



MOHAMED SATHAK A J COLLEGE OF ENGINEERING

Sponsored by Mohamed Sathak Trust
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Siruseri IT Park, Egattur, Chennai 603 103

B.E – ELECTRONICS AND COMMUNICATION ENGINEERING

S.NO	Name of the course that include experiential learning through Project work/ Internship
1	IT6005- Digital Image Processing
2	EC6001- Medical Electronics
3	EC6602 –Antenna and Wave Propagation
4	EC6702- Optical Communication and Networks
5	EC6502- Digital Signal Processing
6	EC6303-Signals and Systems
7	EC6703- Embedded and Real Time Systems
8	EC6405- Control System Engineering
9	EC6801- Wireless Communication
10	EC6504- Microprocessor and Microcontroller
11	EC6201 - Electronic Devices
12	EC6601- VLSI Design
13	CS6551- Computer Networks
14	EC6802 - Wireless Networks



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S.No.	Subject Code	Subject Name	Course that include experimental learning through project work
1	IT6005	Digital Image Processing	Digital image fundamentals, Image enhancement, , edge linking and boundary deduction, region based segmentation, Morphological Processing, erosion and dilation.


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The student should be made to:

- Learn digital image fundamentals.
- Be exposed to simple image processing techniques.
- Be familiar with image compression and segmentation techniques.
- Learn to represent image in form of features.

UNIT I DIGITAL IMAGE FUNDAMENTALS**8**

Introduction – Origin – Steps in Digital Image Processing – Components – Elements of Visual Perception – Image Sensing and Acquisition – Image Sampling and Quantization – Relationships between pixels – color models.

UNIT II IMAGE ENHANCEMENT**10**

Spatial Domain: Gray level transformations – Histogram processing – Basics of Spatial Filtering – Smoothing and Sharpening Spatial Filtering – **Frequency Domain:** Introduction to Fourier Transform – Smoothing and Sharpening frequency domain filters – Ideal, Butterworth and Gaussian filters.

UNIT III IMAGE RESTORATION AND SEGMENTATION**9**

Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering **Segmentation:** Detection of Discontinuities – Edge Linking and Boundary detection – Region based segmentation – Morphological processing – erosion and dilation.

UNIT IV WAVELETS AND IMAGE COMPRESSION**9**

Wavelets – Subband coding – Multiresolution expansions – **Compression:** Fundamentals – Image Compression models – Error Free Compression – Variable Length Coding – Bit-Plane Coding – Lossless Predictive Coding – Lossy Compression – Lossy Predictive Coding – Compression Standards.

UNIT V IMAGE REPRESENTATION AND RECOGNITION**9**

Boundary representation – Chain Code – Polygonal approximation, signature, boundary segments – Boundary description – Shape number – Fourier Descriptor, moments – Regional Descriptors – Topological feature, Texture – Patterns and Pattern classes – Recognition based on matching.

TOTAL: 45 PERIODS**OUTCOMES:**

Upon successful completion of this course, students will be able to:

- Discuss digital image fundamentals.
- Apply image enhancement and restoration techniques.
- Use image compression and segmentation Techniques.
- Represent features of images.

TEXT BOOK:

1. Rafael C. Gonzales, Richard E. Woods, "Digital Image Processing", Third Edition, Pearson Education, 2010.

REFERENCES:

1. Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins, "Digital Image Processing Using MATLAB", Third Edition Tata Mc Graw Hill Pvt. Ltd., 2011.




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AUTOMATED DETECTION OF WHITE BLOOD CELLS CANCER DISEASES

A PROJECT REPORT

Submitted by

E.Sujatha (Reg.no:311815106030)
M.Maimoon Asiya (Reg.no:311815106013)

In partial fulfillment for the award of the degree

Of

BACHELOR OF ENGINEERING

In

**ELECTRONICS AND COMMUNICATION ENGINEERING
MOHAMED SATHAK A.J. COLLEGE OF ENGINEERING
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APRIL 2019



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ABSTRACT

Blood smear images are efficient and reliable source of information in extraction of features in case of cancer detection. In assessment of cancer detection like leukemia cancer image feature extraction and reduction has to be carried out efficiently. In this paper, we discuss a robust image feature extraction algorithm using scale invariant feature points for keypoint extraction and GLCM Shape Analysis. For matching the keypoints, an k nearest network algorithm is developed with tumbling functions of model. This technique assist in comparing the scale invariant feature points and GLCM features. From the obtained outcomes, the capability of the obtained accuracy is estimated and it is wrapped up that the proposed approach is efficient in regards to previous algorithm.




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BONAFIDE CERTIFICATE

Certified that this project report "**AUTOMATED DETECTION OF WHITE BLOOD CELLS CANCER DISEASES**" is the bonafide work of "E.SUJATHA(311815106030), M.MAIMOONASIYA(311815106013)" who carried out the project work under my supervision.

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Submitted for viva-voice examination held on...11/4/19.....

INTERNAL EXAMINER

EXTERNAL EXAMINER



CHAPTER 7

CONCLUSION AND FUTURE WORK

7.1 CONCLUSION

This paper proposed a method to automate the segmentation, feature extraction and classification of red and white blood cells using KNN, NN, and SVM classification algorithm. Several improvements were made to the SVM algorithm, including an initialization step to find 12-neighbor connected component. Additionally, the proposed model features an enhanced accuracy of selecting the correct circle from three candidate circles, the capability to detect irregular cells, the use of a dynamic number of iterations, and improved detection of overlapping cells. The proposed method performed the segmentation and classification of WBCs and RBCs well when results were compared with the ground truth, which was determined by experts. The following segmentation and counting accuracies were achieved using the proposed method.

7.2 FUTURE WORK

The system eliminates the need for designing a separate system for designing a separate system for detecting each retinal anatomical structure. One compact novel system was used to extract three different anatomical structures with various features and textures.



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S.No.	Subject Code	Subject Name	Course that include experimental learning through project work
1	EC6001	Medical Electronics	Electro-Physiology and Bio-potential recording, Assist devices.

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UNIT I ELECTRO-PHYSIOLOGY AND BIO-POTENTIAL RECORDING

9

The origin of Bio-potentials; biopotential electrodes, biological amplifiers, ECG, EEG, EMG, PCG, lead systems and recording methods, typical waveforms and signal characteristics.

UNIT II BIO-CHEMICAL AND NON ELECTRICAL PARAMETER MEASUREMENT

9

pH, PO₂, PCO₂, colorimeter, Auto analyzer, Blood flow meter, cardiac output, respiratory measurement, Blood pressure, temperature, pulse, Blood Cell Counters.

UNIT III ASSIST DEVICES

9

Cardiac pacemakers, DC Defibrillator, Dialyser, Heart lung machine

UNIT IV PHYSICAL MEDICINE AND BIOTELEMETRY

9

Diathermies- Shortwave, ultrasonic and microwave type and their applications, Surgical Diathermy Telemetry principles, frequency selection, biotelemetry, radiopill, electrical safety

UNIT V RECENT TRENDS IN MEDICAL INSTRUMENTATION

9

Thermograph, endoscopy unit, Laser in medicine, cryogenic application, Introduction to telemedicine

TOTAL: 45 PERIODS**OUTCOMES:**

Upon completion of the course, students will be able to:

- Discuss the application of electronics in diagnostic and therapeutic area.
- Measure biochemical and various physiological information.
- Describe the working of units which will help to restore normal functioning.

TEXTBOOKS:

1. Leslie Cromwell, "Biomedical Instrumentation and Measurement", Prentice Hall of India, New Delhi, 2007.
2. John G. Webster, "Medical Instrumentation Application and Design", 3rd Edition, Wiley India Edition, 2007

REFERENCES:

1. Khandpur, R.S., "Handbook of Biomedical Instrumentation", TATA Mc Graw-Hill, New Delhi, 2003.
2. Joseph J. Carr and John M. Brown, "Introduction to Biomedical Equipment Technology", John Wiley and Sons, New York, 2004.




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BRAIN TUMOR SEGMENTATION AND CLASSIFICATION

USING NEURAL NETWORKS

A PROJECT REPORT

Submitted by

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S.B. VASHA BANU (Reg.no:311815106034)

In partial fulfillment for the award of the degree

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BONAFIDE CERTIFICATE

Certified that this project report "**BRAIN TUMOR SEGMENTATION AND CLASSIFICATION USING NEURAL NETWORKS**" is the bonafide work of "M. JANAKI PRIYA (3118151060010), S.B. VASHA BANU(311815106034)" who carried out the project work under my supervision.

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ABSTRACT

For study of brain tumor detection and segmentation the MRI Images is very useful in recent years. Due to MRI Images we can detect the brain tumor. For detection of unusual growth of tissues and blocks of blood in nervous system can be seen in an MRI Images. The first step of detection of brain tumor is to check the symmetric and asymmetric Shape of brain which will define the abnormality. After this step the next step is segmentation which is based on two techniques

- 1) OSTU'S METHOD
- 2) REGION PROPERTY(CONTOUR).

These two techniques are used to design the image in MRI. Now by this help of design we can detect the boundaries of brain tumor and calculate the actual area of tumor. In this the Otsu's method is used to give the certain information like rebuilt of missing edges and extracting the silent edges. Accuracy and clarity in an MRI Images is dependent on each other.




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CHAPTER 8

CONCLUSION

8.1 CONCLUSION

We propose a novel NN-based method for segmentation and segmentation of brain tumors in MRI images. We start by a **pre-processing** stage consisting of bias field correction, intensity normalization.

In designing our method, we address the heterogeneity caused by multi-site multi-scanner acquisitions of **MRI images** using intensity normalization . We show that this is important in achieving a good segmentation. Brain tumors are highly variable in their spatial localization and structural composition, so we have investigated the use of data augmentation to cope with such variability. The proposed work uses contour based segmentation to segment brain tumor from MRI images. The from **segmented region GLCM** and shape features are extracted which fed into artificial neural network for classification.




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S.No.	Subject Code	Subject Name	Course that include experimental learning through project work
1	EC6602	Antenna and Wave Propagation	Fundamental of Radiation, Micro strip antennas, special antennas.

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OBJECTIVES:

- To give insight of the radiation phenomena.
- To give a thorough understanding of the radiation characteristics of different types of antennas
- To create awareness about the different types of propagation of radio waves at different frequencies

UNIT I FUNDAMENTALS OF RADIATION

9

Definition of antenna parameters - Gain, Directivity, Effective aperture, Radiation Resistance, Band width, Beam width, Input Impedance. Matching – Baluns, Polarization mismatch, Antenna noise temperature, Radiation from oscillating dipole, Half wave dipole. Folded dipole, Yagi array.

UNIT II APERTURE AND SLOT ANTENNAS

9

Radiation from rectangular apertures, Uniform and Tapered aperture, Horn antenna, Reflector antenna, Aperture blockage, Feeding structures, Slot antennas, Microstrip antennas – Radiation mechanism – Application, Numerical tool for antenna analysis

UNIT III ANTENNA ARRAYS

9

N element linear array, Pattern multiplication, Broadside and End fire array – Concept of Phased arrays, Adaptive array, Basic principle of antenna Synthesis-Binomial array

UNIT IV SPECIAL ANTENNAS

9

Principle of frequency independent antennas -Spiral antenna, Helical antenna, Log periodic. Modern antennas- Reconfigurable antenna, Active antenna, Dielectric antennas, Electronic band gap structure and applications, Antenna Measurements-Test Ranges, Measurement of Gain, Radiation pattern, Polarization, VSWR

UNIT V PROPAGATION OF RADIO WAVES

9

Modes of propagation, Structure of atmosphere, Ground wave propagation, Tropospheric propagation, Duct propagation, Troposcatter propagation, Flat earth and Curved earth concept Sky wave propagation – Virtual height, critical frequency, Maximum usable frequency – Skip distance, Fading, Multi hop propagation

TOTAL: 45 PERIODS**OUTCOMES:**

Upon completion of the course, students will be able to:

- Explain the various types of antennas and wave propagation.
- Write about the radiation from a current element.
- Analyze the antenna arrays, aperture antennas and special antennas such as frequency independent and broad band

TEXT BOOK:

1. John D Kraus, "Antennas for all Applications", 3rd Edition, Mc Graw Hill, 2005

REFERENCES:

1. Edward C.Jordan and Keith G.Balmain" Electromagnetic Waves and Radiating Systems" Prentice Hall of India, 2006
2. R.E.Collin,"Antennas and Radiowave Propagation", Mc Graw Hill 1985.
3. Constantine.A.Balanis "Antenna Theory Analysis and Design", Wiley Student Edition, 2006.
4. Rajeswari Chatterjee, "Antenna Theory and Practice" Revised Second Edition New Age International Publishers, 2006.



DETECTION OF BRAIN TUMOUR USING MICROSTRIP PATCH ANTENNA

A PROJECT REPORT

Submitted by

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A. MOHAMED NASIM (Reg.no:311815106017)

P. PRAKASH (Reg.no:311815106021)

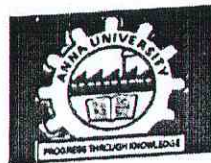
In partial fulfillment for the award of the degree

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IN

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BONAFIDE CERTIFICATE

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INTERNAL EXAMINER

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ABSTRACT

Wearable antenna are used for body wearing electronic devices such as watches due to its body wearing idea of these type devices these devices should be made upon low radiating towards the body because of tissue affection on the body here a body wearable microwave antenna is made to analyse the radiation over the body using this sensing of the radiation detected tumour affection on a particular part of the body (head) is analysed and detected in the combination of the microwave analysis.

Tamil Abstract (சுருக்கம்)

அணியக்கூடிய ஆன்டென்னா உடலில் அணிந்துகொள்ளும் நுண்ணலை ஆன்டென்னா பகுப்பாய்வு செய்யப்படுவதால் உடலில் திகழ் பாசம் காரணமாக இந்த சாதனங்கள் உடலின் மீது குறைந்த கதிர்வீச்சின் போது உருவாக்கப்படும் இந்த வகை சாதனங்களை அதன் உடம்பில் அணிந்து கொள்வதால், கதிரியக்கத்தின் இந்த உணர்வை பயன்படுத்தி உடல் மீது கதிர்வீச்சு உடலின் ஒரு குறிப்பிட்ட பகுதியில் (தலையை) உள்ள நுரையீரல் பாதிப்பை கண்டறிந்து நுண்ணலை பகுப்பாய்வு கலவையில் கண்டறியப்பட்டது




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CHAPTER 7

CONCLUSION AND FUTURE WORK

7.1 CONCLUSION

A patch antenna in the radiator and partial ground plane has been designed and simulated. The proposed antenna exhibits five bands, it supports for 2.55 GHz, as well as good radiation properties. Therefore this antenna suitable for Super High Frequency application are other biomedical applications that works in these frequencies. Patch antenna for single band frequency applications with SISO technique is simulated.

7.2 FUTURE WORK

- To compare return loss and VSWR value of microstrip patch antenna with microstrip feed line technique and microstrip patch antenna with coaxial feed line results at a frequency range of 2 to 4 GHz.
- To analyze and design this microstrip patch antenna with any shape in the partial ground plane by using microstrip feeding method.
- Results of studies have also been used to propose a methodology to design other frequency bands.



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S.No.	Subject Code	Subject Name	Course that include experimental learning through project work
1	EC6702	Optical Communication and Networks	Introduction to optical fibers, fiber optical sources and coupling.


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OBJECTIVES:

- To Facilitate the knowledge about optical fiber sources and transmission techniques
- To Enrich the idea of optical fiber networks algorithm such as SONET/SDH and optical CDMA.
- To Explore the trends of optical fiber measurement systems.

UNIT I INTRODUCTION TO OPTICAL FIBERS

9

Evolution of fiber optic system- Element of an Optical Fiber Transmission link-- Total internal reflection- Acceptance angle -Numerical aperture – Skew rays Ray Optics-Optical Fiber Modes and Configurations -Mode theory of Circular Wave guides- Overview of Modes-Key Modal concepts- Linearly Polarized Modes -Single Mode Fibers-Graded Index fiber structure.

UNIT II SIGNAL DEGRADATION OPTICAL FIBERS

9

Attenuation - Absorption losses, Scattering losses, Bending Losses, Core and Cladding losses, Signal Distortion in Optical Wave guides-Information Capacity determination -Group Delay-Material Dispersion, Wave guide Dispersion, Signal distortion in SM fibers-Polarization Mode dispersion, Intermodal dispersion, Pulse Broadening in GI fibers-Mode Coupling -Design Optimization of SM fibers- RI profile and cut-off wavelength.

UNIT III FIBER OPTICAL SOURCES AND COUPLING

9

Direct and indirect Band gap materials-LED structures -Light source materials -Quantum efficiency and LED power, Modulation of a LED, lasers Diodes-Modes and Threshold condition -Rate equations -External Quantum efficiency -Resonant frequencies -Laser Diodes, Temperature effects, Introduction to Quantum laser, Fiber amplifiers- Power Launching and coupling, Lencing schemes, Fiber -to- Fiber joints, Fiber splicing-Signal to Noise ratio , Detector response time.

UNIT IV FIBER OPTIC RECEIVER AND MEASUREMENTS

9

Fundamental receiver operation, Pre amplifiers, Error sources - Receiver Configuration- Probability of Error - Quantum limit.Fiber Attenuation measurements- Dispersion measurements - Fiber Refractive index profile measurements - Fiber cut- off Wave length Measurements - Fiber Numerical Aperture Measurements - Fiber diameter measurements.

UNIT V OPTICAL NETWORKS AND SYSTEM TRANSMISSION

9

Basic Networks - SONET / SDH - Broadcast - and -select WDM Networks -Wavelength Routed Networks - Non linear effects on Network performance -Link Power budget -Rise time budget- Noise Effects on System Performance-Operational Principles of WDM Performance of WDM + EDFA system - Solutions - Optical CDMA - Ultra High Capacity Networks.

TOTAL: 45 PERIODS**OUTCOMES:**

Upon completion of the course, students will be able to:

- Discuss the various optical fiber modes, configurations and various signal degradation factors associated with optical fiber.
- Explain the various optical sources and optical detectors and their use in the optical communication system.
- Analyze the digital transmission and its associated parameters on system performance.

TEXT BOOKS:

1. Gerd Keiser, "Optical Fiber Communication" Mc Graw -Hill International, 4th Edition., 2010
2. John M. Senior , "Optical Fiber Communication", Second Edition, Pearson Education, 2007.

REFERENCES:

- 1.Ramaswami, Sivarajan and Sasaki "Optical Networks", Morgan Kaufmann, 2009.



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**DESIGN AND ANALYSIS OF RELIABLE VIDEO TRANSMISSION
THROUGH VISIBLE LIGHT (LI-FI)**

A PROJECT REPORT

Submitted by

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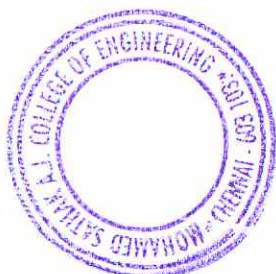
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APRIL 2019

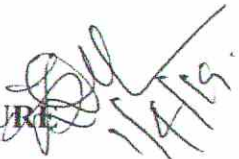


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BONAFIDE CERTIFICATE

Certified that this project report "**DESIGN AND ANALYSIS OF RELIABLE VIDEO TRANSMISSION THROUGH VISIBLE LIGHT(Li-Fi)**" is the bonafide work of "A.SABEENA BEGAM(311815106023), S.SUBASHREE(311815106028), A.THAMEMUNISSA@THASMINANISSA (311815106032)" who carried out the project work under my supervision.


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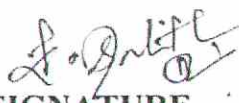
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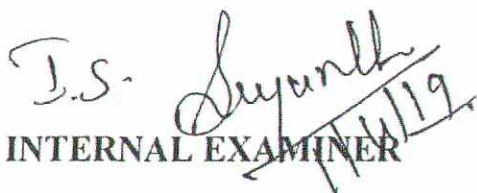
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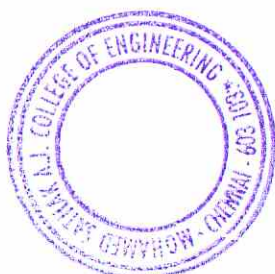
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INTERNAL EXAMINER


EXTERNAL EXAMINER



ABSTRACT

White LEDs (Light Emitting Diodes) in Visible Light Communication (VLC) is an emerging technology that is being researched so it can eventually be used for common communications systems. LEDs have a number of advantages, one of which is long life expectancy. However, like many emerging technologies, VLC has many technical issues that need to be addressed. We proposed a prototype of video file through li-fi with rate of 9600 gbps. We developed a practical implementation of VLC and can be demonstrated. In particular we focused on designing a prototype of VLC that can be used without having to make major changes to the present infrastructure with two types of protocol — namely RS-232 and USB — for data transmission. The audio and data is the existing technology .the current technology we proposed is video transmission through li-fi



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CHAPTER 6

CONCLUSION

Summary

This thesis demonstrated a solution to the problem of integrating Visible Light Communication technology with present infrastructure, without having to make major changes to that infrastructure. The proposed system was segmented into two parts with different interface protocols and was demonstrated practically. Visible Light Communication is a rapidly growing segment of the field of communication. There are many advantages to using VLC. There are also many challenges. VLC will be able to solve many of the problems people have been facing for many years, mainly environmental and power usage issues. VLC is still in its beginning stages, but improvements are being made rapidly, and soon this technology will be able to be used in our daily lives. It is intended that this research will provide the starting steps for further study and development on USB to TTL interfaces where white LEDs can be used for data transmission. In spite of the research problems it is our belief that the VLC system will become one of the most promising technologies for the future generation in optical wireless communication.

6.1 Suggested Future Work

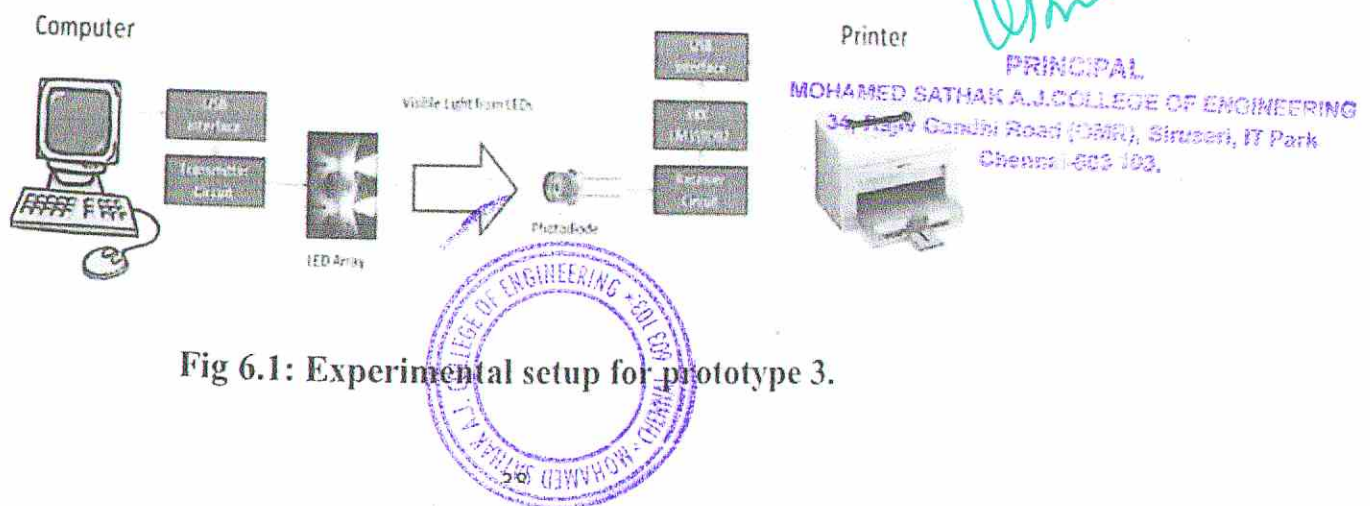


Fig 6.1: Experimental setup for prototype 3.

**A FLEXIBLE PROJECTED VR SYSTEM OF WALL MOUNTED
BUTTONS**

A PROJECT REPORT

Submitted by

MUJIF RAHMAN A

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SAMSUDEEN M

(Reg.no:311815106024)

In partial fulfillment for the award of the degree

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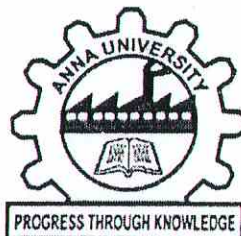
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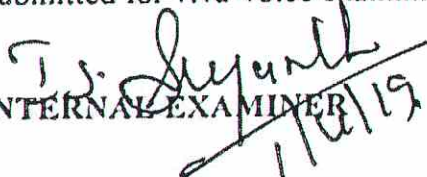

SIGNATURE

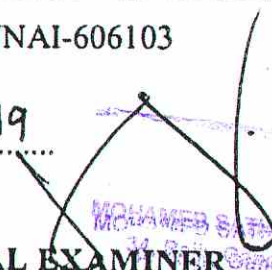
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INTERNAL EXAMINER


EXTERNAL EXAMINER



ABSTRACT

In this concept large interactive display with virtual touch buttons and sliders on a pale-colored flat wall. Our easy-to-install system consists of a front projector and a single commodity camera. A button touch is detected based on the area of the shadow cast by the user's hand; this shadow becomes very small when the button is touched. Our virtual slider is based on this touch-button mechanism. When tested, our scheme proved robust to differences in illumination. The response time for touch detection was about 150 ms. Our virtual slider has a quick response and proved suitable as a **controller** for a Breakout-style game.



A handwritten signature in blue ink, appearing to be "M. Sathak A.", written over a horizontal line.

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CONCLUSION AND RESULTS

In this paper, a virtual wall-mounted button is proposed. The proposed system projects virtual wall mounted buttons on a wall by a projector. The proposed system gets user's height and change buttons' vertical position. In addition, users can change button label and type. As a result of the user-test, the proposed system improves the problems of wall mounted buttons and has a possibility that it improves products and systems UX. On the other hand, user-test shows necessity to improve buttons' visibility.




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S.No.	Subject Code	Subject Name	Course that include experimental learning through project work
1	EC6502	Digital signal Processing	IIR filter design, FIR filter design, DSP applications.

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OBJECTIVES:

- To learn discrete Fourier transform and its properties
- To know the characteristics of IIR and FIR filters learn the design of infinite and finite impulse response filters for filtering undesired signals
- To understand Finite word length effects
- To study the concept of Multirate and adaptive filters

UNIT I DISCRETE FOURIER TRANSFORM

9

Discrete Signals and Systems- A Review – Introduction to DFT – Properties of DFT – Circular Convolution - Filtering methods based on DFT - FFT Algorithms -Decimation in time Algorithms, Decimation in frequency Algorithms - Use of FFT in Linear Filtering.

UNIT II IIR FILTER DESIGN

9

Structures of IIR - Analog filter design - Discrete time IIR filter from analog filter - IIR filter design by Impulse Invariance, Bilinear transformation, Approximation of derivatives - (LPF, HPF, BPF, BRF) filter design using frequency translation.

UNIT III FIR FILTER DESIGN

9

Structures of FIR - Linear phase FIR filter - Fourier Series - Filter design using windowing techniques (Rectangular Window, Hamming Window, Hanning Window), Frequency sampling techniques - Finite word length effects in digital Filters: Errors, Limit Cycle, Noise Power Spectrum.

UNIT IV FINITE WORDLENGTH EFFECTS

9

Fixed point and floating point number representations - ADC -Quantization- Truncation and Rounding errors - Quantization noise - coefficient quantization error - Product quantization error - Overflow error - Roundoff noise power - limit cycle oscillations due to product round off and overflow errors - Principle of scaling

UNITV DSP APPLICATIONS

9

Multirate signal processing: Decimation, Interpolation, Sampling rate conversion by a rational factor - Adaptive Filters: Introduction, Applications of adaptive filtering to equalization.

TOTAL (L:45+T:15): 60 PERIODS**OUTCOMES:**

Upon completion of the course, students will be able to

- apply DFT for the analysis of digital signals & systems
- design IIR and FIR filters
- characterize finite Word length effect on filters
- design the Multirate Filters
- apply Adaptive Filters to equalization

TEXT BOOK:

1. John G. Proakis & Dimitris G.Manolakis, "Digital Signal Processing – Principles, Algorithms & Applications", Fourth Edition, Pearson Education / Prentice Hall, 2007.

REFERENCES:

1. Emmanuel C..Ifeachor, & Barrie.W.Jervis, "Digital Signal Processing", Second Edition, Pearson Education / Prentice Hall, 2002.
2. Sanjit K. Mitra, "Digital Signal Processing – A Computer Based Approach", Tata Mc Graw Hill, 2007.
3. A.V.Oppenheim, R.W. Schafer and J.R. Buck, "Discrete-Time Signal Processing", 8th Indian Reprint, Pearson, 2004.
4. Andreas Antoniou, "Digital Signal Processing", Tata Mc Graw Hill, 2006.



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S.No.	Subject Code	Subject Name	Course that include experimental learning through project work
1	EC6303	Signals and Systems	Classification of signals and systems.

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UNIT I CLASSIFICATION OF SIGNALS AND SYSTEMS

9

Continuous time signals (CT signals) - Discrete time signals (DT signals) - Step, Ramp, Pulse, Impulse, Sinusoidal, Exponential, Classification of CT and DT signals - Periodic & Aperiodic signals, Deterministic & Random signals, Energy & Power signals - CT systems and DT systems- Classification of systems – Static & Dynamic, Linear & Nonlinear, Time-variant & Time-invariant, Causal & Noncausal, Stable & Unstable.

UNIT II ANALYSIS OF CONTINUOUS TIME SIGNALS

9

Fourier series analysis-spectrum of Continuous Time (CT) signals- Fourier and Laplace Transforms in CT Signal Analysis - Properties.

UNIT III LINEAR TIME INVARIANT- CONTINUOUS TIME SYSTEMS

9

Differential Equation-Block diagram representation-impulse response, convolution integrals-Fourier and Laplace transforms in Analysis of CT systems

UNIT IV ANALYSIS OF DISCRETE TIME SIGNALS

9

Baseband Sampling - DTFT - Properties of DTFT - Z Transform - Properties of Z Transform

UNIT V LINEAR TIME INVARIANT-DISCRETE TIME SYSTEMS

9

Difference Equations-Block diagram representation-Impulse response - Convolution sum- Discrete Fourier and Z Transform Analysis of Recursive & Non-Recursive systems

TOTAL (L:45+T:15): 60 PERIODS**OUTCOMES:**

Upon the completion of the course, students will be able to:

- Analyze the properties of signals & systems
- Apply Laplace transform, Fourier transform, Z transform and DTFT in signal analysis
- Analyze continuous time LTI systems using Fourier and Laplace Transforms
- Analyze discrete time LTI systems using Z transform and DTFT

TEXT BOOK:

1. Allan V.Oppenheim, S.Wilsky and S.H.Nawab, "Signals and Systems", Pearson, 2007.

REFERENCES:

1. B. P. Lathi, "Principles of Linear Systems and Signals", Second Edition, Oxford, 2009.
2. R.E.Zeimer, W.H.Tranter and R.D.Fannin, "Signals & Systems - Continuous and Discrete", Pearson, 2007.
3. John Alan Stuller, "An Introduction to Signals and Systems", Thomson, 2007.
4. M.J.Roberts, "Signals & Systems Analysis using Transform Methods & MATLAB", Tata McGraw Hill, 2007.




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ANOMALY DETECTION IN CROWD MOVEMENT

A PROJECT REPORT

Submitted by

SAMVEL.S

(Reg.no:311815106025)

In partial fulfilment for the award of the degree

Of

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in

ELECTRONICS AND COMMUNICATION ENGINEERING

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Who carried out the project work under my supervision.


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EXTERNAL EXAMINER



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ABSTRACT

A robust and efficient anomaly detection technique is proposed, capable of dealing with crowded scenes where traditional tracking-based approaches tend to fail. Initial foreground **segmentation** of the input frames confines the analysis to foreground objects and effectively ignores irrelevant background dynamics.

Input frames are split into non-overlapping cells, followed by extracting features based on motion, size and texture from each cell. Each feature type is independently analyzed for the presence of an anomaly. Unlike most methods, a refined estimate of object motion is achieved by computing the optical flow of only the foreground pixels. The motion and size features are modelled by an approximated version of kernel density estimation, which is computationally efficient even for large **training datasets**.




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CHAPTER-9

CONCLUSION AND FUTURE SCOPE

9.1 CONCLUSION AND FUTURE SCOPE

The results of proposed mechanism showed that we were able to detect the multiple moving objects in the **dynamic video frame** range used for experimentation. We firstly detected the moving crowds. Then the **segmentation of moving sub objects** was done in order to have them processed as singular identities. Once the objects are detected, the information was used for crowd tracking. Finally the speed calculation was done to detect the anomaly vulnerable movements of the crowd.




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S.No.	Subject Code	Subject Name	Course that include experimental learning through project work
1	EC6703	Embedded and Real time Systems	Introduction to embedded computing, embedded computing platform. Operating systems.

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OBJECTIVES:

The student should be made to:

- Learn the architecture and programming of ARM processor.
- Be familiar with the embedded computing platform design and analysis.
- Be exposed to the basic concepts of real time Operating system.
- Learn the system design techniques and networks for embedded systems

UNIT I INTRODUCTION TO EMBEDDED COMPUTING AND ARM PROCESSORS

9

Complex systems and micro processors- Embedded system design process -Design example: Model train controller- Instruction sets preliminaries - ARM Processor - CPU: programming input and output- supervisor mode, exceptions and traps - Co-processors- Memory system mechanisms - CPU performance- CPU power consumption.

UNIT II EMBEDDED COMPUTING PLATFORM DESIGN

9

The CPU Bus-Memory devices and systems-Designing with computing platforms - consumer electronics architecture - platform-level performance analysis - Components for embedded programs- Models of programs- Assembly, linking and loading - compilation techniques- Program level performance analysis - Software performance optimization - Program level energy and power analysis and optimization - Analysis and optimization of program size- Program validation and testing.

UNIT III PROCESSES AND OPERATING SYSTEMS

9

Introduction - Multiple tasks and multiple processes - Multirate systems- Preemptive real-time operating systems- Priority based scheduling- Interprocess communication mechanisms - Evaluating operating system performance- power optimization strategies for processes - Example Real time operating systems-POSIX-Windows CE.

UNIT V SYSTEM DESIGN TECHNIQUES AND NETWORKS

9

Design methodologies- Design flows - Requirement Analysis - Specifications-System analysis and architecture design - Quality Assurance techniques- Distributed embedded systems - MPSoCs and shared memory multiprocessors.

UNIT V CASE STUDY

9

Data compressor - Alarm Clock - Audio player - Software modem-Digital still camera - Telephone answering machine-Engine control unit - Video accelerator.

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course, students will be able to:

- Describe the architecture and programming of ARM processor.
- Outline the concepts of embedded systems
- Explain the basic concepts of real time Operating system design.
- Use the system design techniques to develop software for embedded systems
- Differentiate between the general purpose operating system and the real time operating system
- Model real-time applications using embedded-system concepts

TEXT BOOK:

1. Marilyn Wolf, "Computers as Components - Principles of Embedded Computing System Design", Third Edition "Morgan Kaufmann Publisher (An imprint from Elsevier), 2012.



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REFERENCES:

1. Jonathan W.Valvano, "Embedded Microcomputer Systems Real Time Interfacing", Third Edition Cengage Learning, 2012.
2. David. E. Simon, "An Embedded Software Primer", 1st Edition, Fifth Impression, Addison-Wesley Professional, 2007.
3. Raymond J.A. Buhr, Donald L.Bailey, "An Introduction to Real-Time Systems- From Design to Networking with C/C++", Prentice Hall, 1999.
4. C.M. Krishna, Kang G. Shin, "Real-Time Systems", International Editions, Mc Graw Hill 1997
5. K.V.K.K.Prasad, "Embedded Real-Time Systems: Concepts, Design & Programming", Dream Tech Press, 2005.
6. Sriram V Iyer, Pankaj Gupta, "Embedded Real Time Systems Programming", Tata Mc Graw Hill, 2004.



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**OBJECT RECOGNITION USING PERSPECTIVE
GLASS FOR BLIND /VISUALLY IMPAIRED**

A PROJECT REPORT

Submitted by

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EXTERNAL EXAMINER

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ABSTRACT

Perspective glass is wearable pair of glass which is designed for blind people which helps them in resolving a major difficulty they face such as identifying the objects or obstacles present before them during walking. The Perspective glass consists of a raspberry pi board, 5mpcamera, ultrasonic sensors, buzzer, headphone, power source. This glass is controlled by a Power button which when pushed ON, will take pictures of the surroundings with respect to the position of the person wearing it. The clarity and the resolution of the picture purely reside on the camera used. The captured information is transferred to the application software which is manually built with the help of Fire Base application. The transferred data is then analyzed with the help of library files that are interfaced to the application via Neural Network "Tensor Flow". Finally the captured image is recognized with the help of Tensor Flow, and the information regarding the object is given out as a voice output to the person via speaker/headphones. All the components are interfaced to the Raspberry pi board which act as the central processing unit. It has the overall control on this setup. In addition to that an Ultrasonic Sensor is connected to the setup which when sensing an obstacle within a particular distance of 3 meter, will produce a buzzer sound instantly giving a caution alert to the blind person. The overall setup is powered through an external power source (power bank).




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CHAPTER 7

RESULT AND ANALYSIS

This paper puts forward a system which allows blind people or people with low vision to detect and avoid hurdles/obstacles was implemented. The obstacle detector/recognition application provides a high detection rate on selected surroundings. In order to improve the robustness of this system a powerful camera could be used, allowing improved obstacle detection. The proposed system could be also applied to smart phones that have android OS and infrared emitter & sensor, thus enabling us to measure a depth map of the environment. This system could be advanced with **GPS data**, a trivial feature to most of the android smart.

This might be very important for the people who are blind by birth. It is because they would have not experienced any kind of facial expression ever before. Thus this may make the more interactive, attentive and attached to their surrounding environment.

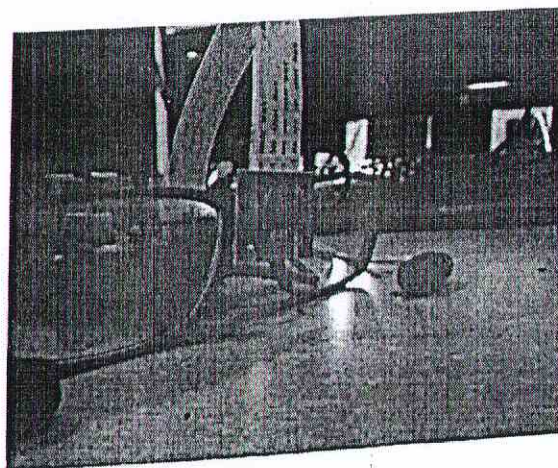


Fig 15. Final setup



**INTELLIGENT ROAD MONITORING SYSTEM FOR SAFETY
ENVIRONMENT**

A PROJECT REPORT

Submitted by

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H. MOHAMED IDRISKHAN (Reg.no:311815106016)

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ABSTRACT

One of the major problems faced by developing countries is the maintenance of the road condition. The **sensor-** based Pothole Detection System uses **ultrasonic Sensors** for detecting those potholes more accurately than before and **GPS** is used for plotting the location of potholes on the map, it will give an alert to the driver about potholes using the buzzer.

Here we propose the design of 'Pothole detection System' which assists the driver in avoiding pot-holes on the roads, by giving prior warnings. Warnings can be like buzzer if it's before to alert the driver. This system uses an ultrasonic sensor to sense the potholes before passing through it. This project aims to produce a Pothole Detection and Alert System. The main components of the project are the **Accelerometer sensor, Ultrasonic Sensor, GPS and Arduino Uno.**




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CHAPTER-7

7. CONCLUSION AND FUTURE SCOPE

7.1 CONCLUSION:

In this project model is, **Automatic detection** of pothole and humps and alerting vehicle drivers, this system helps the user to become more alert while driving since bad road areas like potholes and speed breakers.

The model proposed in this paper overcomes two major problems that concern the people the most and which leads to frequent accidents; the automatic detection of the potholes and the collision detection using **Ultrasonic sensor** the implemented system is most cost-effective and represented in a user-friendly manner so that the road mishaps which mainly occur due to bad road conditions are can be avoided.

This paper aspects vibration data, location data and different data from which pothole conditions can be determined. Identifying the potholes with the assist of **sensors** would be beneficial enough for road administration to operate and implement at low cost.



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**DIGITAL WATER METERING AND AUTOMATIC BILLING
GENERATION SYSTEM**

A PROJECT REPORT

Submitted by

AMIRA THASNEEM K M (Reg.no:311815106005)

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Of

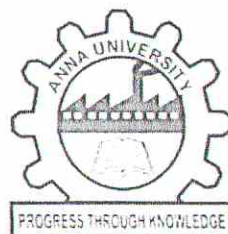
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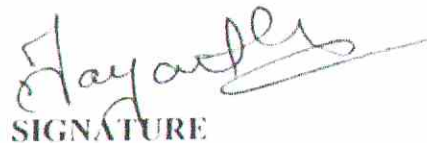
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MOHAMED SATHAK AJ

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COLLEGE OF ENGINEERING

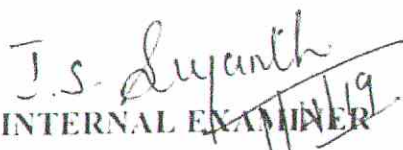
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CHENNAI-603103

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Submitted for viva-voice examination held on...01/04/19


INTERNAL EXAMINER


EXTERNAL EXAMINER





PRINCIPAL
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Chennai-603 103.

ABSTRACT

Water is one of our most important natural resources. We drink it, use it for cooking and cleaning, and depend on it in many aspects of our lives. For this motive water must be protected and managed economically. It should not be surprising, then, that we have a need to measure the amount of water we use. In this paper we present a short history of mechanical residential water meters with moving parts such as displacement and velocity water meters. Due to this traditional water meters we cannot able to get the actual consumption of water. And also for multispecialty flats utility and toilets will be located in different places so we cannot able to get the cumulative value of consumption of each and every flat. And also due to many moving parts in traditional meter there is a lot of chances to getting failure. For solving these problems we are going to introduce a digital water meter. So that we can able to get the flow consumption of each and every inlets of the flat though the digital flow meter and also we can able to generate the accurate water consumption bill for each flats. And also, it has a special advantage of leakage detection, open tap detection and no flow detection alarm. So that we can able avoid the complete leakage of water. We can also be able to monitor the data wirelessly using webpage. And also this project will help us to do effective water conservation.



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09445537082

CONCLUSION AND RESULTS

From the proposed system **Digital Water Metering** System, its results and discussions proved that this system works well, and can be put forward to practical applications. Since Water is one of our most important natural resources. It should not be surprising, then, that we have a need to measure the amount of water we use. For solving these problems we are going to introduce a digital water meter. So that we can able to get the flow consumption of each and every inlets of the flat though the digital flow meter and also we can able to generate the accurate water consumption bill for each flats. And also, it has a special advantage of leakage detection, open tap detection and no flow detection alarm. So that we can able avoid the complete leakage of water. We can also be able to monitor the data wirelessly using webpage. And also this project will help us to do effective water conservation. We also control the water flow to the apartments in case of not paying the bill using a solenoid valve. The main advantage of this paper is to measure water consumption for effective utilization and minimal wastage of water in future.



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MOHAMED SATHAK A J COLLEGE OF ENGINEERING

(Approved by AICTE, New Delhi and affiliated to Anna University, Chennai)

SiruseriIT Park, Egattur, Chennai - 603 103

S.No.	Subject Code	Subject Name	Course that include experimental learning through project work
1	EC6405	Control System Engineering	Control system modeling, time response analysis.

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UNIT I CONTROL SYSTEM MODELING

9

Basic Elements of Control System – Open loop and Closed loop systems - Differential equation - Transfer function, Modeling of Electric systems, Translational and rotational mechanical systems - Block diagram reduction Techniques - Signal flow graph

UNIT II TIME RESPONSE ANALYSIS

9

Time response analysis - First Order Systems - Impulse and Step Response analysis of second order systems - Steady state errors - P, PI, PD and PID Compensation, Analysis using MATLAB

UNIT III FREQUENCY RESPONSE ANALYSIS

9

Frequency Response - Bode Plot, Polar Plot, Nyquist Plot - Frequency Domain specifications from the plots - Constant M and N Circles - Nichol's Chart - Use of Nichol's Chart in Control System Analysis. Series, Parallel, series-parallel Compensators - Lead, Lag, and Lead Lag Compensators, Analysis using MATLAB.

UNIT IV STABILITY ANALYSIS

9

Stability, Routh-Hurwitz Criterion, Root Locus Technique, Construction of Root Locus, Stability, Dominant Poles, Application of Root Locus Diagram - Nyquist Stability Criterion - Relative Stability, Analysis using MATLAB

UNIT V STATE VARIABLE ANALYSIS

9

State space representation of Continuous Time systems - State equations - Transfer function from State Variable Representation - Solutions of the state equations - Concepts of Controllability and Observability - State space representation for Discrete time systems. Sampled Data control systems – Sampling Theorem - Sampler & Hold - Open loop & Closed loop sampled data systems.

TOTAL: 45 PERIODS**OUTCOMES:**

Upon completion of the course, students will be able to:

- Perform time domain and frequency domain analysis of control systems required for stability analysis.
- Design the compensation technique that can be used to stabilize control systems.

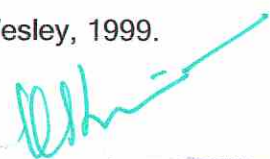
TEXTBOOK:

1. J.Nagrath and M.Gopal, "Control System Engineering", New Age International Publishers, 5th Edition, 2007.

REFERENCES:

1. Benjamin.C.Kuo, "Automatic control systems", Prentice Hall of India, 7th Edition, 1995.
2. M.Gopal, "Control System - Principles and Design", Tata McGraw Hill, 2nd Edition, 2002.
3. Schaum's Outline Series, "Feed back and Control Systems" Tata Mc Graw-Hill, 2007.
4. John J.D'Azzo & Constantine H.Houpis, "Linear Control System Analysis and Design", Tata Mc Graw-Hill, Inc., 1995.
5. Richard C. Dorf and Robert H. Bishop, "Modern Control Systems", Addison - Wesley, 1999.




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Cheral-603 103.

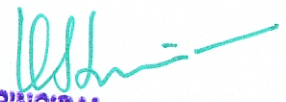


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Siruseri IT Park, Egattur, Chennai - 603 103

S.No.	Subject Code	Subject Name	Course that include experimental learning through project work
1	EC6801	Wireless Communication	Wireless channels, Multiple antenna.


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OBJECTIVES:

The student should be made to:

- Know the characteristic of wireless channel
- Learn the various cellular architectures
- Understand the concepts behind various digital signaling schemes for fading channels
- Be familiar the various multipath mitigation techniques
- Understand the various multiple antenna systems

UNIT I WIRELESS CHANNELS

9

Large scale path loss - Path loss models: Free Space and Two-Ray models -Link Budget design - Small scale fading- Parameters of mobile multipath channels - Time dispersion parameters- Coherence bandwidth - Doppler spread & Coherence time, Fading due to Multipath time delay spread - flat fading - frequency selective fading - Fading due to Doppler spread - fast fading - slow fading.

UNIT II CELLULAR ARCHITECTURE

9

Multiple Access techniques - FDMA, TDMA, CDMA - Capacity calculations-Cellular concept- Frequency reuse - channel assignment- hand off- interference & system capacity- trunking & grade of service - Coverage and capacity improvement.

UNIT III DIGITAL SIGNALING FOR FADING CHANNELS

9

Structure of a wireless communication link, Principles of Offset-QPSK, p/4-DQPSK, Minimum Shift Keying, Gaussian Minimum Shift Keying, Error performance in fading channels, OFDM principle - Cyclic prefix, Windowing, PAPR.

UNIT IV MULTIPATH MITIGATION TECHNIQUES

9

Equalisation - Adaptive equalization, Linear and Non-Linear equalization, Zero forcing and LMS Algorithms. Diversity - Micro and Macrodiversity, Diversity combining techniques, Error probability in fading channels with diversity reception, Rake receiver,

UNIT V MULTIPLE ANTENNA TECHNIQUES

9

MIMO systems - spatial multiplexing -System model -Pre-coding - Beam forming - transmitter diversity, receiver diversity- Channel state information-capacity in fading and non-fading channels

OUTCOMES:

At the end of the course, the student should be able to:

- Characterize wireless channels
- Design and implement various signaling schemes for fading channels
- Design a cellular system
- Compare multipath mitigation techniques and analyze their performance
- Design and implement systems with transmit/receive diversity and MIMO systems and analyze their performance

TEXTBOOKS:

1. Rappaport, T.S., "Wireless communications", Second Edition, Pearson Education, 2010.
2. Andreas.F. Molisch, "Wireless Communications", John Wiley - India, 2006.

REFERENCES:

1. David Tse and Pramod Viswanath, "Fundamentals of Wireless Communication",



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MI BASED WIRELESS UNDERGROUND SENSOR NETWORK

A PROJECT REPORT

Submitted by

P. ASHWIN (Reg.no:311815106006)

S. MOHAMED ASHIK ANWAR (Reg.no:311815106014)

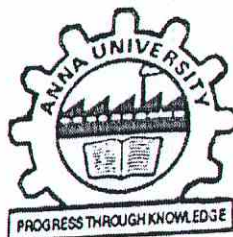
In partial fulfillment for the award of the degree

Of

BACHELOR OF ENGINEERING

IN

ELECTRONICS AND COMMUNICATION



MOHAMMED SATHAK A.J. COLLEGE OF ENGINEERING

ANNA UNIVERSITY :: CHENNAI 600 025

APRIL 2019



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**34, Rajiv Gandhi Road (OMR), Siruseri - 600 093,
Chennai-600 093.**

ANNA UNIVERSITY : CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report "**MI BASED WIRELESS UNDERGROUND SENSOR NETWORK**" is the bonafide work of **P. ASHWIN (311815106006)**, **S. MOHAMMED ASHIK ANWAR (311815106014)** who carried out the project work under our supervision.

SIGNATURE

Dr.E.DHIRAVIDACHELVI, PhD

HEAD OF THE DEPARTMENT

PROFESSOR

Department of ECE

Mohammed Sathak AJ College Of
Engineering

Egattur, Chennai-603103

SIGNATURE

Mr.J.RAJA, M.E

SUPERVISOR

ASSISTANT PROFESSOR

Department of ECE

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Submitted to the viva voce examination held on

11/4/19

INTERNAL EXAMINER



EXTERNAL EXAMINER

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Chennai-603103

ABSTRACT

This project is to transmit and receive data through underground soil medium. It consists of inexpensive electronic components arranged systematically for transmitting data. The well established wireless signal propagation technique using electromagnetic waves do not work well in this environment due to high path loss, dynamic channel condition and large antenna size. Hence this system involves magnetic induction technique which creates constant channel condition and can accomplish the communication with small size coil. It is also harmless to worms, insects and roots that are present in the soil. The concept is for the transmitter coil in one device to modulate a magnetic field which is measured by means of receiver coil in another device. Impedance matching circuit is used at both **WUSN** transmitter and receiver for matching the source and the load. The TTL board is used for converting the data from **CMOS logic** to system logic. Finally the output is viewed in the system.



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CHAPTER 7

CONCLUSION AND FUTURE SCOPE

7.1 CONCLUSION

We have proposed the design and implementation of a wireless underground soil communication. This system has been made such that the roots, worms and other things in the soil are not disturbed and they are not a distortion for transmission of data. This system consists of magnetic induction technique which overcomes the disadvantages of EM waves. The **Arduino controller** that is used is programmed and loaded with all the required data which is used to execute the temperature, humidity and pressure sensor values. The Arduino controller transmits the data to the transmitter module. The magnetic induction technique is processed in the transmitter through the induction coil which acts a small antenna and reduces the path loss compared to **EM waves**. This system can be used in agricultural applications since the soil is not affected and in the military applications since the data's are highly secured. This system has gone through testing with constant improvisations in design and outcome. Constant efforts for changes and improvements are in progress to make it a better system for wireless underground soil communication. Going serially as per the objectives mentioned, the sensor value data's are transmitted underground and received which was successfully implemented and corresponding results were obtained. The further implementation of the system will be performed in accordance with the goals mentioned in the future scope.





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S.No.	Subject Code	Subject Name	Course that include experimental learning through project work
1	EC6504	Micro Processor and Micro Controller	Microcontroller.

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OBJECTIVES:

The student should be made to:

- Study the Architecture of 8086 microprocessor.
- Learn the design aspects of I/O and Memory Interfacing circuits.
- Study about communication and bus interfacing.
- Study the Architecture of 8051 microcontroller.

UNIT I THE 8086 MICROPROCESSOR

9

Introduction to 8086 - Microprocessor architecture - Addressing modes - Instruction set and assembler directives - Assembly language programming - Modular Programming - Linking and Relocation - Stacks - Procedures - Macros - Interrupts and interrupt service routines - Byte and String Manipulation.

UNIT II 8086 SYSTEM BUS STRUCTURE

9

8086 signals - Basic configurations - System bus timing - System design using 8086 - IO programming - Introduction to Multiprogramming - System Bus Structure - Multiprocessor configurations - Coprocessor, Closely coupled and loosely Coupled configurations - Introduction to advanced processors.

UNIT III I/O INTERFACING

9

Memory Interfacing and I/O interfacing - Parallel communication interface - Serial communication interface - D/A and A/D Interface - Timer - Keyboard /display controller - Interrupt controller - DMA controller - Programming and applications Case studies: Traffic Light control, LED display , LCD display, Keyboard display interface and Alarm Controller.

UNIT IV MICROCONTROLLER

9

Architecture of 8051 - Special Function Registers(SFRs) - I/O Pins Ports and Circuits - Instruction set - Addressing modes - Assembly language programming.

UNIT V INTERFACING MICROCONTROLLER

9

Programming 8051 Timers - Serial Port Programming - Interrupts Programming - LCD & Keyboard Interfacing - ADC, DAC & Sensor Interfacing - External Memory Interface- Stepper Motor and Waveform generation.

OUTCOMES:

At the end of the course, the student should be able to:

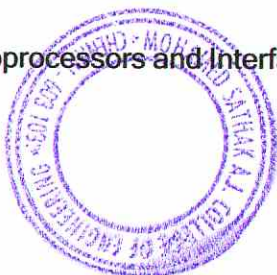
- Design and implement programs on 8086 microprocessor.
- Design I/O circuits.
- Design Memory Interfacing circuits.
- Design and implement 8051 microcontroller based systems.

TEXT BOOKS:

1. Yu-Cheng Liu, Glenn A.Gibson, "Microcomputer Systems: The 8086 / 8088 Family - Architecture, Programming and Design", Second Edition, Prentice Hall of India, 2007.
2. Mohamed Ali Mazidi, Janice Gillispie Mazidi, Rolin McKinlay, "The 8051 Microcontroller and Embedded Systems: Using Assembly and C", Second Edition, Pearson education, 2011.

REFERENCE:

1. Douglas V.Hall, "Microprocessors and Interfacing, Programming and Hardware", TMH, 2012



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Siruseri IT Park, Egattur, Chennai - 603 103

S.No.	Subject Code	Subject Name	Course that include experimental learning through project work
1	EC6201	Electronic Devices	Semi conductor diode, Bi-polar junction.

PRINCIPAL

MOHAMED SATHAK A.J.COLLEGE OF ENGINEERING

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OBJECTIVES:**The student should be made to:**

- Be exposed to basic electronic devices
- Be familiar with the theory, construction, and operation of Basic electronic devices.

UNIT I SEMICONDUCTOR DIODE

9

PN junction diode, Current equations, Diffusion and drift current densities, forward and reverse bias characteristics, Switching Characteristics.

UNIT II BIPOLAR JUNCTION

NPN -PNP -Junctions-Early effect-Current equations – Input and Output characteristics of CE, CB CC-Hybrid -n model - h-parameter model, Ebers Moll Model- Gummel Poon-model, Multi Emitter Transistor.

UNIT III FIELD EFFECT TRANSISTORS

9

JFETs - Drain and Transfer characteristics,-Current equations-Pinch off voltage and its significance- MOSFET- Characteristics- Threshold voltage -Channel length modulation, D-MOSFET, E-MOSFET- ,Current equation - Equivalent circuit model and its parameters, FINFET,DUAL GATE MOSFET.

UNIT IV SPECIAL SEMICONDUCTOR DEVICES

9

Metal-Semiconductor Junction- MESFET, Schottky barrier diode-Zener diode-Varactor diode -Tunnel diode- Gallium Arsenide device, LASER diode, LDR.

UNIT V POWER DEVICES AND DISPLAY DEVICES

9

UJT, SCR, Diac, Triac, Power BJT- Power MOSFET- DMOS-VMOS. LED, LCD, Photo transistor, Opto Coupler, Solar cell, CCD.

TOTAL: 45 PERIODS**OUTCOMES:****At the end of the course, the student should be able to:**

- Explain the theory, construction, and operation of basic electronic devices.
- Use the basic electronic devices

TEXT BOOKS

1. Donald A Neaman, "Semiconductor Physics and Devices", Third Edition, Tata Mc GrawHill Inc. 2007.

REFERENCES:

1. Yang, "Fundamentals of Semiconductor devices", McGraw Hill International Edition, 1978.
2. Robert Boylestad and Louis Nashelsky, "Electron Devices and Circuit Theory" Pearson Prentice Hall, 10th edition, July 2008.



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 PRINCIPAL
 MOHAMED SATHAK A.I. COLLEGE OF ENGINEERING
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AUTOMATIC FIRE EXTINGUISHER ROBOT USING FLAME AND SMOKE SENSORS

A PROJECT REPORT

Submitted by

AVINASH .R

(Reg.no:311815106007)

JAYAKANTH .K

(Reg.no:311815106011)

In partial fulfilment for the award of the degree

Of

BACHELOR OF ENGINEERING

in

ELECTRONICS AND COMMUNICATION ENGINEERING

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EGATTUR , CHENNAI-603103



ANNA UNIVERSITY: CHENNAI 600 025

APRIL 2019



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Chennai-600 025.

BONAFIDE CERTIFICATE

Certified that this project report "**FIRE EXTINGUIER ROBOT**" is the bonafide work of

R. AVINASH

Reg.no:(311815106007)

K.JAYAKANTH

Reg.no:(311815106011)

Who carried out the project work under my supervision.


Dr. E. DHIRAVIDACHELVI

HEAD OF THE DEPARTMENT

Professor

Department of ECE

Mohammed Sathak AJ College

Of Engineering, Egattur,

Chennai-603103.Chennai -603103.


Dr. E. DHIRAVIDACHELVI

SUPERVISOR

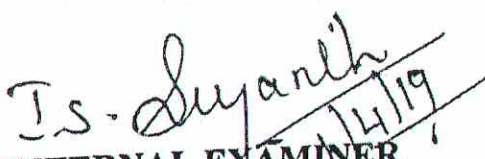
Professor

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Mohammed Sathak AJ College

Of Engineering, Egattur,

Submitted for viva-voice examination held on...14/11/19.....at Mohammed Sathak A.J College of engineering, Chennai-603 103.


INTERNAL EXAMINER




EXTERNAL EXAMINER


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MOHAMMED SATHAK A.J. COLLEGE OF ENGINEERING
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Tamil Abstract (தமிழ் சுருக்கம்) **ABSTRACT**

There are a lot of precautions taken for Fire accidents, these natural/man-made disasters do occur now and then. In the event of a fire breakout, to rescue people and to put out the fire we are forced to use human resources which are not safe.

With the advancement of technology especially in Robotics it is very much possible to replace humans with robots for fighting the fire. This would improve the efficiency of firefighters and would also prevent them from risking human lives. we are going to build a **Fire Fighting Robot using Arduino**, which will automatically **sense** the fire and start the water pump.




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CHAPTER:7

CONCLUSION

This proposes a great chance for automation and will be useful at places where human cannot reach or is dangerous **Arduino microcontroller** is used as the processing and control unit of the robot. The model of robot is simulated and analyzed using Proteus. The hardware of dual mode robot is implemented and tested.



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IMPLEMENTATION OF COLLISION AVOIDANCE SYSTEM FOR HAIRPIN BENDS USING INFRARED AND ULTRASONIC SENSORS

A PROJECT REPORT

Submitted by

HAARIS AHMED .B

(Reg.no:311815106008)

MOHAMED HAMTHAN. B

(Reg.no:311815106701)

In partial fulfilment for the award of the degree

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APRIL 2019

BONAFIDE CERTIFICATE

Certified that this project report "**IMPLEMENTATION OF COLLISION AVOIDANCE SYSTEM FOR HAIRPIN BENDS**" is the bonafide work of

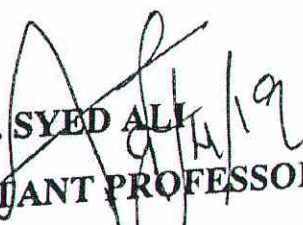
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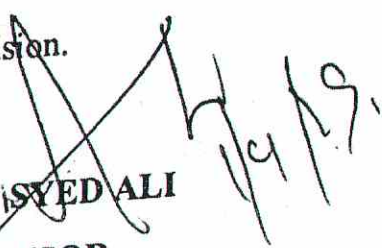
Reg.no:(311815106008)

B.MOHAMED HAMTHAN

Reg.no:(311815106701)

Who carried out the project work under my supervision.


Mr. M. SYED ALI
ASSISTANT PROFESSOR
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Mr. M. SYED ALI
SUPERVISOR

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J.S. Sanyal
INTERNAL EXAMINER




EXTERNAL EXAMINER

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ABSTRACT

The rapid growth in the transport sector has resulted in an increase of the accidents every day. The accident mainly occurs due to our carelessness and breaking of traffic rules. In this paper, the main goal of the proposed system is to avert collisions between vehicles mainly occurring in hairpin bends, short corners, blind curves, etc. by providing indication and making the vehicle drivers' alert. If any problems say, overspeeding or traffic, the module will send to the control room thereby the problems can be solved. This system makes use of ultrasonic sensor, RF ID tag and other embedded systems.

Using these ultrasonic sensor we also add a Radio Frequency Identificaiton (RFID), which recognizes the vehicles and records the information of the vehicle's status and ownership using the Radio Frequency Tag on the number plate.




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Chennai - 600 093.

CONCLUSION.

This proposes a great chance for automation and will be useful at places where human cannot reach or is dangerous. Arduino microcontroller is used as the processing and control unit. In this study, we got to know about the accident which occurs on the road at Ghat section. We understand the causes and effect of accidents and then founded out a solution introducing a new technique to avoid such accident.

The purpose of this paper is to decrease the number of accidents in curve roads. This is done by alerting the driver by means of **LED** light which glows when vehicle comes from the other side of the curve. The vehicle is detected by the help of **Ultrasonic sensor** which is interfaced to the **microcontroller Arduino MEGA**. By this we can save thousands of lives in the curve roads.

Life is important than any other thing, once gone cannot be regained. So, to save this valuable life, this method have important role. It can help Road users at Ghats from being killed in a serious injury.




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Siruseri IT Park, Egattur, Chennai - 603 103

S.No.	Subject Code	Subject Name	Course that include experimental learning through project work
1	EC6601	VLSI Design	FPGA building block, FPGA inter connect.

PRINCIPAL

MOHAMED SATHAK A.J.COLLEGE OF ENGINEERING
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OBJECTIVES:

- In this course, the MOS circuit realization of the various building blocks that is common to any microprocessor or digital VLSI circuit is studied.
- Architectural choices and performance tradeoffs involved in designing and realizing the circuits in CMOS technology are discussed.
- The main focus in this course is on the transistor circuit level design and realization for digital operation and the issues involved as well as the topics covered are quite distinct from those encountered in courses on CMOS Analog IC design.

UNIT I MOS TRANSISTOR PRINCIPLE

9

NMOS and PMOS transistors, Process parameters for MOS and CMOS, Electrical properties of CMOS circuits and device modeling, Scaling principles and fundamental limits, CMOS inverter scaling, propagation delays, Stick diagram, Layout diagrams

UNIT II COMBINATIONAL LOGIC CIRCUITS

9

Examples of Combinational Logic Design, Elmore's constant, Pass transistor Logic, Transmission gates, static and dynamic CMOS design, Power dissipation - Low power design principles

UNIT III SEQUENTIAL LOGIC CIRCUITS

9

Static and Dynamic Latches and Registers, Timing issues, pipelines, clock strategies, Memory architecture and memory control circuits, Low power memory circuits, Synchronous and Asynchronous design

UNIT IV DESIGNING ARITHMETIC BUILDING BLOCKS

9

Data path circuits, Architectures for ripple carry adders, carry look ahead adders, High speed adders, accumulators, Multipliers, dividers, Barrel shifters, speed and area tradeoff

UNIT V IMPLEMENTATION STRATEGIES

9

Full custom and Semi custom design, Standard cell design and cell libraries, FPGA building block architectures, FPGA interconnect routing procedures.

OUTCOMES:

Upon completion of the course, students should

- Explain the basic CMOS circuits and the CMOS process technology.
- Discuss the techniques of chip design using programmable devices.
- Model the digital system using Hardware Description Language.

TEXTBOOKS:

1. Jan Rabaey, Anantha Chandrakasan, B.Nikolic, "Digital Integrated Circuits: A Design Perspective", Second Edition, Prentice Hall of India, 2003.
2. M.J. Smith, "Application Specific Integrated Circuits", Addison Wesley, 1997

REFERENCES:

1. N.Weste, K.Eshraghian, "Principles of CMOS VLSI Design", Second Edition, Addison Wesley 1993
2. R.Jacob Baker, Harry W.Li., David E.Boyee, "CMOS Circuit Design, Layout and Simulation" Prentice Hall of India 2005
3. A.Pucknell, Kamran Eshraghian, "BASIC VLSI Design", Third Edition, Prentice Hall of India, 2007.

TOTAL: 45 PERIODS

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SMART MONITORING SYSTEM USING FPGA AND ZIGBEE MODULE

A PROJECT REPORT

Submitted by

S.MOHNISH

(Reg.no:311815106901)

S.IRFAN AHMED

(Reg.no:311815106702)

In partial fulfilment for the award of the degree

Of

BACHELOR OF ENGINEERING

IN

ELECTRONICS AND COMMUNICATION ENGINEERING

MOHAMMED SATHAK A J COLLEGE OF ENGINEERING

EGATTUR, CHENNAI-603103



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BONAFIDE CERTIFICATE

Certified that this project report "**SMART MONITORING SYSTEM USING FPGA AND ZIGBEE MODULE**" is the bonafide work of "S.MOHNISH (311815106901), S.IRFAN AHMED(311815106702)" who carried out the project work under my supervision.


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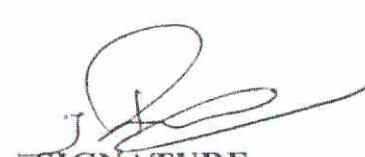
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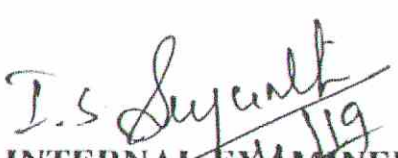
Department of ECE

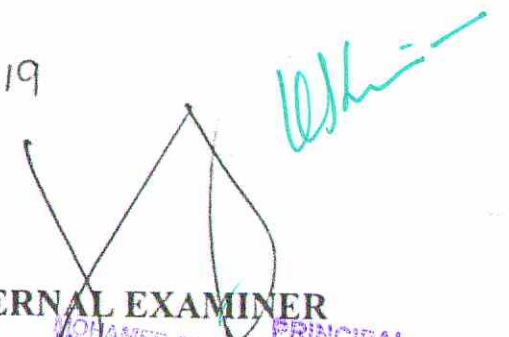
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Submitted for viva-voice examination held on 01/04/19


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ABSTARCT

This project implements Temperature monitoring system for Agricultural field using Spartan 3 an **FPGA** Starter kit. The most important factors for the quality and productivity of lant growth are temperature and humidity. Continuous monitoring of these environmental variables gives information to the grower to better understand, how each factor affects growth and how to manage maximal crop productiveness .The optimal greenhouse climate adjustment can enable us to improve productivity and to achieve remarkable energy savings - especially during the winter in northern countries. The system itself was usually simple without opportunities to control locally heating, lights, ventilation or some other activity, which was affecting the greenhouse interior climate. For the implementation of agricultural technologies, low cost and real time remote monitoring are needed, in this sense, **programmable Logic Devices (PLDs)** present as a good option for the technology development and implementation.



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CHAPTER 5

CONCLUSION AND FUTURE ENHANCEMENTS

The greenhouse automation at commercial level is experiencing attention. Also, to achieve competitiveness in the market, the production costs must be kept as low as possible. Low cost automation can be achieved by using VLSI systems so that all category farmers can afford it. The objective of this project was to develop a system to provide autonomous control for temperature and humidity in a closed environment of Greenhouse, which is fulfilled also, to achieve competitiveness in the market, the production cost must be kept as low as possible. Low cost automation can be achieved by using VLSI systems so that all category farmers can afford it.

FUTURE ENHANCEMENTS

The programming can be extended for n - greenhouse climate control.

- Parameter data can be saved and record can be generated.
- Other control parameters can be added.
- Facilities for user can be increased such as one can set the offset of the temperature and humidity.
- System can be programmed to indicate if fault is generated.



Implementation of Hub and Spoke using MATLAB

A PROJECT REPORT

Submitted by

JEEVA .S (Reg.no:311815106012)

In partial fulfillment for the award of the degree

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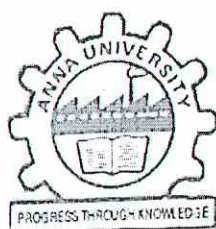
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APRIL 2019

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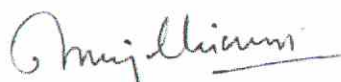

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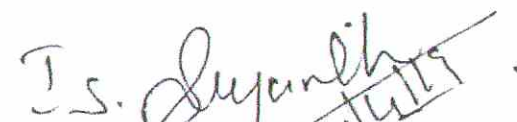
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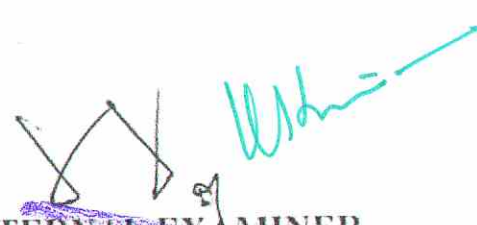
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ABSTRACT

This paper analysis the configuration of Enhanced Interior Gateway Routing Protocol (EIGRP) using the **MPLS** Virtual Private Network (VPN). The **VPN** enables service provider to implement point-to-point link connectivity between the customer locations. And also explain the concept of Hub and the Spoke topology are used to send traffic thus it provides safe and encrypted connection.



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CHAPTER 9

CONCLUSION

In today's economy where the most important objective for an engineer is to implement the new emerging technologies for transferring the data securely and in a cost effective manner. This venture of new technology i.e. MPLS over the existing technology i.e. VPN provides benefits that service providers need urgently in their networks, such as scalability, manageability and security. MPLS VPN offers many advantages including support for TE, QoS provisioning and scalability enhancements, the requirement of having MPLS support throughout the entire network is limiting its widespread usage. It would be an excellent choice for providing VPN services as it combines the benefits of both Overlay and Peer-to-Peer networks. Furthermore by using MPLS core the Service Provider can make use of other MPLS Features such as Traffic Engineering, Quality of Service and Network Management.



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**DEVELOPMENT OF UNIVERSAL SIGNAL CONDITIONING
MODULE FOR ANALOG SENSORS**

A PROJECT REPORT

Submitted by

SUGANTHI. V (311815106029)

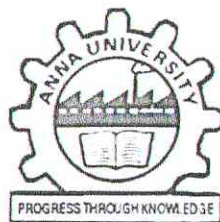
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Of

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IN

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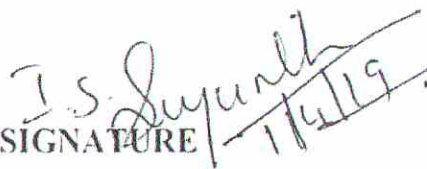

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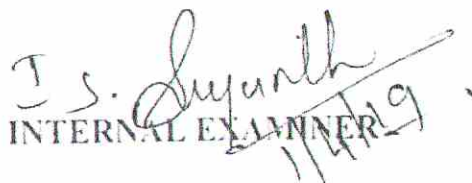
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ABSTRACT

Even though instrumentation and power signals must be very accurate in power and process industry, the electro mechanical components included in the process causes interference.

The signals that are received from **sensors** are of very small voltages, due to interference in a course of time these signals get distorted, for this problem the solution is to get data at the receiver end.

Each analog channel has minimum 2wires and a RS485 protocol through which we can transmit the signal uninterruptedly upto 1200m which is quite long distance and interference of noise also will be drastically reduced.




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CHAPTER 8

CONCLUSION AND FUTURE SCOPE

8.1 CONCLUSION

The proposed work dealt with the development of universal signal conditioning module for analog sensors. This project mainly deals with development of embedded controller with RS485 BUS for various electrical signals like Thermocouple, load cell and AC voltage sensing with basics of C,C++. That the main target is to counter at [1] Reduction of number of transmission lines. [2] To make SCM universal. Because there are different types of sensors output available in the fields is to make the SCM universal. To avoid the problems normally occurs, we have the firsts stage of this **SCM** is INA, so normally in INA the gain is here selected INA were that can be adjusted to high or unity also using trimmer pot. The second stage, filtering has been done using SCF standard IC after that the field signal having sometime unwanted noise coupling to that is to be reduced, after that PWM technique has been used then that high voltage PWM signal is isolated using the opto coupler, the final output is again filtered and given to **ADC**. This technique will be applicability of the signal conditioning module universally and decoupling of the noise. [3] It will reduce the transmission wires, number of transmission wires. Each analog channel it will be with 2 wires we have RS485 protocol through which we can transmit the signal uninterruptedly for upto 1200m which is quite long distance and interference of noise also will be drastically reduced. So these are the main two advantages of the project for which it was selected.




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S.No.	Subject Code	Subject Name	Course that include experimental learning through project work
1	CS6551	Computer Networks	Fundamentals, internet working, transport layer, application layer.

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The student should be made to:

- Understand the division of network functionalities into layers.
- Be familiar with the components required to build different types of networks
- Be exposed to the required functionality at each layer
- Learn the flow control and congestion control algorithms

UNIT I FUNDAMENTALS & LINK LAYER

9

Building a network - Requirements - Layering and protocols - Internet Architecture - Network software - Performance ; Link layer Services - Framing - Error Detection - Flow control

UNIT II MEDIA ACCESS & INTERNETWORKING

9

Media access control - Ethernet (802.3) - Wireless LANs - 802.11 - Bluetooth - Switching and bridging - Basic Internetworking (IP, CIDR, ARP, DHCP, ICMP)

UNIT III ROUTING

9

Routing (RIP, OSPF, metrics) - Switch basics - Global Internet (Areas, BGP, IPv6), Multicast - addresses - multicast routing (DVMRP, PIM)

UNIT IV TRANSPORT LAYER

9

Overview of Transport layer - UDP - Reliable byte stream (TCP) - Connection management - Flow control - Retransmission - TCP Congestion control - Congestion avoidance (DECbit, RED) - QoS - Application requirements

UNIT V APPLICATION LAYER

9

Traditional applications - Electronic Mail (SMTP, POP3, IMAP, MIME) - HTTP - Web Services - DNS - SNMP

TOTAL: 45 PERIODS**OUTCOMES:****At the end of the course, the student should be able to:**

- Identify the components required to build different types of networks
- Choose the required functionality at each layer for given application
- Identify solution for each functionality at each layer
- Trace the flow of information from one node to another node in the network

TEXT BOOK:

1. Larry L. Peterson, Bruce S. Davie, "Computer Networks: A Systems Approach", Fifth Edition, Morgan Kaufmann Publishers, 2011.

REFERENCES:

2. James F. Kurose, Keith W. Ross, "Computer Networking - A Top-Down Approach Featuring the Internet", Fifth Edition, Pearson Education, 2009.
3. Nader. F. Mir, "Computer and Communication Networks", Pearson Prentice Hall Publishers, 2010.
4. Ying-Dar Lin, Ren-Hung Hwang, Fred Baker, "Computer Networks: An Open Source Approach", Mc Graw Hill Publisher, 2011.
5. Behrouz A. Forouzan, "Data communication and Networking", Fourth Edition, Tata McGraw –



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S.No.	Subject Code	Subject Name	Course that include experimental learning through project work
1	EC6802	Wireless Networks	Wireless LAN, Wireless wide area network.

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OBJECTIVES:

- To study about Wireless networks, protocol stack and standards.
- To study about fundamentals of 3G Services, its protocols and applications.
- To study about evolution of 4G Networks, its architecture and applications.

UNIT I WIRELESS LAN

9

Introduction-WLAN technologies: Infrared, UHF narrowband, spread spectrum -IEEE802.11: System architecture, protocol architecture, physical layer, MAC layer, 802.11b, 802.11a - Hiper LAN: WATM, BRAN, HiperLAN2 - Bluetooth: Architecture, Radio Layer, Baseband layer, Link manager Protocol, security - IEEE802.16-WIMAX: Physical layer, MAC, Spectrum allocation for WIMAX

UNIT II MOBILE NETWORK LAYER

9

Introduction - Mobile IP: IP packet delivery, Agent discovery, tunneling and encapsulation, IPV6-Network layer in the internet- Mobile IP session initiation protocol - mobile ad-hoc network: Routing, Destination Sequence distance vector, Dynamic source routing

UNIT III MOBILE TRANSPORT LAYER

9

TCP enhancements for wireless protocols - Traditional TCP: Congestion control, fast retransmit/fast recovery, Implications of mobility - Classical TCP improvements: Indirect TCP, Snooping TCP, Mobile TCP, Time out freezing, Selective retransmission, Transaction oriented TCP - TCP over 3G wireless networks.

UNIT IV WIRELESS WIDE AREA NETWORK

9

Overview of UTM Terrestrial Radio access network-UMTS Core network Architecture: 3G-MSC, 3G-SGSN, 3G-GGSN, SMS-GMSC/SMS-IW MSC, Firewall, DNS/DHCP-High speed Downlink packet access (HSDPA)- LTE network architecture and protocol.

UNIT V 4G NETWORKS

9

Introduction - 4G vision - 4G features and challenges - Applications of 4G - 4G Technologies: Multicarrier Modulation, Smart antenna techniques, OFDM-MIMO systems, Adaptive Modulation and coding with time slot scheduler, Cognitive Radio.

TOTAL: 45 PERIODS**OUTCOMES:**

Upon completion of the course, the students will be able to

- Conversant with the latest 3G/4G and WiMAX networks and its architecture.
- Design and implement wireless network environment for any application using latest wireless protocols and standards.
- Implement different type of applications for smart phones and mobile devices with latest network strategies.

TEXT BOOKS:

1. Jochen Schiller, "Mobile Communications", Second Edition, Pearson Education 2012.(Unit I,II,III)
2. Vijay Garg, "Wireless Communications and networking", First Edition, Elsevier 2007.(Unit IV,V)

REFERENCES:

1. Erik Dahlman, Stefan Parkvall, Johan Skold and Per Beming, "3G Evolution HSPA and LTE for Mobile Broadband", Second Edition, Academic Press, 2008.

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Implementation of Protocol Independent Multicast using MPLS

A PROJECT REPORT

Submitted by

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In partial fulfillment for the award of the degree

Of

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in

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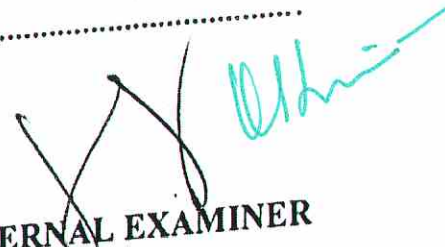
Certified that this project report "**Implementation of Protocol Independent Multicast using MPLS**" is the bonafide work of "**S.S.SYED MOHAMED (311815106031)**" Who carried out the project work under my supervision.


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ABSTRACT

Multiprotocol Label Switching (MPLS) VPN network to provide internet connectivity. The multicast technology implements a very high-efficiency point-to-multipoint data transmission over IP networks (IPv4 and IPv6). Multicast protocols reduces network load, eliminates traffic redundancy, and saves network bandwidth. Therefore, widely used in WAN applications as online games, video conferencing and IPTV. In proposed system, using two internet service providers. One ISP is used to provide MPLS VPN service to the customer and the other ISP router is used to provide internet access for the customer who also has MPLS VPN service. This session describes (or) how to design an MPLS CORE for internet access such that VPN remains secure. The implementation of internet over MPLS VPN is simulated by using a software GNS3 (Graphic Network Simulator) tool this provide internet access by implementing internet in MPLS VPN technique on ISP's.



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CHAPTER 8

CONCLUSION

The **multicast protocol**, on the basis of PIM, created with scalability as a primary design objective. The simulation studies have shown that the protocol considerably limits the volume of state data and signaling messages as compared with PIM SSM. PIM-SM takes a novel approach towards data forwarding: it treats datagram's not only as units conveying the user payload but also as a form of keep-alive messages from the upstream **router**. The upstream router forwards multicast packets as long as it has valid state data, so reception of the multicast stream is a clear indication for the downstream routers that the upstream network device operates correctly. This routing technique improved privacy by using **VPN**, improved security by using **VPN**, improved speed by using **MPLS** technique.




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