



## Electronics and Communication Engineering

### Text Information Extraction From Images

The project aims to extract and recognize text from camera captured images based on edge based algorithms. The proposed method is a general-purpose text detection and extraction algorithm, which can deal not only with printed document images but also with scene text.

### Secure Skin Tone based Steganography using DWT

In this project, we proposed cropping region works as a key at decoding side and cropping method for data embedding. Here, the secret data is embedded within skin region of image that will provide an excellent secure location for data hiding.

### Solar based Low Power Wireless Sensor Nodes

This project aims at building a wireless data acquisition system that offers a very cost effective and easy to use solution to remote sensory data transfer. A new protocol RTS (Receive Transmit Sleep) was designed to suit the requirements. The data integrity issue is addressed using CRC, Data whitening and Manchester coding.

## Computer Science and Engineering

### Eye Tracker

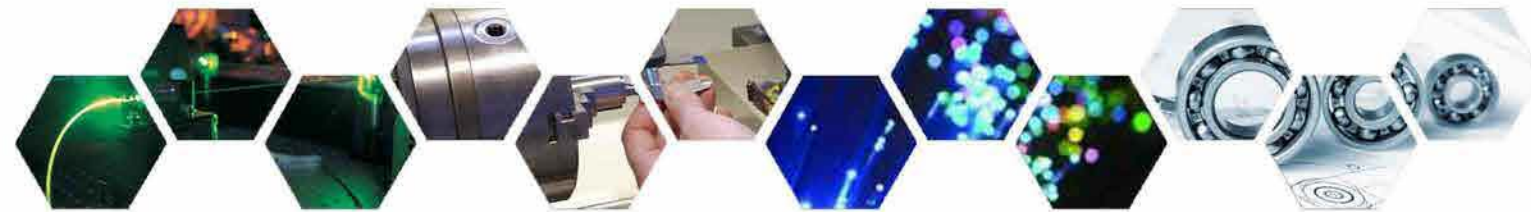
A real time Gaze determination software that controls a computer cursor by following the user's gaze. Eye movements are tracked using motion analysis to impart relative movement to cursor. Blink detection is used to implement left click, right click and double click.

### Clustering using Mobiles

The idea behind the project is to create and maintain a cluster of mobile phones coordinated by a server on the internet. The cluster empowers each mobile to do tasks which seems impossible to do on its own. Such resources are obtained by using the combined resources of all the phones together.

### Implementing Distributed File Systems in Mobiles

The idea here is to avoid memory constraints in mobile device by sharing the data among cluster of mobiles by using server and client mode. This project creates a method by which an interconnection is established between phones and creates a very efficient file distributed system.



## Electronics and Biomedical Engineering

### Deaf Aid Telephone System

Deaf aid telephone system with speech recognition is a complex electronic device that can help to provide a sense of sound to a person who is deaf. The word produced by a normal person in transmitter end can be viewed by a physically deaf person in the receiver end.

### Human Controlled Remote Robotic Arm

This project aims to design a remote robotic arm which finds application in surgery, bomb diffusing, mining, undersea recovery, extra-terrestrial exploration vehicle. It replicates the exact motion of the human arm. The flex sensors and MEMS are used for detection of human hand motions.

### Blind Navigation

In Wearable ZigBee-based guidance, a main controller collects ultrasound and GPS signals from sensors attached to sub controllers and provides appropriate directions to a blind person. The signals from the different sources need to be handled separately, which reduces the effective sampling rate, and may impact the quality of the guidance provided.

## Electrical and Electronics Engineering

### Automatic Phase Charger

In single phase applications, if the voltage in any phase drops below the required range, the project will help the equipment to work on normal voltage. On resumption of power to faulty phase, the load gets transferred to the original phase.

### Electrical Gearshift for Electrical Vehicles

The project deals with designing of an electric gearshift with ultra-capacitors for power train of a directly driven electric vehicle. This electric gearshift combines different parallel and serial connections of batteries, motor windings, and ultra-capacitors to accommodate various driving patterns in the speed and torque.

### Magnetic Levitation Train

Magnetic Levitation reduces pollution and increases both the speed and efficiency when compared to other modes of transportation. The project is to produce a small scale proof of concept magnetic levitation system in order to demonstrate that magnetic levitation is feasible and efficient option for new transportation infrastructure development.





## Signal Processing

### Compressed Sensing MRI

Magnetic resonance imaging (MRI) is an essential medical imaging tool with an inherently slow data acquisition process. Compressed sensing (CS) aims to reconstruct signals and images from significantly fewer measurements than were traditionally through necessary.

### Binary Partition Tree for Face Detection

Binary partition Trees (BPTs) are region based representation of images. In this the factors being analysed are the computational complexity and accuracy. Within the frame work of the BPT representation the work in adopts a different approach to tackle the trade-off between accurate description and usefulness for object detection.

### 3D Object Recognition of Canonical Objects from 2D Views

3D objects recognition has two parts- training and recognition. The recognition algorithm has to be robust and might have produced them. The algorithms are implemented in CUDA GPU since recognitions and training algorithms support parallel processing.

## Optoelectronics and Communication

### Vision based Navigation Sensors for Flying Robots

The project work include identifying the principle behind each components implementing algorithms and techniques for realising each sensor and developing a bio-inspired vision based Sensor suit for navigation and flight stabilization of flying robots.

### Detection and Localisation of Phase Sensitive Events

The objective is to design a fiber optic interferometric system to detect, classify and locate the sensitive events along pipeline and communication links, and the security borders or restricted areas, with sufficient accuracy and early warning to enable corrective action to be put in place to prevent damage and cost occurring.

### Optical Imaging System Using Scanned Laser Beam

Micro Electro Mechanical System (MEMS) technology provides miniaturization of components. The project aims at implementation of the optical imaging system using laser source, MEMS mirror, object and photo detector.



## Image Processing

### Retinal Blood Vessel Segmentation

Automated retinal blood vessel segmentation for diabetic retinopathy screening from among the alternatives available and also to find the width of retinal blood vessels.

### Detection and Counting of People in Visual

The detection and counting of people from the videos obtained from Visual Surveillance Systems is performed. The videos obtained are of low resolution, most of the people are stationary and background is complicated. The number of people entering and leaving through user specified area is also counted.

### Multiview Video Coding For Bandwidth

Use of multi-video-coding to compress the data stream to overcome the bandwidth constraint and multi-video-stream is used to create 3D video which can be fed to a 3D monitor which can be used by rocket engineers to analyze the performance of stage separation and pin point the root cause of failure.

## VLSI and Embedded Systems

### Derivation of Methodology and IBIS Modelling

The project aims at derivation of methodology and IBIS modelling of analog characteristics for I/O buffers that are differential or pseudo differential in nature, which are generally used in high speed applications like DDR and LVDs to ensure that all electrical specifications are met. The tools used are Hyperlynx and Hspice.

### Fetal Electrocardiogram for the Detection of Feotal Asphyxia

The project mainly focuses on the extraction of foetal ECG (FECG) from the composite abdominal ECG (AECG) signal. The ECG obtained is used for foetal heart rate variability analysis and health of the feotus can be observed and evaluated using it.

### FPGA in Automatic Gain Controller for Hearing Aids

In this project, a computational effective Auditory Compensation System (ACS) is developed for Digital Hearing aids. System is implemented in FPGA. A ANSI S1.11 1/3-octave filter bank is used for frequency shaping in this application.





## Electronics and Communication Engineering

### CORE SUBJECTS

- Digital Electronics
- Solid State Electronics
- Digital Signal Processing
- Microelectronics & Integrated Circuits
- Microprocessors
- Microwave Techniques & Devices
- Digital & Analog Communication
- Electronic Products Design
- Control Systems Engineering
- VLSI & Embedded Systems
- Digital System Design
- Radio Communication
- Audio & Video Engineering
- Optoelectronics and Communication

### ELECTIVES

- Intelligent Systems
- Fundamentals of RF Design
- Hardware Modelling
- ASIC Design
- Digital Image Processing
- Mixed Signal System Design



### LABS & RESOURCES

- Digital Lab
- Advanced Microprocessor Lab
- Communication Lab
- E-Cad Lab
- VLSI Lab
- Digital Communication Lab
- Electronic Circuits Lab 1 & 2
- LPKF PCB Prototyping Machine
- Edwin Software
- Virtual Modelling Systems
- Signal Explorer
- Arbitrary Function Generator
- DSP Trainer

## Computer Science and Engineering

### CORE SUBJECTS

- Discrete Computational Structures
- Object Oriented Programming
- Computer Architecture
- Automata Languages & Computation
- Data Structures & Algorithms
- Computer Graphics
- Database Management Systems
- Compiler Construction
- Operating Systems
- Analysis & Design of Algorithms
- Computer Networks
- Distributed Computing
- Security in Computing

### ELECTIVES

- Embedded Systems
- Information Retrieval
- Artificial Neural Networks
- Web Commerce & Technology
- Digital Image Processing
- Bioinformatics



### LABS & RESOURCES

- System Programming and Hardware Lab
- Data Structures Lab
- Network and OS Lab
- Language Processor Lab
- Two CUDA processors- Tesla C2XXX & Geforce GTX480
- Dual Processor industry standard Blade server
- Internet connectivity via a 24/7 active 1 Mbps leased line and an 8 Mbps broadband connection.



## Electronics and Biomedical Engineering

### CORE SUBJECTS

- Digital Electronics
- Microprocessors
- Integrated Circuits & Systems
- Communication Techniques
- Control Systems & Engineering
- Bio Signal Processing
- Bio Instrumentation
- Hospital Engineering
- Biosensors and Transducers
- Therapeutic Equipments
- Medical Image Processing
- Principles of Radio Diagnosis
- Object Oriented Programming

### ELECTIVES

- VLSI Design
- Modelling of Physiological System
- Embedded Systems & Applications
- Artificial Neural Networks
- Computer Communications
- Biostatistics & Design of Experiments
- Computer Graphics



### LABS & RESOURCES

- Digital Electronics Lab
- Basic Electronics Lab
- Microprocessor Lab
- Bio Signal Processing Lab
- Bio Engineering Lab
- Medical Electronics Lab
- Bipolar Catheterization Lab
- Analytic Equipments
- Image Acquisition System
- Therapeutic Equipments
- Diagnostic Equipments

## Electrical and Electronics Engineering

### CORE SUBJECTS

- Electrical Measurements & Measuring Instruments
- Fluid Mechanics & Heat Engines
- Electrical Machines
- Industrial & Power electronics
- Field Theory
- Electrical Material Science
- Power Systems
- Control Systems
- Digital Signal Processing
- Electrical Machine Design
- Electronic Instrumentation
- Electric Circuit Theory

### ELECTIVES

- Computer Communications
- High Voltage DC Transmission
- Neural Network & Fuzzy Logic
- Optimal Control Theory
- Control Systems 2
- Digital Image Processing
- Renewable Sources of Energy
- Flexible AC Transmission



### LABS & RESOURCES

- Mechanical Workshop
- Electrical Workshop
- Basic Electrical Engineering Lab
- Digital Electronics Lab
- Power Electronics Lab
- Electrical Machines Lab 1 & 2
- Advanced Electrical Engineering Lab
- Microprocessor Lab



## VLSI and Embedded Systems

## CORE SUBJECTS

- Advanced DSD
- Designing with Microcontrollers
- VLSI Technology and Design
- Embedded System Design
- Analog Integrated Circuit Design
- Advanced DSP Architecture

## ELECTIVES

- VLSI Design and Automation
- Embedded and Real Time Systems
- System on Chip Design
- Low Power Digital Design
- High Power Digital Design
- CPLD & FPGA Architecture

## LABS &amp; RESOURCES

- Reconfigurable Computing Lab
- RTOS Lab
- Xilinx Virtex-4 SX XC4VSX35
- FF668 Device Kit
- Xilinx Virtex-II Pro
- Xilinx Spartan-III Families

## Signal Processing

## CORE SUBJECTS

- Fundamentals of Spectral Estimation
- Advanced Digital Systems Design
- Digital Communication
- Adaptive Signal Processing
- VLSI Architectures for DSP
- Digital Image Processing

## ELECTIVES

- Multirate Signal Processing
- Digital Signal Processors
- Digital Control Systems
- Array Signal Processing
- Signal Compression Techniques
- Artificial Neural Networks

## LABS &amp; RESOURCES

- DSP Hardware Lab
- Advanced DSP Lab
- GNU Octave, Scilab, Maple
- TMS320C6455 Based Starter Kit
- Medical Imaging Software Tool
- TMS320C6713 Based Starter Kit

## Optoelectronics and Communication

## CORE SUBJECTS

- Digital & Optical Signal Processing
- Optoelectronics
- Laser Technology
- Fibre Optics
- Biophotonics
- Optical Communication Theory

## ELECTIVES

- Modern Optics
- Communication Networks
- Laser Based Instrumentation
- Integrated Optics
- Industrial Photonics
- Advanced Optical Communication

## LABS &amp; RESOURCES

- Signal Processing Lab
- Optoelectronics Lab
- Fibre Optics Lab
- Optical Communication Lab
- Faraday's Apparatus
- Fibre Optics Kit

## Energy Management

## CORE SUBJECTS

- Numerical Methods in Heat Transfer
- Energy Conversion Systems
- Solar Energy Engineering
- Electrical Energy Systems & Management
- Energy Conservation in Thermal & Electrical Systems
- Energy Audit & Management
- Renewable Energy Technology
- Energy & Environment

## ELECTIVES

- Economics of Energy Engineering
- Process Reliability Engineering
- Energy Policies for Sustainable Development
- Energy Systems Modeling & Analysis
- Management tools in Engineering Design
- Vehicle Power Management
- Heat Transfer in Energy Systems
- Emerging Refrigeration Technologies
- Thermal Energy Storage Systems
- Optimum Utilization of Heat & Power
- Safety Technology & Management
- Research Methodology



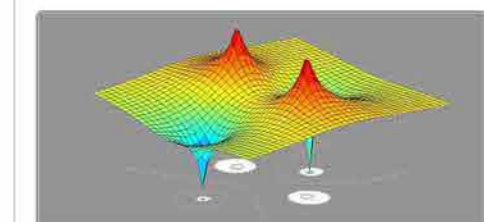
## Image Processing

## CORE SUBJECTS

- Digital Image Processing
- Advanced Data Structure & Algorithms
- Pattern Recognition
- Computer Vision
- Computer Graphics



## ELECTIVES



- Artificial Neural Networks & Fuzzy Systems
- Data Mining
- Natural Language Processing
- Data Compression
- Medical Language Techniques

## LABS &amp; RESOURCES

- Image Processing Lab
- Computer Graphics
- Two CUDA processors- Tesla C2070 & GeForce GTX480
- 15 WiFi hotspots

