

## DUAL DEGREE PROJECT

### **Implementation of cognitive radio on the USRP kit | June 2013 - till date**

*Guide: Prof S N Merchant, Dept. of Electrical Engineering, IIT Bombay*

- Carried out energy detection spectrum sensing to find the lowest energy frequency band using Python
- Set up calls and messages on a software defined GSM network named OpenBTS
- Carried out a field testing of an OpenBTS network to check the interference with other nearby networks
- Working on a cognitive OpenBTS system

## PROGRAMMING SKILLS

**General purpose:** C, Python, Assembly for the Intel 8085 microprocessor, Verilog, Ruby

**Numerical computing:** Matlab, Octave, SciPy

**Miscellaneous:** bash scripting, SQL, XML, Javascript, LaTeX

**Operating systems:** Unix, Linux and Mac OS X

## COURSE PROJECTS

### **Scalable video coding using wavelets | Feb-Apr 2013**

*Guide: Prof V M Gadre, Dept. of Electrical Engineering, IIT Bombay*

- Compressed three different spatial resolutions of a video together into a single bitstream using Matlab
- At the receiving end, uncompressed the best resolution for the bit rate available

### **Principal Component Analysis in face recognition | Oct-Nov 2012**

*Guide: Prof V Rajbabu, Dept. of Electrical Engineering, IIT Bombay*

- Implemented an iterative algorithm of using PCA in face recognition using Matlab

### **Design and test an algorithm for restoring a brain image | Sep-Nov 2012**

*Guide: Prof Arjun Arunachalam, Dept. of Electrical Engineering, IIT Bombay*

- Implemented an algorithm to remove noise artifacts from a brain image using Matlab
- Used the non-linear conjugate gradient method to optimize the estimate

### **A simple AM voice transmitter | Aug-Oct 2011**

*Guide: Prof S N Merchant, Dept. of Electrical Engineering, IIT Bombay*

- Developed an AM voice transmitter with a carrier frequency of 1 MHz, taking input from a music player via a 3.5 mm jack

### **Mini UID for IIT Bombay Campus | Oct-Nov 2009**

*Guide: Prof Deepak Phatak, Dept. of Computer Science and Engineering, IIT Bombay*

- Automated fingerprint matching for the purposes of registration, verification and attendance

## KEY COURSE ASSIGNMENTS

### **Course: Advanced computing for electrical engineers | Sep 2012**

*Guide: Prof Virendra Singh, Dept. of Electrical Engineering, IIT Bombay*

- Implemented stack, queue, double ended queue, linked list, doubly linked list, self-adjusting lists
- Implemented 2-3 tree, splay tree, huffman tree and AVL tree
- Used C programming language for the implementation

### **Course: Speech Processing | Autumn 2012**

*Guide: Prof Preeti Rao, Dept. of Electrical Engineering, IIT Bombay*

- Synthesized speech signals using Matlab and used DTFT to analyze them
- Analyzed speech signals using Linear Prediction and also re-synthesized them.
- Estimated the pitch of a speech signal using Cepstrum estimation
- Used Praat software to extract speech signals from .wav files

## SEMINARS

### **Measurement of interference temperature | Jan-Apr 2013**

*Guide: Prof S N Merchant, Dept. of Electrical Engineering, IIT Bombay*

- Surveyed various ways of measuring interference temperature efficiently
- Became familiar with the concept of Cognitive Radio

### **LED's for high speed applications (over 100 Mbps) | Mar-Apr 2013**

*Guide: Prof Joseph John, Dept. of Electrical Engineering, IIT Bombay*

- Presented a seminar on how LED's could be used for high speed fiber optic communications. LED's are cheaper, rugged and safer to handle compared to laser diodes

## RELEVANT COURSES

### **Communications**

Digital Communications, Fibre Optic Communications, Communication Systems, Probability and Random Processes

### **Computing and math**

Advanced Computing for Electrical Engineers, Microprocessors, Microprocessors Lab

## EXTRA CURRICULAR

- Won a silver medal in the All India Computer Knowledge Competition 2006
- '9/10' in the course EE 717: Advanced Computing for Electrical Engineers
- **Organizer, Infrastructure Team**, Techfest 2010
- **Social Service**: surveyed water and electrical resources of remote villages in Maharashtra
- **Social Service**: taught math and physics to 6th standard students
- **Interests**: Computer programming for technical problems, communications, wireless applications, problem solving, functional programming