Multi-sensor data often presents complementary information, so image fusion provides an effective method to enable comparison and analysis of data. The aim of image fusion, apart from reducing the amount of data, is to create new images that are more suitable for the purposes of human/machine perception, and for further image processing tasks such as segmentation, object detection or target recognition in applications such as remote sensing and medical imaging. For example, visible-band and infrared images may be fused to aid pilots landing aircraft in poor visibility.

Multi-sensor images often have different geometric representations, which have to be transformed to a common representation for fusion. This representation should retain the best resolution of sensor. A prerequisite for successful in image fusion is the alignment of multi-sensor images. However, image fusion does not necessarily provide multisensory sources, there are interesting applications for both single-sensor and multi-sensor image fusion.

2. PROPOSED WORK

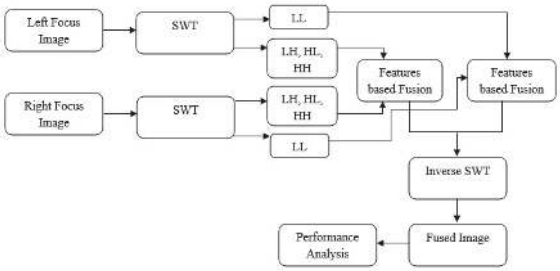

Figure 1: proposed Schematic diagram for fusing images coded in JPEG format..

The spatial frequency, which had its beginning with the study of the human visual system, indicates the overall active level of an image. It is difficult to completely comprehend the human visual system with current physiologic means, but the spatial frequency supplies an effective contrast criterion for image fusion. It is shown in Section II that the calculation of spatial frequency in DCT domain is simple. Hence, we can use the spatial frequency value as the contrast measure of the 8*8 blocks of the source images. Fig. 4.1 shows the schematic diagram of the proposed multifocus image fusion method. For simplicity, we only consider two source images A and B, but the method can be extended for more than two source images. The fusion process consists of the following steps:

Blind Facial Image Quality Enhancement Using Personal priors

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Abstract:- In this paper, we have proposed a new way of solving the general inverse problem of several simultaneous disturbances, such as deletion, reducing resolution, and noise and contrast variations, without a clear estimate of degradation. The proposed concept is based on non-solid semantic patches, special high-quality previous data and no problem with a solid combination of registration tools. We show how significant improvements in quality can be achieved visually and quantitatively in case of facial expressions. The method is illustrated by the problem of cell photography from dark faces to different identities, expressions and poses, quality and, compared with a number of advanced methods, eliminating noise, fading, and higher resolution and color correction.

Keywords: Denoisy, Non-Regid Semantic Images, Registration-Based Affinity Space, Facial Image Quality Enhancement

1. INTRODUCTION

It's well known that human eyes work much better because cameras capture scenes in real world with a high dynamic range that can cover more than six layers. The currently available image processing equipment can only be measured approximately 3 times. Therefore, images captured in high-dynamic scenes often suffer from excessive saturation or insufficient due to the movement of the movement, resulting in dark images with low contrast. This leads to poor representation of some of the important properties of the resulting images, because it makes it difficult to select algorithms for human eye or artificial view. Scrap compression with high dynamic range is a possible solution for managing the limited dynamic range (LDR) of current devices. Various global methods for histogram modification.

To implement this concept, gamma control methods, logarithmic compression, histogram alignment and levels / curves are developed. Using such methods, some functions may be lost or improved, and the results generally lack the local contrast that contains important information about the image. Advanced image enhancement techniques have been developed. They take into account not only the dynamic range compression, but also improve local contrast, allowing for a high-quality vision.

MSRCR (Mutiscale Retinex with Color Restoration) by Rahman et al. The proposed a frequently quoted image enhancement method is the algorithm based on Retinex using logarithmic compression and spatial convolution. The goal is to synthesize improved local contrast, consistency of color reproduction and brightness / color to enhance the color digital image. MSRCR works well with a wide range of images. Another new method proposed by Li et al. Is the IRME (Illumaniance reflectance model based nonlinear enhancement). It consists of two separate processes, namely, adaptive brightness enhancement and customizable contrast enhancement to provide greater flexibility and better control to enhance the image. IRME also produces good results for most natural images.

1.1 Digital Image Processing:

Background:

Digital image processing is an area characterized by the need for extensive experimental work to determine the feasibility of solutions to

Smart Sensor Network based Industrial Parameters Monitoring in IOT Environment using Virtual Instrumentation Server

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Professor, Department of Electronics and Communication Engineering,
G.Pullaiah College of Engg. & Technology, Kurnool[2]

ABSTRACT:

A remote monitoring and control are one of the most important criteria for maximizing the production in any industry. With the development of modern industry the requirement for industrial monitoring system is getting higher. This project explains the real time scenario of monitoring temperature and humidity in industries. National Instruments my RIO is used and results are observed on LabVIEW front panel and VI Server. The server VI program and client VI program is developed in block diagram for the two sensor data. This proposed system develops a sensor interface device essential for sensor data acquisition of industrial Wireless Sensor Networks (WSN) in Internet of Things (IOT) environment. By detecting the values of sensors like temperature, humidity present in the industrial area. The results are displayed on the web page. The data can be accessed with admin name and password. After logging into the web page the index of files is displayed. After restarting the RIO kit and initiate the deploying process the file the excel sheet will appear on the VI Server. This VI server is tested for its working, using a data acquisition web application using a standard web browser. The critical situation can be avoided and preventive measures are successfully implemented.

KEYWORDS: wireless sensor networks; virtual instrumentation; safety monitoring; Lab VIEW

INTRODUCTION

The environmental care has become one of the biggest concerns for almost every country in the last few years. Even though the industrial accident level has been increasing without any control in the last decades, the current situation in the industry towards more hazardous environment. Recently, the modern industries are demanding sophisticated instrumentation for monitoring and control of environmental risk parameters of the hazardous area .Human safety and property losses are the essential to maintain the equilibrium between industry and environments. Virtual instrumentation environment, offers an intuitive way for engineers and scientists to quickly deploy applications [6] for measurement and control in the form of Lab VIEW graphical programming language is used for program function design.

LITERATURE SURVEY

In recent years, keeping pace with most of the industrialized accident that occur in hazardous environment due to which the consequences may be very serious and generally cause damage to life, property and environment .Hazardous environmental safety and security can be most important for moral, legal, and financial reasons.

Design considerations focus on improving key areas such as: (1) sampling methodology; (2) context awareness; and (3) sensor placement.[3] this paper proposes an industrial environment monitoring server system for monitoring information concerning environment in industry utilizing Wireless Sensor Network (WSN) technology. [4] This paper surveys the needs associated with environmental

Detection of Glaucoma using Adaptive Neuro Fuzzy in DWT Domain

N. Ramamurthy, KCT Swamy, G. Ramarao, Molla Riyaz Pasha

Abstract— Glaucoma is that the second leading reason for loss of vision within the world.Examining the pinnacle of the ratio of cup to disc is extremely vital for eye disease diagnosis. This research work provides segmentation technique to calculate the disc and cup geometrical parameters mechanically and accurately. These techniques facilitate professionals with designation and observation eye disease by providing them with clear and correct information concerning the optic nerve headstructure. The individuality of this paper is in demonstrating the segmentation methodology by using adaptive neuro fuzzy algorithms for thsegmentation.

Index Terms—Optic Cup, Glaucoma,Optic Disc, Optic Nerve Head , Ratio of Cup to Disc and Adaptive Neuro fuzzy.

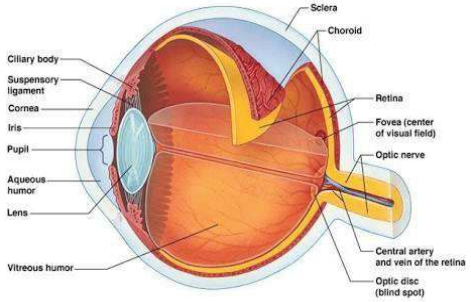
1. INTRODUCTION

The eye decease Glaucoma, now a days is one of the most dangerous eye deceases that damages the human eye sight. As per so many surveys, the Glaucoma is the world's second leading decease which causes blindness.By the year 2020, the glaucoma effected patients may increase further.Early detection of Glaucoma can prevent its progress and minimize loss of eye sight. Based on the models of images, many options of the structures of retina, like associate in nursing eyecup,optic disc, the second cranial nerve head papillary atrophy, and retinal fiber layer, got to be discovered for eye disease detection. [1]. Glaucoma damages the potic nerve by reducing retinal neurons as a result blind spots develop in the eye[2].Some of the proposed methods for disc segmentation are template based mostly technique,pixel classification technique and circular Hough remodel area unit accustomed model the disc boundary due to their procedure potency. From almost all the clinical studies it is clear that a disc incorporates a rather oval kind with the diameter of vertical axis being 7%-10% longer than the diameter of horizontal sxis.The utilization of machine-driven diagnostic tools is fascinating to reduce sound judgment and build the diagnosing sturdy and consistent. Color structure imaging has emerged because the most well-liked procedure for comprehensive large-scale retinal illness screening because of their easy acquisition and smart visibility of retinal structures. [3].The human eye is sown in figure (1.1).

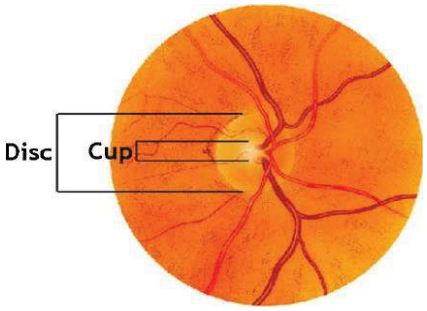
There are three different techniques to doagnise the Glaucoma more accurately.(1)"Evaluation of the intraocular pressure" (IOP) using Goldman tonometry, (2) "Evaluation of the visual field", and (3) "Evaluation of the optic nerve head damage" [4]. The optic disk is formed of more than one million neural structure cell axons .The relation between optic tract and cup and loss of visual view is obtained by examining the eyecup segmentation [5]. The point is split into 3 totally different areas: neuroretinal rim, the cup (central area), and typically parapapillary atrophy[6] . The cup-to-disc quantitative relation (CDR) is that the quantitative relation of the vertical diameter of the cup to the vertical diameter of the disc [7].

In [8], the authors straight a way obtained optic disk and calyculus victimization connected half labeling followed by two-dimensional figure .The cup and disc of fundus image of human eye are shown in figure(1.2)

In this paper, the adaptive neuro fuzzy method is proposed to detect the ratio of cup to disc more accurately. Color structure imaging has emerged because the most well-liked procedure for comprehensive large-scale retinal illness screening because of their easy acquisition and smart visibility of retinal structures.



Figure(1.1): Human Eye



Figure(1.2): Disc and Cup of fundus Image

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Analysis of Multi-Frequency Multi-GNSS Real-Time Signal Observations Acquired by Septentrio PolaRx5 Receiver Station

Dr. K.C.T. Swamy, Dr. N. Ramamurthy, Pasuluri Bindu Swetha, M.Riyaz Pasha

Abstract*— Global Navigation Satellite System (GNSS) constellations such as Global Positioning System (USA), GLONASS (Russia), Galileo (European Union), BeiDou (China) transmit radio signals continuously on multiple frequencies for PNT applications on or above the globe. On the other side IRNSS(India) and QZSS (Japan) are the regional navigation systems with limited service area. The combination of multiple constellations with quality signals improves robustness and stability of position,navigation and time measurements. Hence, this research work investigates signal quality to identify strong/ important signals and geometry of the satellites for the combined use of global and regional constellations over the Indian region. Real-time signal observations of multiple GNSS were collected by 'Septentrio PolaRx5' receiver stations installed at GPCET, Kurnool (15^0.47'N, 78^0.04'E). From the results, it is found that the user over this region can receive signals from a minimum of 60 satellites with Position Dilution of Precision (PDOP) value less than unity.

Index Terms*— multi-GNSS, DOP, Carrier to noise ratio

I. INTRODUCTION

Satellite based navigation system is a more powerful technique or approach for precise Position, Navigation and Time (PNT) estimation. At present two systems, namely Global Positioning System (GPS) of USA and GLObal NAvigation Satellite System (GLONASS) of Russia are fully operational [1]-[2]. Galileo of European Union (EU) and BeiDou of China are under development. All these four systems are meant for PNT services at anywhere over the entire globe. In addition to these global systems, India and Japan have been developing their own satellite navigation systems, namely Indian Regional Navigation Satellite System (IRNSS) and Quasi-Zenith Satellite System (QZSS) with limited service area confined to their geographical region and surroundings [3]-[4]. Therefore, users over the Indian subcontinent get signals from GPS, GLONASS, Galileo, BeiDou, IRNSS and one or two satellite signals from QZSS at all the time. Various GNSS signals which could be available over the Indian Latitude are listed in the Table I [5]. IRNSS constellation consists of 4 Geosynchronous and 3 geostationary satellites to transmit signals on L and S bands for position, navigation and time applications over the India [6]. However, in urban areas and dense foliage environment, GNSS and regional constellation signal strength decreases and sometimes receiver gets insufficient number of satellites in view to achieve good Dilution of Precision (DOP). Moreover, continuity of the service is also being interrupted due to the insufficient number of satellites. GNSS signal strength can be measured in terms of carrier-to – noise density ratio (C/No) using the following mathematical expression given in equation (1) [7],

Table I. Signals and frequency bands of multiple GNSS constellation [12]-[17]

Constellation	Signal	Frequency Band /Frequency (MHz)	No. of Satellites in operation
GPS	L1 C/A L1 P(Y) L2 P(Y) L2C L5	L1/1575.42 L2/1227.60 L5/1176.45	31
GLONASS	L1 C/A L1 P L2 P L2 C/A L3	L1/1602+k*9/16 k=-7……+12 L2/1246+k*716 L3/1202.025	24
Galileo	L1 BC E5a E5b E5 E6BC	L1/1575.42 E5a/ 1176.45 E5b/1207.14 E5/1191.795 E6/1278.75	18
BeiDou	B1 B2 B3	B1/1561.098 B2/1207.14 B3/1268.52	17
IRNSS	L5 S	L5/1176.45 S/2492.028	07
QZSS	L1 C/A L2 C L5	L1/1575.42 L2/1227.60 L5/1176.45	04

$$C/N_0\,(dB-Hz) = C-(N-BW)$$

$$C - N_0 = SNR + BW \qquad (1)$$

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Impact of High Geomagnetic Activity on Global Positioning System Satellite Signal (L-Band) Delay and Klobuchar Algorithm Performance Over Low Latitudinal Region

K. C. T. Swamy

Abstract The Klobuchar algorithm is currently being used by the single frequency Global Positioning System (GPS) user to compute the ionospheric time delay at anywhere in the world. The aim of this paper is a preliminary assessment of Klobuchar algorithm performance by using ionospheric time delay estimated with the data provided by International Global Navigation Satellite System (GNSS) Service (IGS) network on a geomagnetic storm day of high solar activity year, 2016. This work is carried out at various IGS stations, namely PBRI, IISC, HYDE, LCK4 and LHAZ. Klobuchar model mean results agreement with experimental data is acceptable at the considered stations. This is the preliminary work done in the process of improvement of the Klobuchar algorithm for low latitude regions.

Keywords GPS · IGS · Ionospheric time delay

1 Introduction

Day to day the dependence on Global Navigation Satellite System (GNSS) is increasing in high precision applications such as air transportation, marine communication, missile tracking and guidance civil aviation along with timing applications. But, the radio signals of GNSS satellites are being affected by the different phenomena that occur in space between the Earth and the Sun. The effect is potentially severe on GNSS signals during the geomagnetic storm [1]. Geomagnetic storms have the impact on ionosphere behaviour and produce disturbances in the density of free electrons present in the F2-region. The understanding of ionospheric storms presented in [2–5]. One of the major effects on GNSS signal is refraction, it

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Zero Baseline Analysis for Measurement of NavIC-L5 Signal Quality with Real-Time Data

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***Abstract*—Recently developed Navigation Indian Constellation (NavIC) signal (L5-1176.45 MHz and S-2492.028 MHz) pseudo range and carrier phase measurements are to be used for position, navigation and time computation in different engineering, science and other applications over the Indian sub-continent and its surroundings. To ensure the quality services analysis of signals that are being received is essential. Since, NavIC signal uses complex BPSK on L5 and BoC(5,2) on S-band different analysis methods are to be employed for evaluating the quality. In this research work, NavIC-L5 signal quality is analyzed using zero baseline double difference pseudo range and carrier phase measurements with real time data collected through Septentrio PolaRX5 receivers. Results show that the NavIC signal quality is slightly better (less residual) for GSO satellites. However, the residual is minimum for IRNSS 1C when IRNSS 1B is considered as a reference. Moreover, NavIC GSO signals are less consistent than other 3 GEO satellites signals.**

Keywords—NavIC, Zero Baseline, Signal Quality

I. INTRODUCTION

Indian Regional Navigation Satellite System (IRNSS) also known as NavIC (Navigation Indian Constellation) is the Indian indigenous satellite navigation system with seven satellites (IRNSS 1B, IRNSS 1C IRNSS 1D, IRNSS 1E, IRNSS 1F, IRNSS 1H, IRNSS 1I). They transmit signal on two frequenc bands namely L5 (1176.45 MHz) and S (2492.028 MHz). NavIC provides the Standard Positioning Service (SPS) through BPSK (1) modulated signals on L5 band and restricted service (RS) through binary offset carrier i.e. BoC (5, 2) on S- band with bandwidth of 24 MHz and 16.5 MHz respectively shown in Fig. 1 [1]. For the better understanding of the signal structure, mathematical representation of SPS and RS signals (S1 (t) and S2 (t)) is given below (https://www.isro.gov.in/sites/default/files/irnss_sps_icd_version1.1-2017.pdf)[2].

$$S_1(t)=\sum_{i=-\infty}^{\infty} C_{sps}\left(|i|_{L-sps}\right).d_{sps}\left([i]CD-sps\right).rect_{TC,sps}\left(t-i_{TC,sps}\right)$$

$$S_2(t)=\sum_{i=-\infty}^{\infty} C_{rs\_d}\left(|i|_{L\_rs\_d}\right).d_{rs\_d}\left([i]_{CD\_rs\_d}\right).rect_{Tc,rs\_d}\left(t-iT_{c,rs\_d}\right).SC_{rs\_d}(t,0)$$

$C_{sps}(i)$ is i[th] chip of spreading code

$d_{sps}(i)$ is i [th] bit of navigation message

$CD-sps$ indicates number of chips per navigation data bit

$rect_x(t)$ indicates rectangular pulse function with duration 'x'

Tc, sps is spreading code chip duration

$SC_x(t)$ is binary NRZ subcarrier

L_x is length of spreading code in chips

|i| indicates 'i' modulo 'X'

$[i]_X$ is integer part of (i/X)

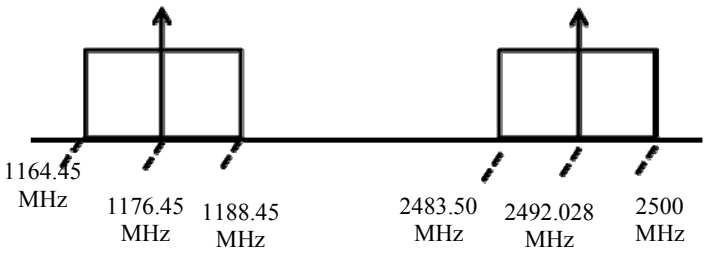

Fig. 1 NavIC signals spectrum

With the successful completion of NavIC constellation, the number of satellite signals available over the Indian region increases. This can improve the precision in position, navigation and time applications with good satellites geometry. However, the precision or accuracy also be limited by the quality of the signal. Hence, it is necessary to investigate the quality of the NavIC new signals to understand the impact on accuracy/precision. Yiming Quan et al., (2016) measured the quality of GPS, GLONASS, Galileo, BDS and QZSS new signals [3]. Zero baseline method is implemented to estimate stochastic properties of GPS L5Q and GIOVE E5Q, GPS L1 C/A and GIOVE E1B [4]. Moreover, single and double difference models are also be used for attitude determination [5]. This research work carries out an early assessment of NavIC signals with the following objective. To study the measurement noise (residual) levels in the currently available NavIC-L5 signals by investigating double difference (DD) pseudo range and

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Improvement of GPS DOP Variants with NavIC Constellation for Indian Users

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***Abstract*— GPS, a standardized and matured satellite based navigation system, having a broad range of applications. It is widely preferred due to its fast and better performances. The accuracy of a GPS system is an important issue in PNT service to all the dependents, which is limited by geometry of visible satellites. With the advent of multiple constellations, research work is continuing to combine different constellations to get good geometry *i.e.* Dilution of Precision (DOP). In this research work, GPS and NavIC (Navigation Indian Constellation) constellations are combined to investigate the DOP values for the receiver located at GPCET (15.79^{0}N, 78.07^{0}E), Kurnool, India. GDOP is an instructional parameter as it specifies error in 3D position and time. In urban environments the GPS or NavIC users would be able to pick the satellite signals of higher elevation because of the obstructed sky view. In case of higher elevation mask angle (30^0) mean GDOP is 19.22 by GPS alone and 3.44 by the combined constellation (GPS+NavIC). Hence, the combination of GPS and NavIC is more preferable to get good geometry to improve the accuracy of PNT services in and around Indian region.**

***Keywords*— GPS, NavIC, GDOP**

I. INTRODUCTION

The GPS satellites broadcast signals on L-band with frequencies L1 (1575.42 MHz), L2 (1227.60 MHz) and L5 (1176.45MHz) are used for Position Navigation and Time (PNT) services. The pseudo range and carrier phase measurements employed for PNT services are degraded by various factors like atmospheric errors, receiver and satellite clock bias, multipath etc., Apart this geometry of satellites also has impact on accuracy.

DOP is the ratio between the standard deviations(SD) of a specific parameter (East North Up and Time) of the receiver and the pseudorange in the mathematical sense[1]. The various forms of DOP include GDOP, PDOP, TDOP, HDOP and VDOP. Vertical DOP can be computed as the ratio between the SD of the GPS receiver vertical component and SD of the pseudo range. Geometric DOP, the ratio between the root sum square of the standard deviation of the variables (x, y, z coordinates and time) and the standard deviation of the pseudorange, is involved with more than one parameter. In Physical sense, DOP is described as the geometric strength of the visible satellites configuration on the GPS accuracy. GDOP quality can be classified as: Excellent if 2 $\leqslant$ GDOP < 3; Good if 4 $\leqslant$ GDOP < 6; Moderate if 7 $\leqslant$ GDOP < 8 [2].Table I shows the significance and expressions of various DOPs.

In urban canyons single constellation accuracy is less because of poor satellite geometry with a limited number of satellites. Sometimes, position computation is also not possible due to insufficient count of satellites.

After GPS and GLONASS, other constellations like Galileo, Beidou, NavIC and QZSS are being developed. Researchers have been studied the potential of combining multiple constellations [3-6].These constellations can be combined (multi constellation) for improving the satellite geometry. By adding the new constellation, the number of satellites visible increases to provide reliable PNT services even in urban canyons [7, 8]. An increased number of satellites in multi constellation offers better geometry [9].

TABLE I. MATHEMATICAL EXPRESSIONS AND SIGNIFICANCE OF VARIOUS DOPS

S.No	DOP	Mathematical expression	Significance
1	GDOP	$GDOP^2 = PDOP^2 + TDOP^2$	Provides accuracy degradation in 3D position and time
2	PDOP	$PDOP = \frac{\sqrt{\sigma_E^2+\sigma_N^2+\sigma_U^2}}{\sigma} = \sqrt{D_{11}+D_{22}+D_{33}}$ $PDOP^2 = HDOP^2 + VDOP^2$	Provides accuracy degradation in 3D position
3	TDOP	$TDOP = \frac{\sigma_T}{\sigma} = \sqrt{D_{44}}$	Provides accuracy degradation in time
4	HDOP	$HDOP = \frac{\sqrt{\sigma_E^2+\sigma_N^2}}{\sigma} = \sqrt{D_{11}+D_{22}}$	Provides accuracy degradation in horizontal direction
5	VDOP	$VDOP = \frac{\sigma_U}{\sigma} = \sqrt{D_{33}}$	Provides accuracy degradation in vertical direction

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Global Navigation Satellite System and Augmentation

K C T Swamy

Knowing about Global Navigation Satellite System (GNSS) is imperative for engineers, scientists as well as civilians because of its wide range of applications in various fields, including personal and vehicle navigation, aviation, defense, transportation, science, security, telecommunication, and survey. Global availability of signal and continuous service has made GNSS technology popular with a large number of users. This article covers various aspects of GNSS/GPS like architecture, working principle, signal structure and augmentation (GAGAN). The article also covers the Indian Regional Navigation Satellite System (IRNSS) and its potentials.

Dr. K C T Swamy is an Associate Professor in ECE at G Pullaih College of Engineering and Technology, Kurnool, Andhra Pradesh. His research interests are global navigation satellite system and antennas. He has been carrying out research in the area of GNSS since 2010 and has published papers in reputed journals and conference proceedings.

1. Introduction

Global Navigation Satellite System (GNSS) is a generic name given to a group of several satellite constellations such as the Global Positioning System (GPS), GLObal NAvigation Satellite System (GLONASS), Galileo, and Compass. The satellite constellations (navigation satellites) broadcast their positions and timing data on radio frequencies continuously under all weather conditions. GNSS receiver determines its own location coordinates by capturing the radio signals transmitted by the navigation satellites. The first worldwide satellite navigation system – GPS – was developed by the US Department of Defense (DoD) for military purposes. Later, GPS found several applications, and today it has become an essential navigation technology. The second fully operational global satellite navigation system is Russia's GLONASS. However, the accuracy of standalone GPS, which is limited by several errors is not sufficient to meet the safety requirements of real-life applications such as critical airborne applications including missile guidance and tracking. To meet this required accuracy, errors need to be reduced or eliminated by

Keywords
Global Navigation Satellite System, GPS, Indian Regional Navigation Satellite System, GLONASS, Galileo, Compass, GAGAN.

Detection of Glaucoma using Adaptive Neuro Fuzzy in DWT Domain

N. Ramamurthy, KCT Swamy, G. Ramarao, Molla Riyaz Pasha

Abstract— Glaucoma is that the second leading reason for loss of vision within the world.Examining the pinnacle of the ratio of cup to disc is extremely vital for eye disease diagnosis. This research work provides segmentation technique to calculate the disc and cup geometrical parameters mechanically and accurately. These techniques facilitate professionals with designation and observation eye disease by providing them with clear and correct information concerning the optic nerve headstructure. The individuality of this paper is in demonstrating the segmentation methodology by using adaptive neuro fuzzy algorithms for thsegmentation.

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1. INTRODUCTION

The eye decease Glaucoma, now a days is one of the most dangerous eye deceases that damages the human eye sight. As per so many surveys, the Glaucoma is the world's second leading decease which causes blindness.By the year 2020, the glaucoma effected patients may increase further.Early detection of Glaucoma can prevent its progress and minimize loss of eye sight. Based on the models of images, many options of the structures of retina, like associate in nursing eyecup,optic disc, the second cranial nerve head papillary atrophy, and retinal fiber layer, got to be discovered for eye disease detection. [1]. Glaucoma damages the potic nerve by reducing retinal neurons as a result blind spots develop in the eye[2].Some of the proposed methods for disc segmentation are template based mostly technique,pixel classification technique and circular Hough remodel area unit accustomed model the disc boundary due to their procedure potency. From almost all the clinical studies it is clear that a disc incorporates a rather oval kind with the diameter of vertical axis being 7%-10% longer than the diameter of horizontal sxis.The utilization of machine-driven diagnostic tools is fascinating to reduce sound judgment and build the diagnosing sturdy and consistent. Color structure imaging has emerged because the most well-liked procedure for comprehensive large-scale retinal illness screening because of their easy acquisition and smart visibility of retinal structures. [3].The human eye is sown in figure (1.1).

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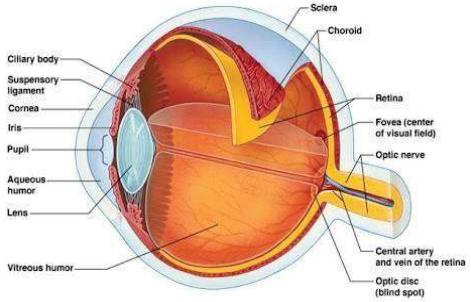
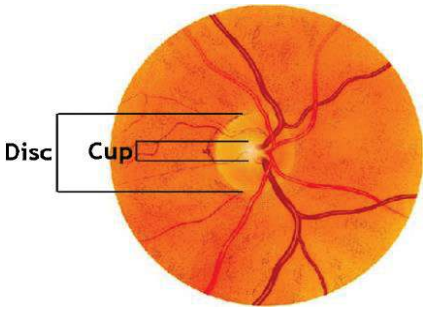


Figure(1.1): Human Eye



Figure(1.2): Disc and Cup of fundus Image

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Analysis of Multi-Frequency Multi-GNSS Real-Time Signal Observations Acquired by Septentrio PolaRx5 Receiver Station

Dr. K.C.T. Swamy, Dr. N. Ramamurthy, Pasuluri Bindu Swetha, M.Riyaz Pasha

Abstract*— Global Navigation Satellite System (GNSS) constellations such as Global Positioning System (USA), GLONASS (Russia), Galileo (European Union), BeiDou (China) transmit radio signals continuously on multiple frequencies for PNT applications on or above the globe. On the other side IRNSS(India) and QZSS (Japan) are the regional navigation systems with limited service area. The combination of multiple constellations with quality signals improves robustness and stability of position,navigation and time measurements. Hence, this research work investigates signal quality to identify strong/ important signals and geometry of the satellites for the combined use of global and regional constellations over the Indian region. Real-time signal observations of multiple GNSS were collected by 'Septentrio PolaRx5' receiver stations installed at GPCET, Kurnool (15^0.47'N, 78^0.04'E). From the results, it is found that the user over this region can receive signals from a minimum of 60 satellites with Position Dilution of Precision (PDOP) value less than unity.

***Index Terms*— multi-GNSS, DOP, Carrier to noise ratio**

I. INTRODUCTION

Satellite based navigation system is a more powerful technique or approach for precise Position, Navigation and Time (PNT) estimation. At present two systems, namely Global Positioning System (GPS) of USA and GLObal NAvigation Satellite System (GLONASS) of Russia are fully operational [1]-[2]. Galileo of European Union (EU) and BeiDou of China are under development. All these four systems are meant for PNT services at anywhere over the entire globe. In addition to these global systems, India and Japan have been developing their own satellite navigation systems, namely Indian Regional Navigation Satellite System (IRNSS) and Quasi-Zenith Satellite System (QZSS) with limited service area confined to their geographical region and surroundings [3]-[4]. Therefore, users over the Indian subcontinent get signals from GPS, GLONASS, Galileo, BeiDou, IRNSS and one or two satellite signals from QZSS at all the time. Various GNSS signals which could be available over the Indian Latitude are listed in the Table I [5]. IRNSS constellation consists of 4 Geosynchronous and 3 geostationary satellites to transmit signals on L and S bands for position, navigation and time applications over the India [6]. However, in urban areas and dense foliage environment, GNSS and regional constellation signal strength decreases and sometimes receiver gets insufficient number of satellites in view to achieve good Dilution of Precision (DOP). Moreover, continuity of the service is also being interrupted due to the insufficient number of satellites. GNSS signal strength can be measured in terms of carrier-to – noise density ratio (C/No) using the following mathematical expression given in equation (1) [7],

Table I. Signals and frequency bands of multiple GNSS constellation [12]-[17]

Constellation	Signal	Frequency Band /Frequency (MHz)	No. of Satellites in operation
GPS	L1 C/A L1 P(Y) L2 P(Y) L2C L5	L1/1575.42 L2/1227.60 L5/1176.45	31
GLONASS	L1 C/A L1 P L2 P L2 C/A L3	L1/1602+k*9/16 k=-7……+12 L2/1246+k*716 L3/1202.025	24
Galileo	L1 BC E5a E5b E5 E6BC	L1/1575.42 E5a/ 1176.45 E5b/1207.14 E5/1191.795 E6/1278.75	18
BeiDou	B1 B2 B3	B1/1561.098 B2/1207.14 B3/1268.52	17
IRNSS	L5 S	L5/1176.45 S/2492.028	07
QZSS	L1 C/A L2 C L5	L1/1575.42 L2/1227.60 L5/1176.45	04

$$C/N_0\,(dB-Hz) = C-(N-BW)$$

$$C - N_0 = SNR + BW \qquad (1)$$

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PAPR Reduction by using Cooperative PTS for SFBC MIMO-OFDM Systems

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Abstract— Multiple input multiple output (MIMO) orthogonal frequency division multiplexing (OFDM) system has been receiving a great attention for high-data-rate transmission. MIMO can be used to improve the performance and increase the capacity of wireless communication systems. OFDM is a popular technology and has been adopted for many new and emerging broadband communication systems including wireless LAN, WIMAX, Digital Video broadcasting and 4G mobile systems. MIMO-OFDM suffers from high PAPR, this demands expensive linear amplifiers with wide dynamic range. In MIMO-OFDM systems, a straightforward way for PAPR reduction is to apply existing techniques separately on each transmit antenna, then the overall PAPR reduction is obtained. For orthogonal frequency division multiplexing (OFDM) system, several Peak-to-average power ratio (PAPR) reduction schemes have been presented in recent years. The conventional partial transmit sequences (PTS) scheme can be applied to each transmitting antenna directly to reduce the PAPR of MIMO-OFDM systems, but it has high computational complexity. To better handle dispersive channel, Space frequency block code (SFBC) MIMO-OFDM is preferred. SFBC is a coding technique used for transmission diversity. In this the antennas are separated by space and subcarriers are separated by frequency and the coding is performed in a block.

Key words: MIMO, OFDM, PAPR, WIMAX, SFBC, MIMO-OFDM

I. INTRODUCTION

OFDM is a popular technology and has been adopted for many new and emerging broadband communication systems including wireless LAN, WIMAX, Digital Video broadcasting and 4G mobile systems. In these techniques, the transmission frequency band is divided into a large number of subcarriers that are orthogonal to each other. The information is then divided onto multiple lower speed signals that are transmitted simultaneously on different frequency in parallel. MIMO is the use of multiple antennas at both the transmitter and receiver to improve communication performance. OFOM combined with MIMO technology is an attractive candidate for modern mobile communication systems due to its ability to support high data rates, large capacity, and robustness to multipath fading. Recently, Multiple input multiple output (MIMO) orthogonal frequency division multiplexing (OFDM) with space frequency block code (SFBC) has attracted increasing attention because it is robust to time selective fading channels. However, SFBC MIMO-OFDM signal also inherit disadvantages from OFDM techniques e.g. sensitivity to synchronization errors and high peak-to-average power ratio (PAPR).Therefore many PAPR reduction methods have been introduced. Especially, the signal scrambling methods such as partial transmit sequence (PTS), selective mapping, polyphase interleaving and inversion, cross-antenna translation and partial shift sequence method. All the PAPR reductions methods have some drawbacks like increase in transmit power, high bit error rate (BER), high computational complexity, reduction in bit transmission rate of the system and high peak-to-average power ratio. In this paper, a co- operative partial transmit sequence (Co-PTS) is proposed for SFBC MIMO-OFDM. In Co-PTS, alternate optimization and spatial sub block circular permutation are combined the use of alternate optimization results improvement in performance for PAPR reduction.

II. EXISTING METHOD

In the past few years, many researchers have been working on the reduction of peak-to-average power in MIMO-OFDM systems using the different techniques. Some of the existing techniques are clipping, selective mapping, poly phase interleaving, partial transmit sequence etc. However, these techniques have some drawbacks like increase in transmit power, high bit error rate (BER), high computational complexity, reduction in bit transmission rate of the system. A straightforward way for PAPR reduction is to apply existing techniques separately on each transmit antenna, then the overall PAPR reduction is obtained.

There are many methods for reduction of peak-to-average power (PAPR). Reduction of PAPR is a significant factor in MIMO-OFDM systems. It includes the measurement of peak power, rms power, average power, bit error rate, data transmission rate. The methods for PAPR reduction can be classified into two categories with respect to the computational operation applied on the signals.

A. Clipping

Clipping is one of the techniques to reduce PAPR. In this technique the peak amplitude is reduced which in turn reduces the peak power and hence the overall PAPR can be reduced. Clipping is of two types: positive clipping and negative clipping. In positive clipping the positive peak amplitude is reduced and in negative clipping the negative peak amplitude is reduced. This technique has several disadvantages:

1) The performance of BER could be affected negatively due to the in-band distortion caused by clipping.
2) Also out-of-band radiation usually appears with clipping technique that could disturb the adjacent channels.

B. Selective Mapping

Selective mapping is a distortion less technique that can reduce PAPR efficiently without increase in power requirement and data rate loss. In this technique different signals are generated to represent same information and the

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Crosstalk Noise Avoidance and Low Power Coding for VLSI Circuits

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Abstract: In this project a coding scheme is proposed for avoiding crosstalk, reducing power consumption. System-on-Chip (SoC) buses are associated with a delay problem, power problem and reliability problem. Capacitive crosstalk and high power consumption due to various capacitances are the major causes of this problem. Theencoder and decoder modules are designed to avoid these problems using Verilog Simulation.

Keywords*: Bus-invert, Crosstalk, Correlated switching, Forbidden Pattern.*

I. INTRODUCTION

SOC defines the fabrication of all the computer components on a single silicon chip. This in turn reduces the development cycle, increase product functionality, performance and quality.Modems, mobile phones, DVD players, televisions, iPods are examples of integration. Integration or fabrication of all componentsneeds analog as well as digital circuits, processors and firmware[1], forexample, the single-chip mobile phone. The main advantages of a single chip fabrication is low cost, decreased size, reduced power consumption[2].Due to long buses, the amount of power dissipated in digital circuits. Interconnect width and spacing reduce due to DSM technology in CMOS, which in turn increases the inter-wire capacitance and interconnect resistance[3].

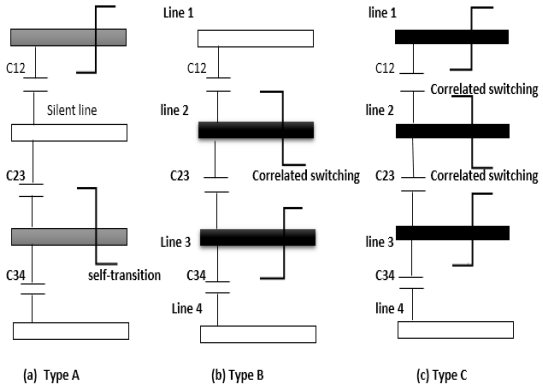
The coupling capacitance is significant in deep sub-micron than compare with the bulk capacitance[4]. Hence the wire delay becomes more due to capacitive crosstalk on adjacent wires. This delay is referred to as the crosstalk delay; coding techniques have been proposed to avoid crosstalk delay[4].

II. PREVIOUS WORK

Crosstalk is defined as the interference of one signal with another signal.Due to the capacitive coupling between the two wires on-chip crosstalk occurs[5]. Crosstalk is increases when the adjacent lines are switching opposite direction simultaneously. Crosstalk in the adjacent wires causes timing violations and extra power dissipation[6].

The Significant delay and Loss of signal integrity are two problems due to crosstalk.Significant delay occurs due to misinterpretation of signals between the lines.The timing and quality of the signal is not in good condition at destination due to the loss of signal integrity.When two adjacent wires are switching opposite directions simultaneously called correlated switching which is shown in below figure.For Example, the adjacent wire (aggressor) is switching from low to high while a victim wire is switching from high to low at the same time.

The Different possibilities of signal transitions in a data bus is analyzed in Figure 1.



In type A transition (Figure 1(a)), there is no correlated switching and the cross-coupling capacitance is minimum. In type B transition (Figure 1(b)), there is one correlated switching. In this case, the effect of coupling capacitance between line 1 and line 2 increases twice due to Miller effect. Theworst possible case scenario is correlated switching between its neighboring wires in type C. Coupling capacitance is increases due to a Miller effect.The Miller effect is defined by increasing the equivalent input capacitance of an inverting voltage amplifier due to a capacitance connected between two gain-related nodes, one on the input side of an amplifier and other at output side.

III. CROSSTALK AVOIDANCE CODING AND DECODING

A. Forbidden Pattern Based Crosstalk Avoidance coding

The patterns "101" and "010" are forbidden patterns. If there is no forbidden pattern in any three consecutive bits is called *Forbidden-pattern-free*(FPF)vector. For example, 01100110 and 11000110 are FPF vectors, 11010011 and 11111010 are not FPF vectors.

For the particular encoding shown in Table 1, the logic functions are:

$q1 = d1$ --------- (7)
$q2 = (d2d3 + d2\overline{d4}) \oplus d1$ --------- (8)
$q3 = (d2 + d3\overline{d4}) \oplus d1$ --------- (9)
$q4 = (d3 + d2d4) \oplus d1$ --------- (10)
$q5 = d4 \oplus d1$ --------- (11)

Consider a 16-bit bus and the input is divided into four bit groups. The data of each group is encoded using a 4 to 5 encoder.

INPUT	OUTPUT
0000	00000
0001	00001
0010	00110
0011	00011
0100	01100
0101	00111

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Hardware Implementation of Automated Home Security System using Spartan 3 FPGA

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***Abstract*—**Remote sensing has many applications in real life; One of these applications is for home automation. Spartan 3 FPGA is used for providing security with home automation using gas sensor and fire sensor. The proposed System monitors the leakage of gas and existence of fire. The system has been designed and implemented in hardware using VHDL language and Xilinx Spartan 3E FPGA.

***Index Terms*—**FPGA, Home Automation, Fire sensor, Gas Sensor.

I. INTRODUCTION

One of the most effective technologies for home safety is a security system. These systems monitor the most critical areas of the house in order to detect intrusions or other anomalies that might otherwise go unnoticed. During recent past, a number of systems were introduced for security measurements based on wired networks. In literature, researchers suggested a number of security systems based on new technologies like GSM (Global System for Mobile communication), USN (ubiquitous sensors network) and implemented through FPGA (field programmable gate arrays), DSP (digital signal processor), and MCU (microcontroller unit). A Java based home automation system is developed. An embedded board physically connected all the home automation devices and, through integration with a personal computer (PC) based web server, provided remote access to the system. The use of Java technology, which incorporates built-in network security features, produces a secure solution. However, the system requires an intrusive and expensive wired installation and the use of a high end PC [1]. Introduced a Bluetooth based home automation system, consisting of a primary controller and a number of Bluetooth sub-controllers. Each home device is physically connected to a local Bluetooth sub controller.

The home devices communicate with their respective sub-controller using wired communications. From the sub-controller all communications are sent to the primary controller using wireless communications. It is desirable for each home device to have a dedicated Bluetooth module. However, due to the fiscal expense of Bluetooth technology, a single module is shared amongst several devices. This architecture reduces the amount of physical wiring required and hence the intrusiveness of the installation, through the use of wireless technology.

Home Automation systems are commonly found in electronic form today. A system of sensors is connected to a controller, which in turn connects to a device. Remote sensing has many applications in real life; One of these applications is for home automation. We are introducing the design of a controller with low cost and large number of inputs and outputs that can be used either for controlling or sensing the remote devices. The system is based on designing and implementing an FPGA chip .The hardware of the controller chip has been designed using VHDL and has been tested using Xilinx FPGA. First a synthesizable VHDL code has been written and simulated using Xilinx ISE 10.1i tools, and then implemented on a Xilinx Spartan 3 FPGA.

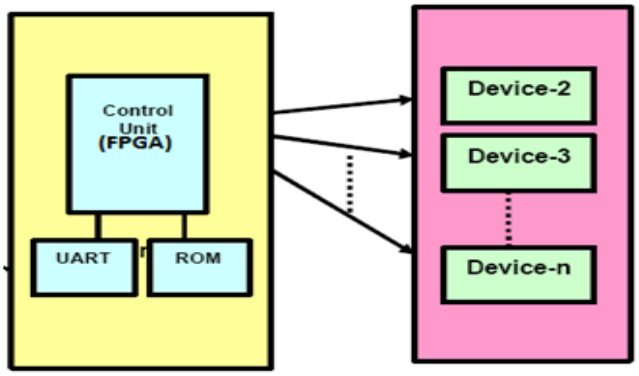

Figure 1 Block diagram

II. PROPOSED SYSTEM

The low remote monitoring system can be implemented using programmable logic devices (PLDs).PLDs allow fast deployment of prototypes and the design of complex hardware system using FPGA. The system contains low cost components easily available which cuts down the overall system cost. Due to low cost components used it will be useful to everyone.It is also a wireless mode of communication but it works very efficiently and have high flexibility.

The architecture of the system mainly consists of three main components as shown in Figure, the controller, and the remote devices and sensors. The controller connected to the different types of sensors and devices. An interface circuit has been designed which includes sensors as input devices and 220 volt lamp as an output devices which represents the controlled devices. The controller consists mainly from three components: The Control Unit (CU), ROM, and UART (Universal Asynchronous Receiver Transmitter). The VHDL code also includes a communications.

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ASIC Implementation of Low Power Efficient Crosstalk Analytical by LUT-BED-CLA

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Abstract: Nowadays, crosstalk noise is one of the major problems in VLSI design circuits. While transmitting the input information, the noise occurs in the channel. After receiving the information, the input data affect by the crosstalk. In this paper, Look Up table with Bus Encoding Decoding Carry Look Ahead adder (LUT-BED-CLA) is introduced to eliminate the crosstalk noise in the receiver side. Encoder block consists of transition detector, Type-A detector, Type-B detector, XOR stack, and Latch. Encoder output is given to the crosstalk model circuit, which is implemented in Cadence virtuoso. This crosstalk model output connects to decoder input. Decoder block contains an XOR circuit to retrieve the original data, which is given to the input of the encoder. From the encoder and decoder, the area, power, and delay was evaluated. Instead of using normal adder, CLA adder was used in counter which gave better performance. Form the crosstalk analysis, cross talk output was given to the decoder input. Even though, decoder output gave same output which was given to the encoder input. This entire work implemented in Verilog to evaluate ASIC performance for 180nm and 45nm technology. In ASIC 180nm technology, 26.3% of area, 39.67% of power, 55.53% of APP, and 26.3% of ADP is minimized in LUT-BED-CLA as well as 45nm technology, 34.4% of area, 24.1% of power, 38.62% of delay, 50.11% of APP, and 59.6% of ADP reduced in LUT-BED-CLA method compared to existing method.

Keywords: Bus encoding decoding, Crosstalk, Cadence virtuoso, Look up table, 180nm and 45nm.

1. Introduction

In VLSI fabrication process, Deep Sub-Micrometer System-On-Chip (DS-SOC) becomes a global trend because it's having desired advantages such as high-speed, efficient communication, and etc. But, inter-wire Crosstalk (IWC) is one of the major challenges in VLSI technology [1]. Normally, crosstalk is a type of noise which is introduced by unwanted coupling between two neighbouring buses [2]. In Energy Consumption and Delay (ECD) models, the entire crosstalk bus is represented as a function of energy consumption that is used to determine the delay and the speed of the bus [3]. Many authors have introduced different types of crosstalk Reduction Technique (CRT) such as eliminating specific data transition patterns, reducing the energy consumption, coding technique and minimizing the delay [4]. To eliminate the crosstalk, a Simple Delay Penalty (SDP) technique is introduced in passive shielding inserts passive (e.g., grounded) and shield wires between adjacent active data lines [5]. This technique is used to reduce the bus delay. But, it requires doubled a number of wires to create a bus without any loss [6].

The Crosstalk Avoidance Coding(CAC) technique has given the promising solution in low power activity such as 1) low-power buses through Self and Coupling Transition (SCT) activity reduction (Low-Power Codes(LPC)) [7 - 9], 2) Improved reliability in low-swing buses (Error-Control Codes (ECCs)) [10, 11]. The most of the CAC reduction existing systems have very high complexity like more power consumption, cross-talk noise. For example, the Coder-Decoder (CO-DEC) technique has a complexity in the size of the bus [12]. Many researchers have found the different way of the CAC in CO-DEC to solve the crosstalk problem. In

Design and Implementation of Low-Power Memory-Less Crosstalk Avoidance Codes Using Bit-Stuffing Algorithms

Battari Obulesu and P. Sudhakara Rao

Abstract The crosstalk problems of interconnects are one of the main problems in DSM of switching network high-speed buses. To avoid the problem of crosstalk, we provided the crosstalk avoidance codes (CACs) to avoid the crosstalk problem. In this chapter, we will traverse and then produce FTC that should not have opposed directions of transitions, any direction of n number of neighboring wires in the channel. In this, we proposed a new method called a low-power algorithm for sequential and parallel bit stuffing. The low-power algorithm is for sequential and parallel bit stuffing by just inserting inverters (NOT gate) by avoiding the opposite transitions in the channel. We show the results of both algorithms (serial and parallel) of bit-stuffing (bus encoding) simulations and bit-removing (bus decoding) simulations using Verilog HDLs and synthesis and implement in FPGA. Compared to sequential bit stuffing, algorithms are somewhat more rapidly fast than the bit stuffing. And also we are finding the coding rate of both algorithms. The algorithms achieved not only higher coding rates but also lower power. Finally, we can extend the bit stuffing encoding system for generating forbidden transition codes (FTC) that avoid the two transition patterns, "$01 \rightarrow 10$" and "$10 \rightarrow 01$", on any four adjacent wires.

Keywords CACs · Bit stuffing · FTC · Bus encoding and bus decoding Switching networks · Inverters

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Design and Implementation of Crosstalk Avoidance Using Bit-Stuffing Algorithms in VLSI Circuits

B Jyothi and B Obulesu***

Crosstalk is one of the major problems in VLSI circuits of high-speed buses. To eliminate this problem, several types of coding techniques have been proposed in the literature. The paper aims at avoiding the opposite transition on any two adjacent wires. Sequential bit-stuffing algorithm and parallel bit-stuffing algorithm are studied. The problem in parallel bit-stuffing algorithm is that the code rates for even-numbered wires are significantly lower than those of odd-numbered wires. To solve the uneven rate problem, the paper considers parallel bit-stuffing algorithm with rate balancing, where padding of additional bits on odd-numbered wire with the help of 2×2 crossbar switch with bar state and cross state is done. By doing so, even-numbered code rate becomes equal to odd-numbered code rate, then code rates become balanced. Parallel bit-stuffing algorithm with rate balancing not only achieves higher coding rate but also lowers power consumption.

Keywords: Bit-stuffing, Rate balancing, High-speed switching, Crosstalk

Introduction

Many VLSI circuits exchange information from one device to another device using high-speed buses. To reduce the crosstalk problem, several coding techniques are being used. These techniques are used to avoid opposite transition on any two adjacent wires, which mainly occurs due to sending different bits in VLSI circuits. This problem mainly occurs in the high speed buses of the VLSI circuits. The coding schemes that avoid opposite transition on any two adjacent wires are proposed by various authors (Ma and He, 2001; Moision *et al*., 2001; Victor and Keutzer, 2001; Sotiriadis, 2002; Mutyam, 2004; Sridhara and Shanbhag, 2005; Hsieh *et al.*, 2007; and Duan *et al.*, 2008).

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Implementation of Crosstalk Avoidance and Low Power Coding Scheme for SoC

D Chakradhar and B Obulesu***

The paper proposes a coding scheme for avoiding crosstalk and reducing power consumption. System-on-Chip (SoC) buses are associated with delay, power and reliability problems. Capacitive crosstalk and high power consumption due to various capacitances are the major causes of this problem. Verilog simulation of encoder and decoder modules are designed to avoid these problems.

Keywords: Bus-invert coding, Crosstalk, Correlated switching, Forbidden Pattern Condition (FPC)

Introduction

System-on-Chip (soC) is defined as the fabrication of all the computer components on a single silicon chip (Pasricha and Dutt, 2008). This in turn reduces the development cycle and increases product functionality, performance and quality. Modems, mobile phones, DVD players, televisions and iPods are the examples of integration. Integration or fabrication of all components needs analog as well as digital circuits, processors and firmware, for example, single-chip mobile phone. The main advantages of single chip fabrication are low cost, decreased size and reduced power consumption. Due to long buses, a large amount of power is dissipated in digital circuits. The interconnect width and space reduction due to DSM technology in CMOS in turn increases the interwire capacitance and interconnect resistance.

The coupling capacitance is significant in deep submicron compared with the bulk capacitance. Hence, the wire delay becomes more due to capacitive crosstalk on adjacent wires. This delay is referred to as crosstalk delay; coding techniques have been proposed to avoid crosstalk delay.

Literature Review

Crosstalk is defined as the interference of one signal with another signal. Due to the capacitive coupling between the lines, on-chip crosstalk occurs. Crosstalk increases

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Geomagnetic Storms: Impact on GPS/GNSS signal delay over the low latitudes

This article demonstrates TEC results at low latitude Indian region, Bangalore (13.020 N, 77.570 E) and Hyderabad (17.410 N, 78.550 E) on the days of high intensity storms (October 29th, 2003), medium intensity storms (March 17th, 2013) and low/no intensity storms (July 05th, 2018

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Now a days more than hundred Global Navigation Satellite System (i.e. GPS, GLONASS, Galileo, Beidou, and IRNSS) signals are available everywhere all the time at free of cost. Hence, dependency on the GNSS technology has been increasing with more number of applications in almost all the fields for Position, Navigation and Time (PNT) estimation. The accuracy of GNSS in PNT estimation is being limited by various reasons one among them is dynamic nature of the ionosphere propagation medium which is extended approximately from 60-1000 Km above the earth surface.

One of the reasons for the dynamic nature of the ionosphere is Geomagnetic storms that occur in the interplanetary space. Moreover, an equatorial phenomenon is additional threat to the signals in low latitudes like India. A Geomagnetic Storm is a sudden and temporary disturbance of the Earth's Magnetosphere caused by changes in the solar wind and interplanetary magnetic field (IMF). The disturbance in the interplanetary medium that drives the storms are due to a solar coronal mass ejection (CME) or a high speed stream (co-rotating interaction region or CIR) of the solar wind originating from a region of weak magnetic field on the Sun's surface.

Also, the frequency of storms changes with Sun Spot Number (SSN). Most of the storms that occur during the solar maximum period are CME driven whereas the storms of solar minimum period are CIR driven. Storms lead to many changes in the plasma, magnetic and electric fields and currents in the Earth's magnetosphere. However, the space weather description and characterisation of geomagnetic storm can be done by measuring the Disturbance Storm time (Dst) index and planetary geomagnetic disturbance index (Kp), Sun Spot Number (SSN), Solar activity, interplanetary magnetic field (IMF) etc. In order to demonstrate and describe impact of the Geomagnetic Storms, three days of different storm intensity levels have been chosen with the Kp index of $4 < Kp < 9$ (29-10-2003), $2 < Kp < 7$ (17-03-2013) $1 < Kp < 5$ (05-07-2018). SSN for the corresponding days is 330, 126 and 0 respectively.

The interplanetary magnetic field direction (Bz) towards the south with values of -10 nT and lower are the indicators for the geomagnetic storm. Figure 1, shows IMF direction (Bz) for different storm days. On October 29th 2003, the geomagnetic storm began to develop at 5:58 UTC when the Bz dropped suddenly from 0 to -35.51 nT and within five minutes it turned to Bz: 5.07 nT at 6:03 UTC. Further it reaches minimum at 6:32 UTC, Bz: -53.85 nT and it reaches positive peak Bz: 34.86 nT at 6:44 UTC. The Bz value remains negative from 18: 11 UTC to 23:59 UTC. Also, the flares occurred on that day are C, M, and X type, among all more intense one is X10.0 flare that happened around 21:00 UTC and a good correlation could be observed between IMF and solar activity. For March 17,

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Estimation and Analysis of ROT and ROTI Variations at Low Latitude Region during HAS (2014) in India

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Abstract: The ionosphere is an important layer in GNSS applications as the signals passes through this layer travelling from satellite to earth station receiver. The ionosphere layer results with the predominant and irremovable error (ionospheric time delay) due to its dispersive nature. This error can be directly measured and decreased using dual frequency GNSS receivers. The performance of navigation systems is degraded due to gradients and irregularity in the ionosphere layer caused by solar activity. This paper focuses in estimating and analyzing the TEC fluctuations over low latitude international GNSS services (IGS) receiver station HYDE (lat/lon: 17.41º N/78.55º E) for HSA year 2014. Initially, the data is collected from the SOPAC (Scripps Orbit and Permanent Array Center), TEC is estimated using pseudo ranges measured on both L1 and L2. Using this data, ROTI (rate of TEC index) is estimated which is used to analyze the TEC fluctuations. The strong TEC fluctuations are observed at low latitude over Indian region in HSA year 2014.

Keywords: *Total electron content (TEC), Rate of TEC (ROT), Rate of TEC index (ROTI).*

I. INTRODUCTION

The ionosphere is important because it reflects and modifies radio waves used for communication and navigation.The **Ionosphere** is part of Earth's upper atmosphere, between 60 and about 1000 km where Extreme UltraViolet (EUV) and x-ray solar radiation ionizes the atoms and molecules thus creating a layer of electrons. Solar phenomena, such as flares, and changes in the solar wind and geomagnetic storms effect the charging of the ionosphere. Since the largest amount of ionization is caused by solar irradiance, the night side of the earth, and the pole pointed away from the sun (depending on the season) have much less ionization than the day side of the earth, and the pole pointing towards the sun. Sunspots change continuously, but individual spots may persist for only a few hours or for many weeks and even months. The total number of sunspots has long been known to vary with an 11-year period known as **the solar cycle**. The peak of the solar cycle is known as solar maximum and the valley of the cycle is known as solar minimum. The ionosphere gradients and irregularities have impacts on Radio Communication, Radio Navigation (GPS) and Satellite Communication.

There are several ways in which space weather impacts GPS function. GPS radio signals travel from the satellite to the receiver on the ground, passing through the Earth's ionosphere. The charged plasma of the ionosphere bends the path of the GNSS radio signal,and delays the signal. The positioning of the receiver is done by the trilateration principle, where pseudo ranges are measured using propagation delay of the GNSS signal.The accuracy of the positioning information of GNSS is degraded by the ionosphere delays.The ionosphere layer effects with the predominant and irremovable error (ionospheric time delay) due to its dispersive nature. This error can be directly measured and decreased using dual frequency GNSS receivers. However, the GNSS signal delays because of irregularities and gradients occurred in the ionosphere decreases the performance of navigation systems.

Dual frequency GNSS systems can provide position information more accurate than single frequency. In systems the two different GPS signals are used to better characterize the ionosphere and remove its impact on the position calculation. But when the ionosphere becomes highly disturbed, the GPS receiver cannot lock on the satellite signal and position information becomes inaccurate.

Geomagnetic storms create large disturbances in the ionosphere. The currents and energy introduced by a geomagnetic storm enhance the ionosphere and increase the total height integrated number of ionospheric electrons, or the **Total Electron Count (TEC).** GNSS cannot correctly model this dynamic enhancement and errors are introduced in the position calculations. This usually occurs at high latitudes, though major storms can produce large TEC enhancements at mid-latitudes as well.

Near the Earth's magnetic equator there are current systems and electric fields that create instabilities in the ionosphere. The instabilities are most severe just after sunset. These smaller scale (tens of kilometers) instabilities, or bubbles, cause GNSS signals to scintillate. Near the equator, dual frequency GPS systems often lose their lock due to "ionospheric scintillation". Ionospheric scintillations are not associated with any sort of space weather storm, but are simply part of the natural day-night cycle of the equatorial ionosphere.

The change in the path and velocity of radio waves in the ionosphere has a big impact on the accuracy of satellite navigation systems such as GPS/GNSS. Neglecting changes in the ionosphere TEC can introduce tens of meters of error in the position calculations.The velocity of radio waves changes when the signal passes through the electrons in the ionosphere. The total delay suffered by a radio wave propagating through the ionosphere depends both on the frequency of the radio wave and the TEC between the transmitter and the receiver. At some frequencies the radio waves pass through the ionosphere. At other frequencies, the waves are reflected by the ionosphere.

The Total Electron Content (TEC) is the total number of electrons present along a path between a radio transmitter and receiver. Radio waves are affected by the presence of electrons. The more electrons in the path of the radio wave, the more the radio signal will be affected. For ground to satellite

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Statistical Behavior of Ionosphere F_2-layer Critical Parameters Based on IRI-2016 Model for Electromagnetic Wave Propagation Applications

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Abstract- Electromagnetic (EM) signals radiated towards the Earth by the antennas mounted on communication and navigation satellites are being impacted by the ionosphere medium free electron density (N_e)in terms of reflection, refraction, Faraday rotation and scintillations etc.Additionally, N_e variability creates unpredictable dynamics in the behaviorofF_2 layer communication parameters such as; critical frequency (foF_2), height of maximum ionization (h_mF_2) and maximum electron density (N_mF_2) which are useful in frequency planning and radio link establishment. This paper presents N_e,h_mF_2, N_mF_2 and foF_2 statistical behavior analyzed at different locations across the India during rising phase of solar cycle 24 (2009-2011). Interestingly, the results revealed that h_mF_2, N_mF_2 and foF_2peaksreached to maximum value during spring (March and April) and autumn (September and October) equinox periods and the dynamics are more near the equator (i.e.Trivandrum (8.47^0N, 76.91^0E)).The statistical results obtained would be useful for further studies such as development of estimation and forecasting models.However, the accessibility of data required for this research work is made through International Reference Ionosphere (IRI)-2016 model due to unavailability ofexperimental data at various locations in India.

Keywords: *h_mF_2, N_mF_2 , foF_2, IRI-2016*

I. INTRODUCTION

Electromagnetic (EM) signal based navigation systems are being developed and deployed for various civilian, defense and aviation applications. At present, GPS of U.S.A Department of Defense (DoD) and GLONASS of Russian defense are providing services to civilians all over the world. Indian Space Research Organisation (ISRO) developed regional navigation system Indian Regional Navigation Satellite System (IRNSS) satellites signals also available with frequency L_5 =1176.45 MHz and S=2492.028 MHz in the air over the Indian sub continental region. Beside navigation, EM signals of microwave frequency range find many more applications including communication, astronomy, broadcasting, and weather forecasting. In all applications,receiver acquires ionosphere medium impacted EM signals. The upper layer of the ionosphere (i.e. F_2) is more responsible for impacts like group delay, phase advance, scintillations because it consists more number of free electrons and ions produced by the Sun's Ultra-Violet (UV) radiation. In low latitudes like India $N_e$enhanced by equatorial phenomena; Equatorial Ionization Anomaly (EIA), Equatorial Electrojet (EEJ) and Equatorial Spread-F (ESF) etc. Their occurrence is due to the interaction among plasma, the earth magnetic field and dynamo process produced electric field in the E and F-layers (Millward et al., 2001; Fesen et al., 2000; Rishbeth, 1997;Richmond, 1995). As a result, communication parameters of F_2-layer such as; height of maximum ionization (h_mF_2)critical frequency (foF_2) and peak electron density (N_mF_2) exhibit unexpected behavior. Therefore, the continuous studies need to be carriedout for understanding characteristic behavior of ionosphere medium in communication and navigation aspects. Studies over mid and high latitude regions were carried out and found that the diurnal behavior is anomalous (Yu et al., 2004; Pavlov and Pavlova, 2009). Also, it is reported that IRI model N_mF_2 and foF_2estimates are in good agreement with ionosonde measurements in middle and high latitude (Sezen et al., 2013). Further, it was expected that there could be an enhancement in irregularities of N_e, foF_2 and N_mF_2(Pezzopane, 2011). F_2-layer models in the context of HF communications can be found in (Yan et al., 2011; Barabashov et al., 2006). Also, ionospheric studies carried out with radar signals for measurement of electron density, multipath time delay and Doppler shift (Ma et.al., 2011; Chen et al., 2013).But, not much significant work is done for the Indian low latitude region.So, it is necessary to analyze the characteristic behavior of N_e, N_mF_2, h_mF_2 and foF_2 statistically during different solar activity periods for radio frequency planning and management of communication as well as navigation systems. This paper presents, estimation and analysis of N_e, h_mF_2, N_mF_2 and foF_2 statistical behavior over the different parts of Indian region during rising phase of solar cycle 24 (2009-2011). The data required for statistical study is

Smart Sensor Network based Industrial Parameters Monitoring in IOT Environment using Virtual Instrumentation Server

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ABSTRACT:

A remote monitoring and control are one of the most important criteria for maximizing the production in any industry. With the development of modern industry the requirement for industrial monitoring system is getting higher. This project explains the real time scenario of monitoring temperature and humidity in industries. National Instruments my RIO is used and results are observed on LabVIEW front panel and VI Server. The server VI program and client VI program is developed in block diagram for the two sensor data. This proposed system develops a sensor interface device essential for sensor data acquisition of industrial Wireless Sensor Networks (WSN) in Internet of Things (IOT) environment. By detecting the values of sensors like temperature, humidity present in the industrial area. The results are displayed on the web page. The data can be accessed with admin name and password. After logging into the web page the index of files is displayed. After restarting the RIO kit and initiate the deploying process the file the excel sheet will appear on the VI Server. This VI server is tested for its working, using a data acquisition web application using a standard web browser. The critical situation can be avoided and preventive measures are successfully implemented.

KEYWORDS: wireless sensor networks; virtual instrumentation; safety monitoring; Lab VIEW

INTRODUCTION

The environmental care has become one of the biggest concerns for almost every country in the last few years. Even though the industrial accident level has been increasing without any control in the last decades, the current situation in the industry towards more hazardous environment. Recently, the modern industries are demanding sophisticated instrumentation for monitoring and control of environmental risk parameters of the hazardous area .Human safety and property losses are the essential to maintain the equilibrium between industry and environments. Virtual instrumentation environment, offers an intuitive way for engineers and scientists to quickly deploy applications [6] for measurement and control in the form of Lab VIEW graphical programming language is used for program function design.

LITERATURE SURVEY

In recent years, keeping pace with most of the industrialized accident that occur in hazardous environment due to which the consequences may be very serious and generally cause damage to life, property and environment .Hazardous environmental safety and security can be most important for moral, legal, and financial reasons.

Design considerations focus on improving key areas such as: (1) sampling methodology; (2) context awareness; and (3) sensor placement.[3] this paper proposes an industrial environment monitoring server system for monitoring information concerning environment in industry utilizing Wireless Sensor Network (WSN) technology. [4] This paper surveys the needs associated with environmental

Detection of Glaucoma using Adaptive Neuro Fuzzy in DWT Domain

N. Ramamurthy, KCT Swamy, G. Ramarao, Molla Riyaz Pasha

Abstract— Glaucoma is that the second leading reason for loss of vision within the world.Examining the pinnacle of the ratio of cup to disc is extremely vital for eye disease diagnosis. This research work provides segmentation technique to calculate the disc and cup geometrical parameters mechanically and accurately. These techniques facilitate professionals with designation and observation eye disease by providing them with clear and correct information concerning the optic nerve headstructure. The individuality of this paper is in demonstrating the segmentation methodology by using adaptive neuro fuzzy algorithms for thsegmentation.

Index Terms—Optic Cup, Glaucoma,Optic Disc, Optic Nerve Head , Ratio of Cup to Disc and Adaptive Neuro fuzzy.

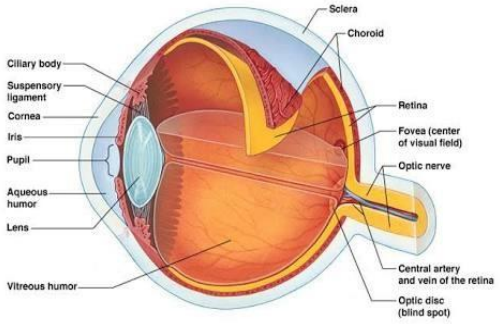
1. INTRODUCTION

The eye decease Glaucoma, now a days is one of the most dangerous eye deceases that damages the human eye sight. As per so many surveys, the Glaucoma is the world's second leading decease which causes blindness.By the year 2020, the glaucoma effected patients may increase further.Early detection of Glaucoma can prevent its progress and minimize loss of eye sight. Based on the models of images, many options of the structures of retina, like associate in nursing eyecup,optic disc, the second cranial nerve head papillary atrophy, and retinal fiber layer, got to be discovered for eye disease detection. [1]. Glaucoma damages the potic nerve by reducing retinal neurons as a result blind spots develop in the eye[2].Some of the proposed methods for disc segmentation are template based mostly technique,pixel classification technique and circular Hough remodel area unit accustomed model the disc boundary due to their procedure potency. From almost all the clinical studies it is clear that a disc incorporates a rather oval kind with the diameter of vertical axis being 7%-10% longer than the diameter of horizontal sxis.The utilization of machine-driven diagnostic tools is fascinating to reduce sound judgment and build the diagnosing sturdy and consistent. Color structure imaging has emerged because the most well-liked procedure for comprehensive large-scale retinal illness screening because of their easy acquisition and smart visibility of retinal structures. [3].The human eye is sown in figure (1.1).

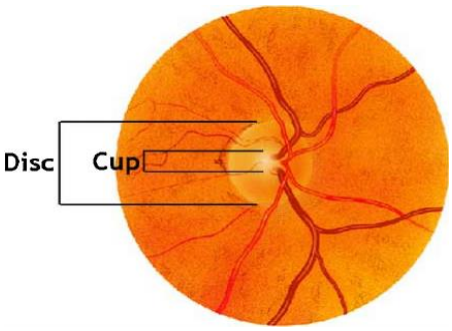
There are three different techniques to doagnise the Glaucoma more accurately.(1)"Evaluation of the intraocular pressure" (IOP) using Goldman tonometry, (2) "Evaluation of the visual field", and (3) "Evaluation of the optic nerve head damage" [4]. The optic disk is formed of more than one million neural structure cell axons .The relation between optic tract and cup and loss of visual view is obtained by examining the eyecup segmentation [5]. The point is split into 3 totally different areas: neuroretinal rim, the cup (central area), and typically parapapillary atrophy[6] . The cup-to-disc quantitative relation (CDR) is that the quantitative relation of the vertical diameter of the cup to the vertical diameter of the disc [7].

In [8], the authors straight a way obtained optic disk and calyculus victimization connected half labeling followed by two-dimensional figure .The cup and disc of fundus image of human eye are shown in figure(1.2)

In this paper, the adaptive neuro fuzzy method is proposed to detect the ratio of cup to disc more accurately. Color structure imaging has emerged because the most well-liked procedure for comprehensive large-scale retinal illness screening because of their easy acquisition and smart visibility of retinal structures.



Figure(1.1): Human Eye



Figure(1.2): Disc and Cup of fundus Image

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Optimizing the Effect of Cropping and Rotation Attacks on Watermarked Images using Back Propagation Neural Network in DWT Domain

Dr. N. Ramamurthy, Dr. K. C. T. Swamy, Gude Ramarao, H. Shravan Kumar

Abstract; Hiding an image in another image is the technique used for copy write protection. In this proposed work, the watermark is inserted into blue plane of the cover image, In this watermark extraction and embedding process, the back propagation neural network in conjunction with biorthogonal wavelets is utilized to improve the efficiency. The performance is tested by normalized correlation coefficient. The imperceptibility of the watermark is tested by cropping and rotation attacks effectively.

Keywords; Watermark, Wavelets, neural network, rotation, compression.

I. INTRODUCTION

Due to the quick and large development of transmission and additionally the widespread use of information superhighway, there is a want for economical, powerful and effective techniques to protect data [1]. Completely different watermarking techniques are developed in special and remodel domain strategies, however, in recent years; the watermarking techniques supported remodel domain ar developed to produce higher lustiness and physical property.

Digital Image watermarking techniques classified as private, semi private and public watermarking techniques. In private watermarking technique the knowledge of cover image and secret key required to recover the watermark from the cover image [2]. In semi-private or semi blind watermarking technique each the secrete key and also the watermark needed to extract the inserted watermark. In blind or public watermarking technique solely the secrete key's enough to extract the watermark [3]. Private watermarking techniques have high robustness than the other two techniques. But the drawback of private watermarking techniques is that they require original information to extract the watermark. The main necessities of any watermarking technique embody hardiness, visibility, and capability. hardiness is that the strength of the watermark in order that it will stand up to totally different image process attacks like cropping, rotation and compression, etc[4]. Visibility of the watermark related to imperceptibility so that the appearance of the watermarked image may not be degraded by the presence of the watermark.

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The capacity of the watermark defined as the amount of data carried by it.

The technique of digital image watermarking is used to embed copyright information into multimedia content. Generation of watermark, watermark insertion, detection of watermark and attacks on watermarked image are the different steps in digital image watermarking. There are four essential factors which include robustness; imperceptibility, capacity, and blindness used to determine the quality of the watermarked image[5]..If the presence of the watermark is not destroying the imperceptibility of the cover image, then the technique is said to be more imperceptible. The blind watermarking technique cannot require the cover image to detect the watermark. The non-blind watermarking technique needs the cover image to detect the watermark. If the secret key and watermark bit sequence are required to detect the presence of the watermark, then the technique is referred to as semi-blind watermarking [6].

The watermarking techniques classified as spatial domain and transform domain techniques based on the domain of watermark insertion. In these techniques the location and luminance of the image pixels are processed directly and the drawback of this method is that the lossy compression can easily destroy these bits .In transform domain methods, special transformations are used to process the coefficients infrequency domain to hide the watermark [7]. In transform domain methods the watermark is inserted in to frequency coefficients of the host image. Low frequency coefficients are not selected to embed watermark, because they suppressed by filtering as noise.The transform domain method provides much better robustness against compression, filtering, rotation, cropping and noise attack compared to spatial domain technique[8].

Wavelets also process an image from low to the high resolution sequentially so that the missing data can be detected at another level [9]. The watermark must be embedded in high frequency coefficients for better imperceptibility, while low frequency coefficients must be selected for high robustness. Hence the watermark coefficients must be embedded in middle frequency coefficients to achieve the balance between robustness and imperceptibility [10]. . In blind or public watermarking technique solely the secrete key's enough to extract the watermark . Private watermarking techniques have high robustness than the other two techniques. But the drawback of private watermarking techniques is that they require original information to extract the watermark.

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Optic Disc Boundary and Vessel Origin Segmentation of Fundus Images

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Abstract*—This paper presents a novel classification-based optic disc (OD) segmentation algorithm that detects the OD boundary and the location of vessel origin (VO) pixel. First, the green plane of each fundus image is resized and morphologically reconstructed using a circular structuring element. Bright regions are then extracted from the morphologically reconstructed image that lie in close vicinity of the major blood vessels. Next, the bright regions are classified as bright probable OD regions and non-OD regions using 6 region-based features and a Gaussian Mixture Model classifier. The classified bright probable OD region with maximum Vessel-Sum and Solidity is detected as the best candidate region for the OD. Other bright probable OD regions within 1-disc diameter from the centroid of the best candidate OD region are then detected as remaining candidate regions for the OD. A convex hull containing all the candidate OD regions is then estimated, and a best-fit ellipse across the convex hull becomes the segmented OD boundary. Finally, the centroid of major blood vessels within the segmented OD boundary is detected.

I. INTRODUCTION

The retinal fundus photograph is widely used in the diagnosis and treatment of various eye diseases such as diabetic retinopathy and glaucoma. Medical image analysis and processing has great significance in the field of medicine, especially in non-invasive treatment and clinical study. Normally fundus images are manually graded by specially trained clinicians in a time-consuming and resource-intensive process. A computer-aided fundus image analysis could provide an immediate detection and characterization of retinal features prior to specialist inspection. With the increasing size and number of medical images of eye, the use of computers in facilitating their processing and analysis has become necessary. In particular, computer algorithms for the delineation of anatomical structures and other regions of interest are a key component in assisting and automating specific radiological tasks. These algorithms, called image segmentation algorithms, play a vital role in numerous biomedical imaging applications such as diagnosis, localization of pathology, study of anatomical structure, treatment planning, partial volume correction of functional imaging data, and computer integrated surgery. Image segmentation remains a difficult task, due to both the tremendous variability of object shapes and the variation in image quality. In particular, medical images are often corrupted by noise, which can cause considerable difficulties when applying classical segmentation techniques. As a result, these techniques either fail completely or require some kind of post processing step to remove invalid object boundaries in the segmentation results. And problem is to tune or optimize the segmentation methods by changing its topology.

II. MATERIALS AND METHOD

Several general-purpose algorithms and techniques have been developed for image segmentation. These are listed below:

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Drowsy Driver Detection System

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ABSTRACT

Every year the amounts of deaths and injuries are increasing in traffic accidents due to human errors. Drowsiness and driving is a very hazardous and it is very difficult to identify. After alcohol drowsiness is the second leading cause of the road accidents. People are conscious about the risk of drinking and driving but don't realize the dangerous of drowsiness because no instruments exist to measure the driver drowsiness. This paper presents a new approach towards automobile safety and security. In recent time's automobile fatigue related crashes have really magnified. In order to minimize these issues, we have incorporated an improved sleep detection and driver alert system by monitoring the driver's eyes. This describes how to find and track the eyes. We also describe a method that can determine if the eyes are open or closed. The main criterion of this system is that it must be highly non-intrusive and it should start when the ignition is turned on without having at the driver initiate the system. Nor should the driver be responsible for providing any feedback to the system. The system must also operate regardless of the texture and the color of the face. It must also be able to handle diverse condition such as changes in light, shadows, reflections etc. In given paper a drowsy driver warning system using image processing.

Keywords: Face, Accuracy, Vehicles, Feature extraction, Fatigue, Face detection.

I. INTRODUCTION

Improvement of public safety and the reduction of accidents are of the important goals of the Intelligent Transportation Systems (ITS).Driver fatigue is a significant factor in a large number of vehicle accidents. The development of technologies for detecting or preventing drowsiness at the wheel is a major challenge in the field of accident avoidance systems. Because of the hazard that Drowsiness presents on the road, methods need to be developed for counteracting its affects .The aim of this project is to develop a prototype drowsiness detection system. The focus will be placed on designing a system that will accurately monitor the open or closed state of the driver's eyes in real-time. In today's world where science has made amazing advances so have the recent cars. These cars are more advanced than ever. But now a days ,due to driver drowsiness accidents are increasing day by day. Driver Drowsiness and then they do rash driving as of that they do not have control on themselves. Here we designed a system which will detect driver drowsiness. Once drowsiness is detected then buzzer will on and turns the vehicle ignition off. Then vehicle will stop immediately. Vehicle accidents are most common if the driving is inadequate. These happen on most factors if the driver is drowsy. Driver drowsiness is recognized as an important factor in the vehicle accidents. The National Sleep Foundation (NSF) reported that 51% of adult drivers had driven a vehicle while feeling drowsy and 17% had actually fallen asleep. Therefore real-time drowsiness monitoring is important to avoid traffic accidents.

HIGH IMPULSE NOISE INTENSITY REMOVAL IN MRI IMAGES USING AMFWM FILTER

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Abstract: This paper introduces an image denoising method which focuses on detail preservation in the presence of high impulse (salt and pepper) noise. The proposed Adaptive Median and Fixed Weighted Mean Filter (AMFWMF) result in enhanced image similarity and optimal edge information preservation with high correlation and structural similarity index measures. For comparative purposes, a comprehensive analysis of other denoising filters is provided based on different structural metrics. Such standard measures, are used as standard measurements to determine which of these methods leads to an optimal outcome. The provided results are compared to other existing denoising filters and support of hypothesis of a filter with high resilience to impulse noise of high density levels, our assertion on the method's resilience to impulse noise even under high-density levels. Here we applied set of noisy MRI images as Input and computed by different levels of impulse noise intensity.

Keywords: Salt and Pepper Noise, Adaptive Median and Fixed Weighted Mean Filter, Median Filter.

1. INTRODUCTION:

Images are often corrupted by impulse noises during acquisition and transmission. Based on the noise values, the noise can be classified as the easier-to-restore salt-and-pepper noise and the more difficult random valued impulse noise. Among all the methods for removal of impulse noise, the median filter is used widely because of its effective noise suppression capability and high computational efficiency. However, it uniformly replaces the gray-level value of every pixel by the median of its neighbors. Consequently, some desirable details are also removed, especially when the window size is large. In order to improve the median filter, many filters with an impulse detector are proposed, DWM filter is one of them. DWM filter performs much better than the other median-based filters in removing random-valued impulse noise, especially when the noise level is as high as 60%. In this paper a filter is used for removal of random valued impulse noise for which the performance may be comparable/better with DWM filter. This filter has been proposed to obtain optimal performance for highly corrupted images.

In image processing it is usually necessary to perform high degree of noise reduction in an image before performing higher-level processing steps, such as edge detection. The median filter is a non-linear digital filtering technique, often used to remove noise from images or other signals. The idea is to examine a sample of the input and decide if it is representative of the signal. This is performed using a window consisting of an odd number of samples. The values in the window are sorted into numerical order; the median value, the sample in the center of the window, is selected as the output. The oldest sample is discarded, a new sample acquired, and the calculation repeats.

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A Reconfigurable Stacked Microstrip Antenna Array for High Gain Applications

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Abstract: A reconfigurable stacked microstrip antenna array for high gain applications is proposed. In this paper the two microstrip antennas are arranged in the stacked form and in between the two antennas foam as been used as a substrate. In order to provide reconfigurability as the frequency of microstrip antenna changes by changing the height of the foam. In order to increase the gain the upper patch is designed by an array of four square parasitic patch elements are used and foam is used as a substrate in between the lower and upper patch and feed is given to the lower patch. As the height of foam is varied a high gain with frequency reconfigurability is obtained. The proposed antenna is designed and simulated using zeland IE3D electromagnetic wave simulator. The simulated results show that the antenna provides a gain of 14.5dBi at 5.93GHz lower frequency and 8.61dBi at 6.79GHz upper frequency. This type of antenna can be best suited for wireless applications.

Keywords- Reconfigurable antenna, stacked microstrip patch antenna, Antenna array.

I.INTRODUCTION

In high-performance applications such as satellite, aircraft and spacecraft we have low cost, less weight, high performance and ease of installation are the main constraints. Presently there are many other government and commercial applications such satellite and wireless communications have the similar specifications. So to meet these required specifications the Microstrip antennas can be used. Microstrip antennas have very low profile, conformable to both planar and non planar surface, inexpensive and simple to manufacture using modern printed circuit technology.

Microstrip antennas are versatile in terms of polarization, resonant frequency, radiation pattern and impedance by adding the load between microstrip patch and ground plane such as pins and the adaptive elements.

In mobile communications, the antenna plays a critical role in transmitting and receiving signals from one terminal to another terminal. As the wireless devices become both smaller and more multifunctional, their antenna systems must do the same. Reconfigurable antenna offers an efficient solution to the multi functionality challenge. A single antenna can be reconfigured to operate at multiple bands can serve the function of multiple antennas.

Ideally reconfigurable antennas should be able to alter their operating frequency, impedance bandwidth, and polarization and radiation pattern to accommodate the changing operating requirements. So by making the antenna's reconfigurable, their behavior can adopt with changing system requirements or environmental conditions and provide additional levels of functionality for any system.

A reconfigurable antenna [1-5] is an attractive feature in a modern wireless communicationSystem because of its flexibility for use in multiple applications such as multiband and point-to-multipoint.Reconfigurable antenna systems were first introduced in 1998 by Brown [6]. In thereconfigurable antenna, the structure of the antenna can be changed by integratingappropriate switches, such as PIN diode switches [7], field-effect transistors (FET), piezoelectric transducers, or electromechanical system (MEMS) [8] switches into the design. Reconfigurable antennas can be grouped into three categories: frequency, polarization and radiation pattern reconfigurable antennas.

To overcome low gain and efficiency of MSA, a gain enhancement technique based on structural resonance has been proposed and discussed. This method involves the addition of a superstrate layer over substrate. The effect of multi layered substrate and superstrate thickness, dielectric material, and patch dimensions are discussed in. By properly selecting the thickness of the substrate and the superstrate layers, a very large gain can be realized. The resonance gain method has been studied using moment method.

In this paper we are going to design the antenna it is used to produce frequency reconfigurability along with high gain and the antenna is arranged in stacked form in order to get dual band reconfigurability.

In this paper we present a reconfigurable antenna with stacked structure can be used to increase the antenna bandwidth and gain with good return loss.

To get the dual band frequencies there is no need to change the antenna structure by simply changing the antenna dimensions like height of the dielectric or foam substrate we can achieve multiple frequencies.

In this paper a two layered stacked microstrip antenna is used. Two square patches are arranged in two different substrates with two different heights, dielectric constants and loss tangents. By changing the height of the second substrate the dual band operation that is frequency diversity can be achieved.

In this antenna the upper patch is designed by 2X2 antenna arrays in order to provide high gain dual band frequency reconfigurability.

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Dispersion Compensation using FBG and DCF in WDM Systems

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ABSTRACT

Toimproveoverallsystemperformanceandreducedispersion,severalcompensationtechnologies are proposed.Inthispaper,dispersioncompensationschemeinWDMsystemis studied.Foropticalcommunication the widelyuseddispersioncompensationtechnologiesareDispersionCompensatingFiber(DCF)andFiberBraggGrating (FBG).Herean8channeloptical networkisusedobservedthatFBG whenusedinpostcompensationisbetterthanallothercompensationschemes.DCFtwo compensation schemes(Pre,Post)aremodelledandforFBGwith twodispersioncompensatorsie.,DCFandFBGtwocompensation

KEYWORDS:WavelengthDivisionMultiplexing(WDM),Dispersion,DispersionCompensatingFiber(DCF),Fiberbragg grating.

1. INTRODUCTION

WDMisoneofthemostefficienttechniques toincrease theinformation carryingcapacity ofanopticalfiber communication system.Ithasanabilitytotransmit multiple signalshavingdifferentwavelengths simultaneously.TransmissioninWDMsystemsisaffected byattenuation, Chromatic dispersion, polarizationmode dispersion andthefibernonlineareffectsathighbitrate andhighpowerlevel.TocompensateattenuationlossesOptical amplifiers are used.

DispersioncompensationisakeyissueinWDMoptical networks.Duetodispersion,lightwavetravellinginside thefibergetsbroadenedandtwoconsecutive pulses overlapeachothercauses Intersymbolinterference (ISI). Thisleadstoerrorinsymboldetection.Soitisnecessary tocompensatedispersion

This paperwill give an emphasis on the study of dispersion. Therearevariousmethodsfordispersion compensationofopticalfiber,suchasFiberBragggrating (FBG),Electricaldispersioncompensation etc.Inthis paperwewillgothroughDispersionCompensating Fiber(DCF)andFiberBragggrating (FBG)asthesearewidely usedtechniques.
Therestofthepaperisorganizedasfollows; insection II theDispersioncompensatingFiber(DCF)is discussedand insectionIIIabriefdescriptionof FiberBraggGrating (FBG)isgiven.SectionIVpresentsthesimulation of communication systemusingDCFandFBGinwhich variousschemes areemployed.SectionVincludes simulation resultsandcomparison andsectionVI concludesthepaper.

II.DISPERSIONCOMPENSATINGFIBER(DCF)

The dispersion compensating fiberfor dispersion Compensationwasproposedin1980's.Thecomponentsof DCF arenot easily affected by temperature and bandwidth,becauseDCFismorestable.TheuseofDCF inanefficientwaytoreducetheoveralldispersion in WDMnetwork.Because theyhavehighernegative dispersioncoefficientandthereforecanbeconnectedto thetransmission fiberhavingthepositivedispersion coefficient.Therefore theoveralldispersion ofthelinkis zero

Therearethreecompensation schemesfordispersion compensationdependinguponthepositionofDCF

- PreCompensation
- PostCompensation
- SymmetricalCompensation

A.PreCompensation

InPrecompensation schemeDCFisplacedbeforethe StandardSingleModeFiber(SSMF)tocompensate the positivedispersionofthestandardfiber.

B.PostCompensation

In Post compensation schemeDCF is placed after StandardSingleModeFiber(SSMF)tocompensate the positivedispersionofthestandardfiber.

III.FIBERBRAGGGRATING(FBG)

FBGisatypeofdistributed Braggreflectorwhich reflects aparticularwavelengthoflightandtransmitsallothers.A FiberBraggGratingiseither usedas an inlineoptical filter toblockcertainwavelength orasawavelength specific reflector.Thereisaperiodicvariationofrefractiveindex inBragggratingwithinthepropagatingmedium.

Fresnelreflectionisthefundamental principlebehindthe operation ofFBG,wherelighttravelling betweenmedia having different refractive indicesmayreflectorrefractat theinterface. Therefractiveindexwillalternate overa particularlength.Duringrefractionsmallamountoflight isreflected.Thesereflectedlightsignalscombinetoone largereflection ataparticularwavelength inwhichthe gratingperiodisapproximately halftheinputlights wavelength.ThisisBraggconditiononthewavelength at whichreflectionoccursiscalledBraggwavelength.

FBGisusedintwoconfigurations,

- Precompensation
- PostCompensation

A.Precompensation
In PrecompensationFBGisplacedatthebeginningofthe opticallinkbeforetheopticalamplifier

B.PostCompensation
InPostcompensationFBGisplacedattheendofthe opticallink

IV.SYSTEMDESIGNANDSIMULATIONSETUP

The8channelWDMopticalnetwork isdesignedusing Optisystem13.0simulationsoftware.Thisisusedto comparedifferentcompensation techniques.Thisisan OpticalCommunicationSystemsimulationpackage.
Inthetransmittermodule,eachsinglechannelconsists of PsuedoRandom BitSequence(PRBS)generatorfollowed byNRZpulsegenerator.ThePRBSgeneratorhaving15 Gbpsbitrate. TheCWlaserhavingpower 0dBmisused. Thelaserateachchannelhaving different frequencies rangingfrom

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Uniform FBG as Dispersion Compensator in Optical Fiber Communications

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Abstract*: The process of communicating using fiber optics involves the following basic steps: The optical signal is created using a transmitter, the signal is relayed along the fiber, the signal is ensured that it does not become too distorted or weak, the optical signal is received and converting it into an electrical signal. The chromatic dispersion in optical fiber is a phenomenon caused by the different wavelengths which depends on its group refractive index which causes Pulse broadening as they propagte in OFC. Though EDFAs (Erbium doped fiber amplifiers) compensate the transmission losses, Chromatic dispersion is not compensated using EDFAs. One of the applicable and important components in optical communication system is Fiber Bragg Grating (FBG). Uniform FBG is studied as a dispersion compensator in any optical communication system. The simulator used is OPTISYSTEM 7.0 simulation software. All the simulations are done in OPTISYSTEM 7.0 at 10 Gbits/sec and 210 km of transmission fiber. The simulated transmission system has been analyzed on the basis of different parameterssuch as BER, Q-factor, Output power, Gain, Noise Figure and Eye height.*

Keywords*: Fiber Bragg Grating (FBG), BER, eye diagram and Q-factor, EDFA, Dispersion.*

1. INTRODUCTION :

Fiber optic communication is a method of transmitting information from one place to another by sending light through an optical fiber. The optical fiber is always used in telecommunication system because of its characteristics which include small size or dimension, low loss and low interferences from outside environment. The light forms an electromagnetic carrier wave that is modulated to carry information. The basic optical communication system consists of three elements which are light source that convert electrical signal into optical signal, optical fiber which acts as a transmission medium and photo detector or light detector that converts the optical signal into electrical signal at the receiver side[1]. The goal of every communication system is to increase the transmission distance and speed. Like other communication systems the optical communication systems also faces problems such as dispersion, attenuation, losses which degrade its performance. Among them the dispersion affects the system most and it is difficult to overcome as compared to other losses. Thus it is important to incorporate an effective dispersion compensation technique[4] in optical communication systems that lead to performance enhancement of the transmission system.

The optical amplifiers (EDFA) have resolved the problem of optical fiber losses and made the long distance transmission possible without electronic regenerators but the dispersion is not compensated. Dispersion is defined as the pulse spreading in an optical fiber. When different wavelengths of light pulses are launched into the optical fiber, these pulses travelled with different speeds due to the variation of refractive index with wavelengths. The light pulses tend to spread out in time domain after travelling some distance in fiber and this is continued throughout the fiber length. This phenomenon is known as dispersion. Since each pulse spreads and overlap with its neighbouring pulse, becoming indistinguishable at the receiver end[7]. This effect is known as inter symbol interference (ISI). Dispersion limits the information carrying capacity at high transmission speeds, reduces the effective bandwidth and increases the bit error rate (BER). In single mode fiber (SMF), the performance is primarily limited by chromatic dispersion (CD) and polarization mode dispersion (PMD). CD occurs because of the wavelength dependency of refractive index of fiber and the fiber has some inherent properties like birefringence that lead to PMD. In order to improve the overall system performance affected by dispersion, FBG dispersion compensation technique is proposed and analyzed.

2. FIBER BRAGG GRATING (FBG) OPERATION

Principle:One of the most advanced techniques being used in the dispersion compensation methods is FBG. FBG is a piece of optical fiber with the periodic variation of refractive index along the fiber axis. This

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Design of High Speed CODEC for On Chip Cross Talk Avoidance Using FPF Transition Patterns

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Abstract: The cross talk is dependent on the data transition patterns on the bus, patterns can be classified based on the severity of the crosstalk they impose on the bus. The general idea behind techniques that improve on-chip bus speed is to remove undesirable patterns that are associated with certain classes of crosstalk. Different schemes incur different area overheads since they requires additional wires, spacing between wires or both. We analyze the properties of the FPF-CAC and show that mathematically, a mapping scheme exists between the data words and code words. Our proposed CODEC design offers a near-optimal area overhead performance. An improved version of the CODEC is then presented, which achieves theoretical optimal performance. We also investigate the implementation details of the CODECs, including design complexity and the speed. Optimization schemes are provided to reduce the size of the CODEC and improve its speed. The design was implemented on Xilinx ISE and the total power consumed by the device was estimated as 0.045W.

Keywords: CODEC, FPF-CAC, Pruning, Shielding.

I. INTRODUCTION

As VLSI technology has marched into the deep sub-micrometer (DSM) regime, new challenges are presented to circuit designers. As one of the key challenges, the performance of bus based interconnects has become a bottleneck to the overall system performance. In large designs [e.g., systems-on chip (SoCs)] where long and wide global busses are used, interconnect delays often dominate logic delays. Once negligible, crosstalk has become a major. Determinant of the total power consumption and delay of on-chip busses. The impact of crosstalk in on-chip busses has been studied as part of the effort to improve the power and speed characteristics of the on-chip bus interconnects. In this paper, we offer a systematic CODEC construction solution for the forbidden-pattern-free crosstalk avoidance code (FPF-CAC). The mapping scheme we propose is based on the representation of numbers in the binary numeral system. We show that all data words can be coded to code words using encoder. We propose several different coding schemes that allow the CODECs to be constructed for any arbitrary bus size. With such a systematic mapping, the CODEC for a wider bus is constructed by a simple extension of the CODEC for a smaller bus. The first CODEC proposed in the paper is proven to have near-optimal area overhead performance. We further offer an improved coding scheme that achieves optimal overhead performance.

We also propose modifications can be made to our near-optimal CODEC that will reduce the complexity and improve the delay performance of the CODEC. The theoretical lower bound of the area overhead for memory-based codes is lower compared to memory-less codes [1]. However, the memory-based CODECs are much more complex and the only known code word generation method is an exhaustive search and pruning-based method. Several different types of memory-less CACs have been proposed. The code designs are discussed in [3]–[6]. These codes offer the same degree of delay reduction as the passive shielding technique, with much less area overhead (ranging from 44% to 62.5%). Unfortunately, none of the referred papers addresses the mapping between data words and code words for the CODECs. So far, all the CODEC design approaches are based on bus partitioning (which breaks a big bus into a number of small groups (lanes) and applies CAC coding on each group independently). Such an approach has to deal with the cross talk across the group boundaries. Several different schemes are proposed to handle this inter-group cross talk, such as group inversion and bit overlapping [4], [5]. In all cases, more wires are needed and therefore the overall area overhead is higher than the theoretical lower bound. Due to this cornstalk problems like delay power dissipation, leakage currents will come in to picture and leads to failure of the chip.

II. RELATED WORK

As the crosstalk is dependent on the data transition patterns on the bus, patterns can be classified based on the severity of the crosstalk they impose on the bus. Crosstalk patterns are classified as 0C, 1C, 2C, 3C, and 4C patterns, respectively, as shown in

An Advanced Six Circuit Traffic Light Controller using Verilog HDL

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Abstract— Traffic control is a challenging problem in many cities. This is due to the large number of vehicles and the high dynamics of the traffic system. Poor traffic systems are the big reason for accidents, time losses. In this it will reduce wa iting time of the vehicles at traffic signals. In traffic light controller, density of traffic is sensed by using IR sensors throughout day and night, and accordingly time is allotted for users to pass. Traffic Light Control (TLC) system also based on microcontroller and microprocessor. But the disadvantage of with microcontroller or microprocessor is that it works on fixed time, which is functioning according to the program that does not have the flexibility of modification on real time basis. Other advantages of this system are: i) System senses emergency vehicles on the individual road moreover it gives priority to the traffic of that particular road where the emergency vehicles is sensed. ii) Finds out defaulter who crosses the red signal by capturing images using camera. In this, we are using FPGA with traffic sensors to control traffic according requirement means we can change the program if it require and thus reduces the waiting time. The hardware design has been developed using Verilog Hardware Description Language (HDL) programming. The output of system has been tested using Xilinx ISE 9.2i.

Key words: FPGA, PLA, FSM (Finate State Machine), Traffic Light Controller (TLC)

I. INTRODUCTION

At road intersections traffic lights or traffic lamps or traffic signals are generally positioned so as to control the traffic flow. It is an electronic system generally installed on an intersection so as to notify the safety related issues with the help of specific predefined color system (usually red, yellow and green). Traffic Light controller (TLC) has been implemented using ASICs, FPGAs and microcontrollers. Some of the advantages of FPGA over microcontroller, it includes the number of I/O ports, speed of processing and performance, all of which are extremely critical in the design of TLC. The cost also is an extremely important issue in design of TLC. The reduced cost increasing the use of FPGAs (Field Programmable Gate Arrays) for verification and implementation of an Implemented system. Conventional traffic control systems has two major drawbacks: First, due to lack of adjustments in timings of traffic signals, the traffic has to wait a long on the lane with few vehicles while on same lane, the traffic cannot pass through in short time due to rush on lane. Second, there is no provision of movement of emergency vehicles like ambulance and fire brigades etc. In rush hours these emergency vehicles have to wait a long and results in human and financial loss. So, there is a need to develop a secure, fast and reliable traffic control system capable to control the vehicular traffic in rush hours without a need of traffic sergeant. In this, we implemented a real traffic control system using Verilog Hardware Description language. We use different modeling styles to implement state machines to improve the readability of code and to increase the speed. The effect of state encoding on the size of synthesized circuit is also realized. The implemented architecture is then tested for the validation of the design on Xilinx software.

II. FSM MODELING & STATE DIAGRAM

The traffic light controller is a sequential circuit and is modeled as a finite state machine. The number of states is a function of the number of intersections chosen and hence variable. For the purpose of description, a state machine for preliminary case of four intersections is described. The working of the state machine is described as follows. Each state in the state diagram corresponds to a traffic intersection. The transition from one state to other is dependent on the timer.

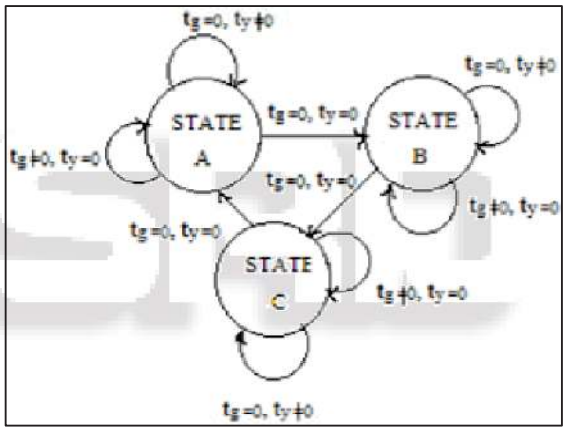

Fig. 1: FSM State Diagram

When the state machine is in a particular state, first of all, the green light corresponding to a particular lane glows for the duration as predefined by the user. Afterwards, the yellow light for the corresponding intersection is turned on for a predefined specific duration. Till this time, the remaining lanes show red light. Once the timer counts down completely, the machine switches to the next state. The state diagram is as shown in Fig.1.tg and ty correspond to duration of green light and yellow light respectively. When tg, ty are non-zero, green light is turned on for the particular intersection and red for all the remaining ones. When tg is zero, ty is non-zero, yellow light is switched on for the particular intersection and when both the timers reach zero, red light is switched on the particular intersection and the machine moves to next state and the same procedure is repeated for the next intersection.

A. TLC Flow Chart

The Flow Chart shown in Fig. 2 illustrates the actions to be taken by the road users. Initially, all RED signals are ON and after few seconds, GREEN of a signal light in one particular direction will be ON to allow traffic in straight, right and left

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BER Performance in MIMO-OFDM by using BPSK, QPSK, 16-QAM & 64-QAM with over Rayleigh Fading

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Abstract: In recent time, the demand for multimedia services has grown up rapidly. One of the most prominent multi-carrier transmission techniques is OFDM (Orthogonal Frequency Division Multiplexing). OFDM is a method of encoding digital data on multicarrier frequencies. The data are sent over parallel sub-channels with each sub-channel modulated by a modulation scheme such as BPSK, QPSK, 16-QAM, 64-QAM. The MIMO-OFDM system is the combination of the MIMO technique and OFDM technique, which is enhancing the capacity, improve the link reliability high data rate transmission for future broadband wireless communication and also use for avoid Inter Symbol Interference (ISI). One of the advantages of OFDM is bandwidth. Its ability to cope with severe channel conditions compared to a single carrier modulation scheme but still maintaining the data rates of a conventional scheme with the same bandwidth. Furthermore, modulation and demodulation is easy to implement. The concept of "data transmission" can be efficiently implemented using IFFT and instead of bank of modulators at the transmitter side and demodulators at receiver side respectively. Channel equalization is simplified because OFDM may be viewed as slowly modulated narrow band signal to reduce the wide band signal by using guard interval. The applications of OFDM are wire-line and wireless.

Keywords*: OFDM, Modulation, BPSK, QPSK, QAM, Bit Error Rate(BER) Rayleigh Adding Channel.*

I. INTRODUCTION

In recent years, multicarrier transmission has become an attractive technique in many wireless standards to meet the increasing demand for high data rate communication systems. One of the most popular multicarrier techniques, orthogonal frequency division multiplexing (OFDM), has developed into a widely-used scheme for wideband digital communication. The major advantage of OFDM over single-carrier schemes is its ability to cope with frequency-selective fading channel with only one-tap equalizer.

Orthogonal Frequency Division Multiplex or OFDM is a modulation format that is finding increasing levels of use in today's radio communications scene. OFDM has been adopted in the Wi-Fi arena where the 802.11a standard uses it to provide data rates up to 54 Mbps in the 5 GHz ISM (Industrial, Scientific and Medical) band. In addition to this the recently ratified 802.11g standard has it in the 2.4 GHz ISM band. In addition to this, it is being used for WiMAX and is also the format of choice for the next generation cellular radio communications systems including 3G LTE and UMB (Ultra Mobile Broadband).

The MIMO-OFDM system is the combination of the MIMO technique and OFDM technique, which is enhancing the capacity, improve the link reliability high data rate transmission for future broadband wireless communication and also use for avoid Inter Symbol Interference (ISI). In broadband wireless channel multiple input multiple output (MIMO) communication system combine with the orthogonal frequency division multiplexing (OFDM) modulation technique can achieve reliable high data rate transmission and to mitigate inter symbol interference. High data rate system suffer from inter symbol interference (ISI). To estimate the desire channel at the receiver channel estimation techniques are used and also enhance system capacity of system. The MIMO-OFDM system uses to independent space-time codes for two sets of two transmit antennas. To improve channel estimation accuracy in MIMO-OFDM system because channel state information is required for signal detection at receiver and its accuracy affects the overall performance of system and it is essential for reliable communication.

Multi band OFDM Ultra Wide Band transmits data simultaneously over multiple carriers spaced apart at precise frequencies on more than one band. OFDM signal needs precisely overlapping but non-interfering carriers, and achieving this precision requires the use of a real-time Fourier transform, which became feasible with improvements in Very Large-Scale Integration (VLSI). An OFDM system offers inherent robustness to multi-path dispersion with a low-complexity receiver. Adding a Cyclic Prefix (CP) forces the linear convolution with the channel impulse response to resemble a circular convolution. A circular convolution in the time domain is equivalent to a multiplication operation in the frequency domain. An important stage in the implementation of OFDM is the modulation of the baseband signal along with the various subcarriers. Baseband signal cannot be transmitted without modulation. Information of baseband signal is transmitted in the way that parameter of high frequency carrier wave, such as amplitude or phase, is modulated by baseband signal, hence conveys the information that can be restored to original signal at the receiver. Selection of proper modulation scheme is essential to communication system design. In this research paper, we present the analysis of various modulation schemes in respect to their performance in terms of BER. For this research work, we have taken BPSK, QPSK, 16 QAM, 64 QAM as the modualtion schemes and have compared the performance

II. LITERATURE RIVEW

In [1] Mohammed S. Akhoirshida et.al have analyzed the performance of OFDM- BPSK, system by using forward error correcting codes(convolutional , reed Solomon as well as concatenated coding) schemes that are used to encode the data stream in wireless communications AWGN channel has been reported here . The authors have presented OFDM for wireless communications.They address basic OFDM and related modulations, as well as techniques to improve the performance of OFDM for wireless communications (OFDM).

In [2], Jun Lu, has considered a space–time coded (STC) orthogonal frequency-division multiplexing (OFDM) system with multiple transmitter and receiver antennas over correlated frequency and time-selective fading channels. It is shown that the product of the time-selectivity order and the frequency-

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Energy Efficient Outdoor Light Monitoring and Control Architecture Using Embedded System

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Abstract: In this letter, we propose an energy efficientZigBee-based outdoor light monitoring and control system that can monitor and handle outdoor lights more efficiently as com-pared to the conventional systems. The proposed system uses the ZigBee-based wireless devices which allow more efficient lamps management. The designed system uses sensors to control and guarantee the optimal system parameters. To realize effectiveness of the proposed system, the prototype has been installed inside the University, where the experimental results proved that the proposed system saves around 70.8% energy for the outdoor street environment because of using sensors, LED lamps, and ZigBee based communication network.

Index Terms*—Embedded System, Energy Efficiency, Led Lamps, Lightning Control System, Zigbee.*

I. INTRODUCTION

ENERGY efficiency is one of the key factor while de-signing indoor or outdoor lighting systems. The street lights consumes almost 30%–40% of the entire city power consumption. Thus, control system able to efficiently manage the lighting is absolutely advisable. For this aim, because of its design based on the old lighting standards and inefficient instruments and devices, the traditional lighting systems are not suitable resulting in energy losses, frequent replacement of devices. Moreover these traditional systems suffer from the lack of pervasive and effective communications, monitoring, automation, and fault diagnostics problems.

To address these challenges, many technologies has been utilized in the literature to save energy such as: the utilization of the light emitting diode (LED) instead of metal halide (MH) lamps, But the systems based on these technologies need further improvement to increase the energy efficiency.To further reduce the energy consumptions and to simplify the wiring structure, numerous lighting control systems have beenproposed to solve that problem such as: occupancy sensing approach, light level tuning [3], and power line communication (PLC). Despite of reducing the wiring structure in PLC based designs presented in [4], occasional drops may occur in PLC networks operating on low voltage power lines. These drops are caused by noise and attenuation, and can last from a few minutes to few tens of minutes. Due to carrier signal attenuation, there may be high latency or communication failure in PLC based de-signs.

To implement wireless control system of lights, several com-parable architectures have been applied for outdoor lighting [5]–[7]. The author in [5]design the intelligent lighting system by considering the system cost as the main factor beside the energy saving. In [5], the author tries to reduce the number of sensors on each lighting nodes, but this reduction will result in less accuracy of the system due to more packet loss and hence will result in performance degradation. Furthermore, the authors in [6]and [7]designed the energy efficient lighting con-trol system by utilizing the WIMAX and GPRS as a backbone technologies, respectively, to communicate with the control center.

One of the drawback of utilizing WIMAX and GPRS is the utilization of licensed spectrum, which will result in inter-ference with the existing WIMAX and GPRS users. Hence, the lighting system will also require efficient interference avoiding algorithms to cope with interference, but this is not suitable for the lighting systems. These systems also have no capability to change the light intensity according to the users' requirement because they statically control the energy consumption and do not consider the user requirements in the sense of light intensity and the user's presence while dimming or turning off the lamps. In [8], the proposed ZigBee based lighting control system work was not being tested completely for different seasons and users moving conditions, and hence it was not completely verified and tested for different conditions.

In order to fill this research hole, we design the energy effi-cientZigBee-based outdoor light monitoring and control system (ZB-OLC) that considers the users' requirement and system en-ergy consumption. The proposed ZB-OLC system also imple-mented the standard mesh routing algorithm which results in better network performance as compared to the conventional systems. The proposed ZB-OLC system also fulfills the user satisfaction by using occupancy and illumination sensors, and gives the gate to design the advance metering infrastructure (AMI). Hence, the designed ZB- OLC system dynamically con-trols the energy level of outdoor users while guaranteeing their predefined minimum satisfaction level.

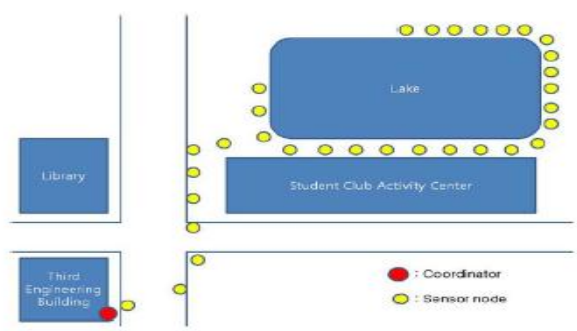

Fig. 1. Proposed energy efficient architecture for Outdoor lighting environment.

Dual-Band Tunable Adapted E-Shaped Microstrip Patch Antenna

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Abstract—Design of an adapted E-shaped microstrip patch antenna for dual-band operationis presented in this paper. Tuning of the resonant frequencies is achieved by using an adjustable air-gap. The proposed patch consists of Roggers RT/duroid 5880 substrate suspended on air-gap above the ground plane.By varying the height of air-gap, the resonant frequencies of the patch are tuned between 1.99 GHz – 2.634 GHz Tuning is done for variable heights of air-gap and at different values of thickness of duroid substrate. The patch is excited by a coaxial probe. Good input impedance matching, return loss and a gain of9.86 dB is achieved in the results over the tuned frequencies.

Keywords—*Microstrip patch antenna, multi band patch antennas, coaxial feed.*

I. INTRODUCTION

The microstrip patch antenna is an extensively handpicked item for multiple performance systems that can concurrently care devices operating at different bands of frequency such as wireless local area network (WLAN), universal mobile telecommunication services (UMTS), and worldwide interoperability for microwave access (WiMAX) owing to its characteristics of low profile, lightweight, ease of integration, and production.

Dual-band antennas that function at two frequencies which are far apart can be used to avoid the usage of two separateantennas. When two or more resonant frequencies of a microstrip antenna (MSA) are close toeach other, a broad BW is obtained. When these are separated, dual-bandoperation is obtained. The separation between the two frequencies can be obtained by adjusting the air-gap between the two layersor by changing the shapeof the patch [1, 2].

II. LITERATURE SURVEY

Multiband antennas have been achieved through techniques such as a slotted microstrip patch with number of posts[1], cross-loaded slots in the ground plane [3], PIFA type varactor tunable [4, 5], by partially magnetized substrates[6] , by varying the vertex of a triangular ring on a patch [7], using corner truncated sector antennas [8], using stacked patch antennas [9], using EBG structures [10],with liquid crystal material as substrates [11] slot cutting the surface of printed antenna[12-15], split p-shaped[16], by using two slots with defective ground structure [17], by changing thelength of the small stub attached to the regularly shaped MSA [18-19]. The microstrip symmetrical E-shaped patch antenna reported by B.K.Ang [20] offers dual frequency at 5.15 – 5.825 GHz but with a reflection coefficient below -10db. The another E-shaped MSA reported by Ajay [21] offers a dual-band of 3.1 GHz and 3.45 GHz but return loss at those are -12dB and -28dB which is not higher in the former case. The another E-shaped reported by Md. MamunHossain [22] resonates at dual band of 3.51 GHz and 5.82 GHz with a good return loss of -21.4dB and 43.2dB but gain of 8.21 dB and 6.17dB which is less in later.

In this paper, a compact high gain adapted E-shaped MSA that results in good return loss, high gain is proposed. A rectangular MSA is cut with slots to obtain an E-shaped microstrip patch. This E-shaped patch has a slight modification in between the slots of arms to get an adapted E-shaped MSA as shown in the Fig. 2 for dual-band operation. According to J.R.James [1], patch can resonate at two frequencies by using an adjustable air-gap between the patch and the ground plane. Structure of the designed patch is shown in Fig. 1. This structure is taken from [1] to obtain dual frequencies. Compared to the case with no air-gap the effective permittivity of the substrate is evidently smaller. As a result the resonant frequencies of the various modes will increase. Since the effective permittivity decreases as thickness of air increases, it follows that the resonant frequencies can be tuned by adjusting the air-gap height.

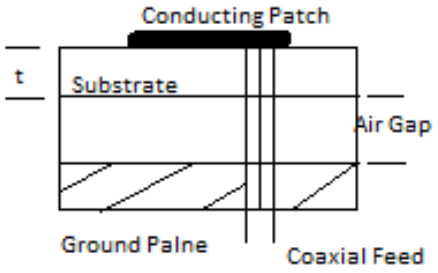

Figure 1. Structure of microstrip antenna with air gap for dual-band operation

III. ANTENNA DESIGN

The resonant frequency of a microstrip rectangular patch antenna can be designed based on the width and length of the patch, for a given height and permittivity of the dielectric material between the conductive patch and ground plane [23]. The thickness of the metallic strip is limited by $t << \lambda_0$ and the height is limited by $0.003\lambda_0 \leq h \leq 0.05\lambda_0$. The width and length of patch can be calculated by the transmission line method [24]. The effective dielectric constantε_e, width of the patch W (m), effective length L_e(m), extended length ΔL (m) and actual length L (m) of MSAare given by

$$\varepsilon_e = \frac{(\varepsilon_r+1)}{2} + \frac{(\varepsilon_r-1)}{2}\left[1 + 10\frac{h}{w}\right]^{-1/2} \quad (1)$$

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Survey on PAPR Reduction Techniques in OFDM System

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Abstract: Orthogonal frequency division multiplexing (OFDM) is perhaps the most spectrally efficient, robust transmission technique discovered so far for communication systems, and it also mitigates the problem of multipath environment. Due to its advantages in multipath fading channel e.g. robust against ISI, ICI and some other advantages like best QoS for multiple users, efficient usage of bandwidth it is suggested to be the modulation technique for next generation 4G networks e.g. LTE. But along with all its advantages there are some disadvantages also e.g. High PAPR (Peak to Average Power Ratio) at the transmitter end and BER (Bit Error Rate) at the receiving end. OFDM is used in the downlink of 4G networks. & Pre-coding etc are suggested but none of them is reduce To reduce the problems of OFDM some techniques e.g. SLM, PTS, Clipping, Coding, the PAPR and BER to an acceptable value. This Paper will discuss some techniques of PAPR & BER reduction, and their advantages and disadvantages in detail.

Keywords: PAPR, BER,OFDM, PAPR reduction techniques.

I. INTRODUCTION

With the ever growing demand of this generation, need for high speed communication has become an utmost priority. Various multicarrier modulation techniques have evolved in order to meet these demands, few notable among them being Code Division Multiple Access (CDMA) and Orthogonal Frequency Division Multiplexing (OFDM). Orthogonal Frequency Division Multiplexing is a frequency – division multiplexing (FDM) scheme utilized as a digital multi – carrier modulation method. A large number of closely spaced orthogonal sub – carriers is used to carry data. The data is divided into several parallel streams of channels, one for each sub – carriers. Each sub – carrier is modulated with a conventional modulation scheme (such as QPSK) at a low symbol rate, maintaining total data rates similar to the conventional single carrier modulation schemes in the same bandwidth. Orthogonal Frequency Division Multiplexing (OFDM) is a Multi-Carrier Modulation technique in which a single high rate data-stream is divided into multiple low rate data-streams and is modulated using sub-carriers which are orthogonal to each other. OFDM is a "Multi-Carrier Transmission Scheme. " ODFM is a good solution for high speed digital communications. In this the data to be transmitted is spreaded over a large number of orthogonal carriers, each being modulated at a low rate.The carriers can be made orthogonal by appropriately choosing the frequency spacing between them.

Orthogonal frequency division multiplexing (OFDM) is a widely used modulation and multiplexing technology, which has become the basis of many telecommunications fields. Therefore OFDM is an advanced modulation technique which is suitable for high-speed data transmission due to its advantages in dealing with the multipath propagation problem, high data rate and bandwidth efficiency.

OFDM have several attractive features which make it more advantageous for high speed data transmission over other data transmission techniques. These features includes

(i) High Spectral Efficiency
(ii) Robustness to channel fading
(iii) Flexibility
(iv) Easy equalization

But inspite of these benefits there are some disadvantages in using OFDM:
(i) OFDM signal exhibits very high Peak to Average Power Ratio (PAPR)
(ii) Very sensitive to frequency errors (Tx. & Rx. offset)
(iii) Intercarrier Interference (ICI) between the subcarriers

OFDM have got certain disadvantages also. One of the major disadvantages of OFDM is high PAPR associated with the transmitted signal. Large PAPR leads to both in-band distortion and out of band radiation. It also increases the complexity of the analog-to-digital and digital-to analog converter and reduces the efficiency of the Radio-Frequency (RF) power amplifier used. Therefore it is useful to reduce the PAPR of the OFDM system. In this paper we are studying different techniques to reduce PAPR in ofdm system.

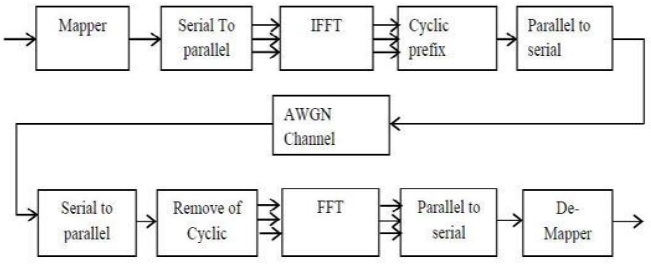

Fig 1. Simple block diagram of OFDM system

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Smart Home Management System Based on MSP430 and Wi-Fi

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Abstract: This paper presents a smart home management system. To protect the home from the outsider's entry and provide the automation is very important now-a-days. This project mainly focusing on these issues, to do this project, we are using the MSP430G2553 microcontroller. To measure the several emergency parameters and the weather parameters, we are using the different sensors. The power consumed by the loads in the home was measured by the energy meter and the total number of units is also displayed on the LCD. The GSM modem is used to send the alert messages to the user if any of the sensors value goes beyond the threshold level. All the sensor levels and the total number of units consumed were sent to the predefined web page by using the Wi-Fi module. The Wi-Fi module was interfaced to the controller through the UART port. The emergency switch provided was to get the status of all the sensors values in the form of SMS.

Keywords: MSP430G2553, LCD, GSM, Wi-Fi, UART, SMS

I. INTRODUCTION

Our system consists of a home controller system, community management system, and cloud server platform. The home controller system comprises network connections, digital input and output (DIO) lines through which the home controller system can integrate physical and conversion sensors and be extended to enable security settings, energy reporting, and scenario control. The community management system not only provides community and home management services and third- party services that enable communication with the cloud service platform but also integrates a central monitor and control system, surveillance system.

Therefore, the community management system forms a location-based, integrated eco broker system. The core management on the cloud service platform focuses on the management and maintenance of communities and homes andprovides remote control and data analysis functions to fixed carriers (e.g., fixed panels and smart TVs) and mobile carriers (e.g., smartphones and tablet computers).

This study first proposed a hierarchical, smart home-service architecture, which employed standard interface devices at the home end to separate the logic and user interfaces, and achieving multiple in-home displays.

Moreover, this study applied a community broker role to integrate smart home services such as managing environment deployment operations, reducing the manual labor required of community management personnel, providing electronic information services, supporting diverse services, and extending the community's integration with the surrounding environment. Therefore, a complete and integrated smart home system can be achieved. In addition, integrating cloud-based services with community services provided location-based services.

II. OBJECTIVE

The main aim of this project is to protect the home from the outsider's entry and provide the automation is very important now-a-days. This project mainly focusing on these issues, to do this project, we are using the MSP430G2553 microcontroller.

III. AIM

The main aim of this project is to develop a smart home management with sensor interface device is essential for sensor data collection of wireless sensor networks (WSN) in mobile environments.

IV. BLOCK DIAGRAM

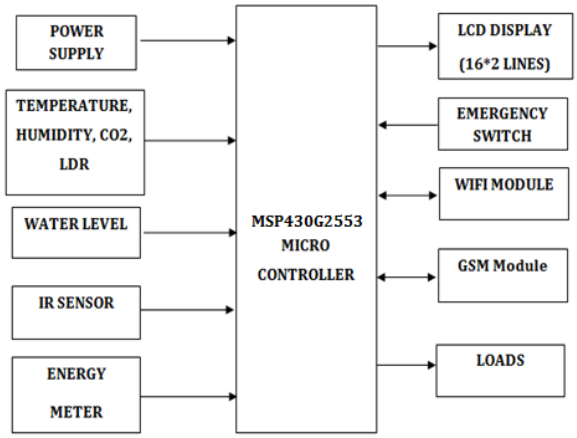

Fig 1: Block diagram of proposed system

The MSP430G2553microcontroller is based on a 16-bit MSP430CPU that combine themicrocontrollerwith embedded high-speed flash memory 16kb. Serial communications interfaces UARTs, SPI, I2C-bus and on-chip RAM make these devices very well suited for communication gateways and protocol converters, soft modems, voice recognition and low end imaging, providing both large buffer size and high processing power. Various 16-bit timers, 10-bit ADC, PWM channels and 16 fast GPIO lines with up to edge sensitive external interrupt pins make these microcontrollers suitable for industrial control and medical systems.

POWER SUPPLY

The input to the circuit is applied from the regulated power supply. The A.C input i.e., 230V from the mains supply is step down by the transformer to 12V and is fed to a rectifier. The output obtained from the rectifier is a pulsating D.C voltage. So in order to get a pure D.C voltage, the output voltage from the rectifier is fed to a filter to remove any A.C components present even after rectification. Now, this voltage is given to a voltage regulator to obtain a pure constant D.C voltage.

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SurveyonRectangularMicrostrip Patch Antenna

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***Abstract*- This paper boons a survey on the microstrip patch antenna and there historical perspectives. The microstrip antenna has better prospects and advantages which make greater progress in latest years. In this paper microstrip antenna, types, feeding techniques and application, advantage and disadvantages over conventional microwave antennas are presented. Dual and circular polarizations, dual-frequency operation, frequency agility, broad band-width and feed line flexibility were also discussed.**

***Index Terms*-Microstrip Antenna (MSA), Feeding Techniques, Advantages**.

I.INTRODUCTION

Antenna is a transducer that converts one form into another and transmits orreceives the electromagnetic waves.Microstripantennaconsistsofradiatingpatchononeside ofdielectricsubstrateandgroundplaneontheotherside.
Microstripantennasprinteddirectlyontoacircuitboardbecause ofthattheyareveryuseful.Radiatingpatchismadeofconducting material(copperorgold)withmanydifferent shapes likerectangular, circular, and elliptical andmanymore shapes.
The rectangularpatchantennaisone-halfwavelengthlongofrectangularmicrostriptransmissionline .
ThePatchantennaisnarrowbandandwide-beamantenna.Fabricationofpatchantennadonebyetchingthee lement
patterninmetaltrace with a continuous metal layer bondedtotheoppositesideofthesubstrate[1].

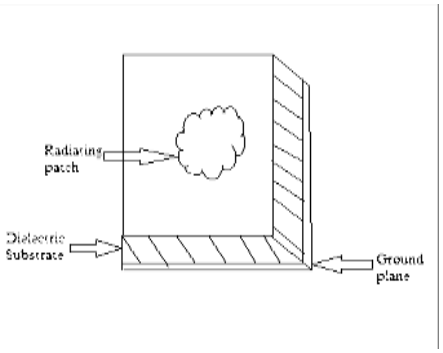

Figure-1:Microstrip patch antenna.

II. MICROSTRIPANTENNA

Microstripantennawasintroduced by Deschampsin 1950s.Laterthatmany
authorinvestigateonitlikeJameshall,DavidM.Pozar.

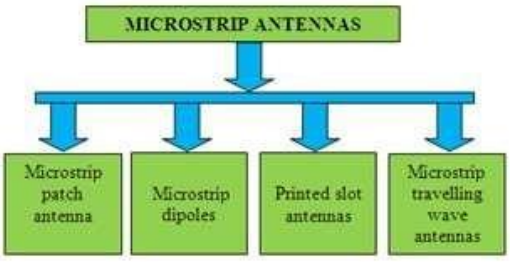

Figure-2:GroupsofMicrostrippatchantenna

Themicrostrippatchantennashavedualandcircularpolarizatio ns,dual-frequencyoperation,frequencyagility, broad band-width,feedlineflexibility,andbeamscanning Omni-directionalpatterning[2].ThereareUandHslotsinrectangularpa tchthatmakesdualandtriplefrequencyofoperation.Thebandw idthimpedanceoftheantenna is
150MHz and1.26GHz band for U slot and154MHz, 484MHzand396MHzforH slot[3].

H-SLOTPATCH ANTENNA:H-shapedslotsformedbycutting threeslotsfromarectangularpatch[4,5]duetowhich gain and bandwidth of micro strip antenna enhanced.Thesizeofgroundplaneis(L XW)90X100 mmandthicknessofdielectricsubstrateis3.2mm.Thisantenna usedforcircularpolarizationwithsinglenarrowbandfrequency.

U-SLOTPATCH ANTENNA: Simplecoupledmicrostripantennawithrectangularpatchresults insingle- bandantenna.FordualbandoperationsingleU-slotiscutinthepatch.Thesizeis(LXW)32X40mm. Thepatchsubstratethicknessis1.57mm anddielectricconstant4.4.resonantfrequencyis3.6GHzand5.2 GHz.AsingleU-slotresultsindualbandantennaandinsertinganother U- slot in same patch results in triple band antenna.Bothprovidesatisfyingvaluesofgainanddirectivity[7] .

S-SLOTPATCHANTENNA: S-shapedslotcutatthecenter ofasquarepatchfor triplebandoperation. The frequencyratiooftheantennacontrolledbyadjustingtheS-shapedslotarmlength.Thesizeis(L XW)115X110 mmanddielectricsubstrateis1.06.Antennasprovidevery high gainanddirectivity and less frequency ratio[2].

Geomagnetic Storms: Impact on GPS/GNSS signal delay over the low latitudes

This article demonstrates TEC results at low latitude Indian region, Bangalore (13.020 N, 77.570 E) and Hyderabad (17.410 N, 78.550 E) on the days of high intensity storms (October 29th, 2003), medium intensity storms (March 17th, 2013) and low/no intensity storms (July 05th, 2018

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Now a days more than hundred Global Navigation Satellite System (i.e. GPS, GLONASS, Galileo, Beidou, and IRNSS) signals are available everywhere all the time at free of cost. Hence, dependency on the GNSS technology has been increasing with more number of applications in almost all the fields for Position, Navigation and Time (PNT) estimation. The accuracy of GNSS in PNT estimation is being limited by various reasons one among them is dynamic nature of the ionosphere propagation medium which is extended approximately from 60-1000 Km above the earth surface.

One of the reasons for the dynamic nature of the ionosphere is Geomagnetic storms that occur in the interplanetary space. Moreover, an equatorial phenomenon is additional threat to the signals in low latitudes like India. A Geomagnetic Storm is a sudden and temporary disturbance of the Earth's Magnetosphere caused by changes in the solar wind and interplanetary magnetic field (IMF). The disturbance in the interplanetary medium that drives the storms are due to a solar coronal mass ejection (CME) or a high speed stream (co-rotating interaction region or CIR) of the solar wind originating from a region of weak magnetic field on the Sun's surface.

Also, the frequency of storms changes with Sun Spot Number (SSN). Most of the storms that occur during the solar maximum period are CME driven whereas the storms of solar minimum period are CIR driven. Storms lead to many changes in the plasma, magnetic and electric fields and currents in the Earth's magnetosphere. However, the space weather description and characterisation of geomagnetic storm can be done by measuring the Disturbance Storm time (Dst) index and planetary geomagnetic disturbance index (Kp), Sun Spot Number (SSN), Solar activity, interplanetary magnetic field (IMF) etc. In order to demonstrate and describe impact of the Geomagnetic Storms, three days of different storm intensity levels have been chosen with the Kp index of $4 < Kp < 9$ (29-10-2003), $2 < Kp < 7$ (17-03-2013) $1 < Kp < 5$ (05-07-2018). SSN for the corresponding days is 330, 126 and 0 respectively.

The interplanetary magnetic field direction (Bz) towards the south with values of -10 nT and lower are the indicators for the geomagnetic storm. Figure 1, shows IMF direction (Bz) for different storm days. On October 29th 2003, the geomagnetic storm began to develop at 5:58 UTC when the Bz dropped suddenly from 0 to -35.51 nT and within five minutes it turned to Bz: 5.07 nT at 6:03 UTC. Further it reaches minimum at 6:32 UTC, Bz: -53.85 nT and it reaches positive peak Bz: 34.86 nT at 6:44 UTC. The Bz value remains negative from 18: 11 UTC to 23:59 UTC. Also, the flares occurred on that day are C, M, and X type, among all more intense one is X10.0 flare that happened around 21:00 UTC and a good correlation could be observed between IMF and solar activity. For March 17,

An Advanced Six Circuit Traffic Light Controller using Verilog HDL

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Abstract— Traffic control is a challenging problem in many cities. This is due to the large number of vehicles and the high dynamics of the traffic system. Poor traffic systems are the big reason for accidents, time losses. In this it will reduce wa iting time of the vehicles at traffic signals. In traffic light controller, density of traffic is sensed by using IR sensors throughout day and night, and accordingly time is allotted for users to pass. Traffic Light Control (TLC) system also based on microcontroller and microprocessor. But the disadvantage of with microcontroller or microprocessor is that it works on fixed time, which is functioning according to the program that does not have the flexibility of modification on real time basis. Other advantages of this system are: i) System senses emergency vehicles on the individual road moreover it gives priority to the traffic of that particular road where the emergency vehicles is sensed. ii) Finds out defaulter who crosses the red signal by capturing images using camera. In this, we are using FPGA with traffic sensors to control traffic according requirement means we can change the program if it require and thus reduces the waiting time. The hardware design has been developed using Verilog Hardware Description Language (HDL) programming. The output of system has been tested using Xilinx ISE 9.2i.

Key words: FPGA, PLA, FSM (Finate State Machine), Traffic Light Controller (TLC)

I. INTRODUCTION

At road intersections traffic lights or traffic lamps or traffic signals are generally positioned so as to control the traffic flow. It is an electronic system generally installed on an intersection so as to notify the safety related issues with the help of specific predefined color system (usually red, yellow and green). Traffic Light controller (TLC) has been implemented using ASICs, FPGAs and microcontrollers. Some of the advantages of FPGA over microcontroller, it includes the number of I/O ports, speed of processing and performance, all of which are extremely critical in the design of TLC. The cost also is an extremely important issue in design of TLC. The reduced cost increasing the use of FPGAs (Field Programmable Gate Arrays) for verification and implementation of an Implemented system. Conventional traffic control systems has two major drawbacks: First, due to lack of adjustments in timings of traffic signals, the traffic has to wait a long on the lane with few vehicles while on same lane, the traffic cannot pass through in short time due to rush on lane. Second, there is no provision of movement of emergency vehicles like ambulance and fire brigades etc. In rush hours these emergency vehicles have to wait a long and results in human and financial loss. So, there is a need to develop a secure, fast and reliable traffic control system capable to control the vehicular traffic in rush hours without a need of traffic sergeant. In this, we implemented a real traffic control system using Verilog Hardware Description language. We use different modeling styles to implement state machines to improve the readability of code and to increase the speed. The effect of state encoding on the size of synthesized circuit is also realized. The implemented architecture is then tested for the validation of the design on Xilinx software.

II. FSM MODELING & STATE DIAGRAM

The traffic light controller is a sequential circuit and is modeled as a finite state machine. The number of states is a function of the number of intersections chosen and hence variable. For the purpose of description, a state machine for preliminary case of four intersections is described. The working of the state machine is described as follows. Each state in the state diagram corresponds to a traffic intersection. The transition from one state to other is dependent on the timer.

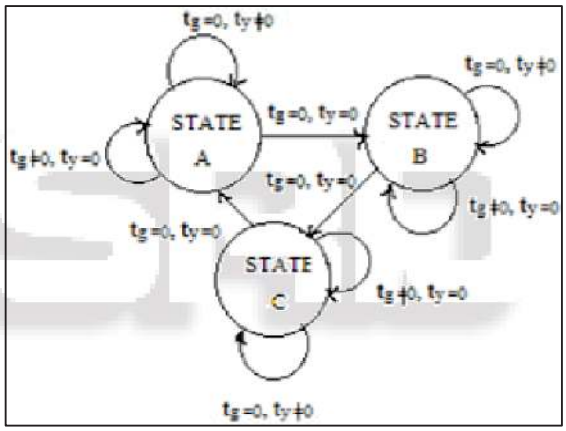

Fig. 1: FSM State Diagram

When the state machine is in a particular state, first of all, the green light corresponding to a particular lane glows for the duration as predefined by the user. Afterwards, the yellow light for the corresponding intersection is turned on for a predefined specific duration. Till this time, the remaining lanes show red light. Once the timer counts down completely, the machine switches to the next state. The state diagram is as shown in Fig.1.tg and ty correspond to duration of green light and yellow light respectively. When tg, ty are non-zero, green light is turned on for the particular intersection and red for all the remaining ones. When tg is zero, ty is non-zero, yellow light is switched on for the particular intersection and when both the timers reach zero, red light is switched on the particular intersection and the machine moves to next state and the same procedure is repeated for the next intersection.

A. TLC Flow Chart

The Flow Chart shown in Fig. 2 illustrates the actions to be taken by the road users. Initially, all RED signals are ON and after few seconds, GREEN of a signal light in one particular direction will be ON to allow traffic in straight, right and left

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Design of High Speed CODEC for On Chip Cross Talk Avoidance Using FPF Transition Patterns

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Abstract: The cross talk is dependent on the data transition patterns on the bus, patterns can be classified based on the severity of the crosstalk they impose on the bus. The general idea behind techniques that improve on-chip bus speed is to remove undesirable patterns that are associated with certain classes of crosstalk. Different schemes incur different area overheads since they requires additional wires, spacing between wires or both. We analyze the properties of the FPF-CAC and show that mathematically, a mapping scheme exists between the data words and code words. Our proposed CODEC design offers a near-optimal area overhead performance. An improved version of the CODEC is then presented, which achieves theoretical optimal performance. We also investigate the implementation details of the CODECs, including design complexity and the speed. Optimization schemes are provided to reduce the size of the CODEC and improve its speed. The design was implemented on Xilinx ISE and the total power consumed by the device was estimated as 0.045W.

Keywords: CODEC, FPF-CAC, Pruning, Shielding.

I. INTRODUCTION

As VLSI technology has marched into the deep sub-micrometer (DSM) regime, new challenges are presented to circuit designers. As one of the key challenges, the performance of bus based interconnects has become a bottleneck to the overall system performance. In large designs [e.g., systems-on chip (SoCs)] where long and wide global busses are used, interconnect delays often dominate logic delays. Once negligible, crosstalk has become a major. Determinant of the total power consumption and delay of on-chip busses. The impact of crosstalk in on-chip busses has been studied as part of the effort to improve the power and speed characteristics of the on-chip bus interconnects. In this paper, we offer a systematic CODEC construction solution for the forbidden-pattern-free crosstalk avoidance code (FPF-CAC). The mapping scheme we propose is based on the representation of numbers in the binary numeral system. We show that all data words can be coded to code words using encoder. We propose several different coding schemes that allow the CODECs to be constructed for any arbitrary bus size. With such a systematic mapping, the CODEC for a wider bus is constructed by a simple extension of the CODEC for a smaller bus. The first CODEC proposed in the paper is proven to have near-optimal area overhead performance. We further offer an improved coding scheme that achieves optimal overhead performance.

We also propose modifications can be made to our near-optimal CODEC that will reduce the complexity and improve the delay performance of the CODEC. The theoretical lower bound of the area overhead for memory-based codes is lower compared to memory-less codes [1]. However, the memory-based CODECs are much more complex and the only known code word generation method is an exhaustive search and pruning-based method. Several different types of memory-less CACs have been proposed. The code designs are discussed in [3]–[6]. These codes offer the same degree of delay reduction as the passive shielding technique, with much less area overhead (ranging from 44% to 62.5%). Unfortunately, none of the referred papers addresses the mapping between data words and code words for the CODECs. So far, all the CODEC design approaches are based on bus partitioning (which breaks a big bus into a number of small groups (lanes) and applies CAC coding on each group independently). Such an approach has to deal with the cross talk across the group boundaries. Several different schemes are proposed to handle this inter-group cross talk, such as group inversion and bit overlapping [4], [5]. In all cases, more wires are needed and therefore the overall area overhead is higher than the theoretical lower bound. Due to this cornstalk problems like delay power dissipation, leakage currents will come in to picture and leads to failure of the chip.

II. RELATED WORK

As the crosstalk is dependent on the data transition patterns on the bus, patterns can be classified based on the severity of the crosstalk they impose on the bus. Crosstalk patterns are classified as 0C, 1C, 2C, 3C, and 4C patterns, respectively, as shown in

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Survey on PAPR Reduction Techniques in OFDM System

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Abstract: Orthogonal frequencydivision multiplexing(OFDM) is perhaps the most spectrallyefficient, robust transmissiontechniquediscoveredsofarforcommunication systems,anditalsomitigatestheproblemofmultipath environment.Duetoitsadvantagesinmultipathfadingchannele.g.robustagainst ISI,ICIandsomeotheradvantages likebestQoSformultipleusers,efficientusageofbandwidthitissuggestedtobethemodulationtechniquefornext generation4Gnetworkse.g.LTE. Butalongwith allitsadvantagestherearesomedisadvantagesalsoe.g.HighPAPR (PeaktoAveragePowerRatio)atthetransmitterendandBER(BitErrorRate)atthereceivingend.OFDMisusedin thedownlink of4Gnetworks.&Pre-codingetcaresuggestedbutnoneofthemisreduceToreducetheproblems of OFDMsometechniquese.g.SLM,PTS, Clipping,Coding, thePAPRandBERtoanacceptablevalue. ThisPaperwill discusssometechniquesofPAPR&BERreduction,andtheiradvantagesanddisadvantagesindetail.

Keywords:PAPR,BER,OFDM,PAPRreductiontechniques.

I. INTRODUCTION

Withtheevergrowingdemandofthisgeneration,need for highspeedcommunicationhasbecomeanutmostpriority. Variousmulticarriermodulationtechniqueshaveevolved inordertomeetthesedemands,fewnotableamongthem beingCodeDivision MultipleAccess(CDMA)and OrthogonalFrequencyDivisionMultiplexing (OFDM). OrthogonalFrequencyDivision Multiplexingis a frequency–divisionmultiplexing (FDM)schemeutilized asadigitalmulti–carriermodulation method.Alarge number ofcloselyspacedorthogonalsub–carriersisused to carrydata. The datais dividedinto severalparallel streamsofchannels,oneforeach sub–carriers.Eachsub – carrier is modulated with a conventionalmodulation scheme(suchasQPSK)atalowsymbol rate,maintaining totaldataratessimilartotheconventional singlecarrier modulation schemesinthesamebandwidth. Orthogonal Frequency Division Multiplexing (OFDM) is a Multi-Carrier Modulation technique in which asinglehigh ratedata-streamisdividedintomultiplelow rate data-streamsandismodulatedusingsub-carriers which are orthogonalto each other. OFDM isa "Multi-Carrier Transmission Scheme."ODFM isa good solution for highspeeddigital communications.Inthisthedatatobe transmittedis spreadedover a large number of orthogonal carriers, each being modulated at a low rate.Thecarriers can be made orthogonal by appropriatelychoosing the frequency spacing between them.

Orthogonal frequency division multiplexing (OFDM) is a widely used modulation and multiplexing technology, which has become thebasis ofmanytelecommunicationsfields.ThereforeOFDMis anadvancedmodulationtechniquewhichis suitablefor high-speeddatatransmissionduetoits advantages in dealing with the multipath propagationproblem,high data rateandbandwidthefficiency.

OFDM haveseveralattractive features whichmake it more advantageous for high speed datatransmission overother data transmission techniques. These featuresincludes

(i)HighSpectralEfficiency
(ii) Robustnessto channelfading
(iii)Flexibilit
y
(iv)
Easyequalization

But inspiteof these benefits there are some disadvantagesin usingOFDM:
(i) OFDM signalexhibits veryhigh Peak to Average PowerRatio(PAPR)
(ii)Verysensitivetofrequencyerrors(Tx. &Rx.offset)
(iii)IntercarrierInterference(ICI)betweenthe subcarriers

OFDMhavegotcertaindisadvantages also.Oneofthe majordisadvantages ofOFDMishighPAPRassociated withthetransmitted signal.LargePAPRleadstobothin-banddistortion andoutofbandradiation.Italsoincreases the complexity of the analog-to-digital and digital-to analogconverterandreducestheefficiency oftheRadio-Frequency (RF) power amplifier used. Therefore itis useful toreducethePAPRoftheOFDM system. Inthis paper weare studying different techniques to reduce PAPRinofdmsystem.

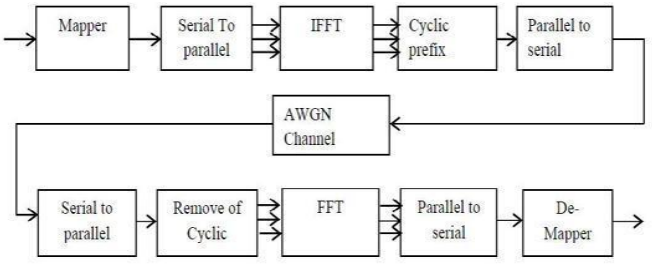

Fig1. SimpleblockdiagramofOFDMsystem

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Smart Home Management System Based on MSP430 and Wi-Fi

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Abstract: This paper presents a smart home management system. To protect the home from the outsider's entry and provide the automation is very important now-a-days. This project mainly focusing on these issues, to do this project, we are using the MSP430G2553 microcontroller. To measure the several emergency parameters and the weather parameters, we are using the different sensors. The power consumed by the loads in the home was measured by the energy meter and the total number of units is also displayed on the LCD. The GSM modem is used to send the alert messages to the user if any of the sensors value goes beyond the threshold level. All the sensor levels and the total number of units consumed were sent to the predefined web page by using the Wi-Fi module. The Wi-Fi module was interfaced to the controller through the UART port. The emergency switch provided was to get the status of all the sensors values in the form of SMS.

Keywords: MSP430G2553, LCD, GSM, Wi-Fi, UART, SMS

I. INTRODUCTION

Our system consists of a home controller system, community management system, and cloud server platform. The home controller system comprises network connections, digital input and output (DIO) lines through which the home controller system can integrate physical and conversion sensors and be extended to enable security settings, energy reporting, and scenario control. The community management system not only provides community and home management services and third- party services that enable communication with the cloud service platform but also integrates a central monitor and control system, surveillance system.

Therefore, the community management system forms a location-based, integrated eco broker system. The core management on the cloud service platform focuses on the management and maintenance of communities and homes andprovides remote control and data analysis functions to fixed carriers (e.g., fixed panels and smart TVs) and mobile carriers (e.g., smartphones and tablet computers).

This study first proposed a hierarchical, smart home-service architecture, which employed standard interface devices at the home end to separate the logic and user interfaces, and achieving multiple in-home displays.

Moreover, this study applied a community broker role to integrate smart home services such as managing environment deployment operations, reducing the manual labor required of community management personnel, providing electronic information services, supporting diverse services, and extending the community's integration with the surrounding environment. Therefore, a complete and integrated smart home system can be achieved. In addition, integrating cloud-based services with community services provided location-based services.

II. OBJECTIVE

The main aim of this project is to protect the home from the outsider's entry and provide the automation is very important now-a-days. This project mainly focusing on these issues, to do this project, we are using the MSP430G2553 microcontroller.

III. AIM

The main aim of this project is to develop a smart home management with sensor interface device is essential for sensor data collection of wireless sensor networks (WSN) in mobile environments.

IV. BLOCK DIAGRAM

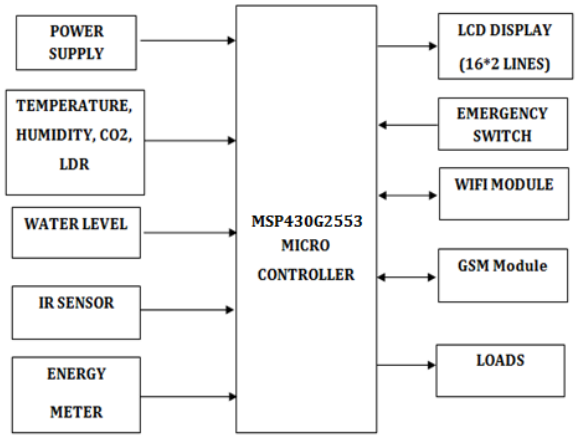

Fig 1: Block diagram of proposed system

The MSP430G2553microcontroller is based on a 16-bit MSP430CPU that combine themicrocontrollerwith embedded high-speed flash memory 16kb. Serial communications interfaces UARTs, SPI, I2C-bus and on-chip RAM make these devices very well suited for communication gateways and protocol converters, soft modems, voice recognition and low end imaging, providing both large buffer size and high processing power. Various 16-bit timers, 10-bit ADC, PWM channels and 16 fast GPIO lines with up to edge sensitive external interrupt pins make these microcontrollers suitable for industrial control and medical systems.

POWER SUPPLY

The input to the circuit is applied from the regulated power supply. The A.C input i.e., 230V from the mains supply is step down by the transformer to 12V and is fed to a rectifier. The output obtained from the rectifier is a pulsating D.C voltage. So in order to get a pure D.C voltage, the output voltage from the rectifier is fed to a filter to remove any A.C components present even after rectification. Now, this voltage is given to a voltage regulator to obtain a pure constant D.C voltage.

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SurveyonRectangularMicrostrip Patch Antenna

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***Abstract*- This paper boons a survey on the microstrip patch antenna and there historical perspectives. The microstrip antenna has better prospects and advantages which make greater progress in latest years. In this paper microstrip antenna, types, feeding techniques and application, advantage and disadvantages over conventional microwave antennas are presented. Dual and circular polarizations, dual-frequency operation, frequency agility, broad band-width and feed line flexibility were also discussed.**

***Index Terms*-Microstrip Antenna (MSA), Feeding Techniques, Advantages**.

I.INTRODUCTION

Antenna is a transducer that converts one form into another and transmits orreceives the electromagnetic waves.Microstripantennaconsistsofradiatingpatchononeside ofdielectricsubstrateandgroundplaneontheotherside.
Microstripantennasprinteddirectlyontoacircuitboardbecause ofthattheyareveryuseful.Radiatingpatchismadeofconducting material(copperorgold)withmanydifferent shapes likerectangular, circular, and elliptical andmanymore shapes.
The rectangularpatchantennaisone-halfwavelengthlongofrectangularmicrostriptransmissionline .
ThePatchantennaisnarrowbandandwide-beamantenna.Fabricationofpatchantennadonebyetchingthee lement
patterninmetaltrace with a continuous metal layer bondedtotheoppositesideofthesubstrate[1].

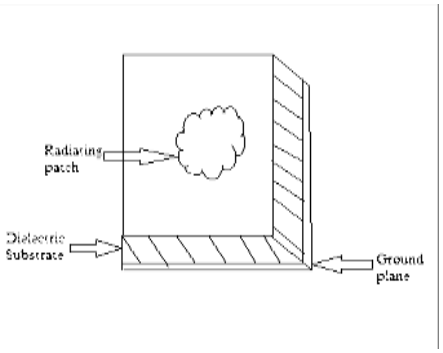

Figure-1:Microstrip patch antenna.

II. MICROSTRIPANTENNA

Microstripantennawasintroduced by Deschampsin 1950s.Laterthatmany
authorinvestigateonitlikeJameshall,DavidM.Pozar.

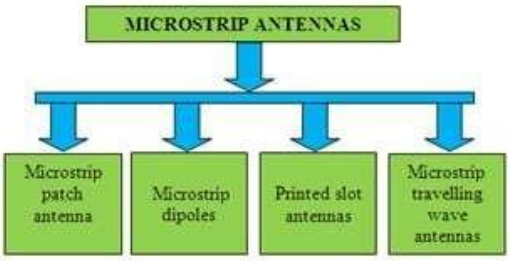

Figure-2:GroupsofMicrostrippatchantenna

Themicrostrippatchantennashavedualandcircularpolarizatio ns,dual-frequencyoperation,frequencyagility, broad band-width,feedlineflexibility,andbeamscanning Omni-directionalpatterning[2].ThereareUandHslotsinrectangularpa tchthatmakesdualandtriplefrequencyofoperation.Thebandw idthimpedanceoftheantenna is
150MHz and1.26GHz band for U slot and154MHz, 484MHzand396MHzforH slot[3].

H-SLOTPATCH ANTENNA:H-shapedslotsformedbycutting threeslotsfromarectangularpatch[4,5]duetowhich gain and bandwidth of micro strip antenna enhanced.Thesizeofgroundplaneis(L XW)90X100 mmandthicknessofdielectricsubstrateis3.2mm.Thisantenna usedforcircularpolarizationwithsinglenarrowbandfrequency.

U-SLOTPATCH ANTENNA: Simplecoupledmicrostripantennawithrectangularpatchresults insingle- bandantenna.FordualbandoperationsingleU-slotiscutinthepatch.Thesizeis(LXW)32X40mm. Thepatchsubstratethicknessis1.57mm anddielectricconstant4.4.resonantfrequencyis3.6GHzand5.2 GHz.AsingleU-slotresultsindualbandantennaandinsertinganother U- slot in same patch results in triple band antenna.Bothprovidesatisfyingvaluesofgainanddirectivity[7] .

S-SLOTPATCHANTENNA: S-shapedslotcutatthecenter ofasquarepatchfor triplebandoperation. The frequencyratiooftheantennacontrolledbyadjustingtheS-shapedslotarmlength.Thesizeis(L XW)115X110 mmanddielectricsubstrateis1.06.Antennasprovidevery high gainanddirectivity and less frequency ratio[2].

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Detection of Forgery Region by using Feature Extraction with SURF and Its Comparative Analysis with SIFT technique

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Abstract
The invention of the internet has introduced the unimaginable growth and developments in the renowned research fields such as medicine, satellite imagery, image processing, security, biometrics, and genetics. The algorithms implemented in the 21st century has made the human life more comfortable and secure, but the security to the original documents belongs to the authenticated person is remained as concerned in the digital image processing domain. A new study is proposed in this research paper to detect the forgery detection in accurate manner using the adaptive over-segmentation and feature point matching. The integration of the block-based and key point-based forgery detection methods is the key idea in the proposed study and the detection of the suspected regions are detected by the adaptive non-overlapping and irregular blocks and this process is carried out using the adaptive over-segmentation algorithm. The extraction of the feature points is performed by performing the matching between the each block and its features. The feature points are gradually replaced by using the super pixels in the proposed Forgery Region Extraction algorithm and then merge the neighboring blocks that have similar local color features into the feature blocks to generate the merged regions; finally, it applies the morphological operation to the merged regions to generate the detected forgery regions. The proposed forgery detection algorithm achieves much better detection results even under various challenging conditions the earlier methods in all aspects. We will analyze the results obtained by the both SIFT and SURF and it is proved that the proposed technique SURF is giving more satisfactory results by both subjective and objective analysis.

Keywords: *Copy-move, Forgery detection, the adaptive over-segmentation, feature point matching, neighboring blocks, super pixels, feature points.*

1. INTRODUCTION

The digital image processing is the prominent research domain in the 21st century where its presence is clearly observed in various fields. The digital image processing is a important constituent of the electromagnetic spectrum and the security field remain as one of the major research areas on which lot of research needs to be done to secure the privacy and the confidential information with greater robustness. The forgery has become the major concerned area in the 21st and a lot of research is carried out in the literature but still achieving the desired results remained as unsolved issue. The digital images are considered as the primary source of the medium used for too meet the very purpose which includes the data transmission, the data compression, the data hiding and the various other applicative research areas. The forgery of the images has reach to the new level to pose serious issues in the 21st century and it creates the situation where the difference between the forged and non forged documents identification become the biggest drawback, which is addressed in efficient way using the proposed work.

Image forgery performance is easy nowadays. One of the most famous manipulations on digital image is copy-move forgery, in which we have to copy the particular region and paste it to another part of the same image. In literature we saw that so many forgery detection techniques are developed to copy–move forgery detection. Fridrich et al.proposed forgery detection technique in which input image is segmented into overlapped rectangular blocks to find tampered regions with the help of Discrete Cosine Transform (DCT) coefficient. Luo et al. for block feature we used RGB colour components as well as direction