KARTIK KULGOD

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FIELD OF INTEREST

I am interested in statistical and mathematical aspects of Signal Processing and its application to the field of communication

EDUCATION

Birla Institute of Technology and Science, Pilani *August 2015 - Present*
B.E. (Hons.) Electrical & Electronics Engineering
Overall GPA: 8.825/10

City International School, Pune *March 2015*
High School
Overall Percentage: 96.8%
School Topper

PROJECTS

Brain Signal Processing *January 2018 - Present*
Prof. Veeky Baths ***BITS Cognitive Neuroscience Lab***

· Analysing *Electroencephalography (EEG)* Signals using the method of *Wavelet Transforms*.

Winter Signal Processing Projects *December 2017 - January 2018*

· ***Estimation of FIR Filter Response***:Estimated the response of a FIR filter using the *method of moments* for a *white* signal, coupled with the *Levinson algorithm* for calculating the inverse of the *autocorrelation toeplitz* matrix. [Project Page]
· ***Spatial Sound Generation:*** Generated spatial sound from a single channel sound using simple convolutional techniques. [Project Page]

DTMF Decoder *October 2017*

· Developed a software that can decode Dual Tone Multi Frequency Tones.
· Implemented the software using two methods, the *Fast Fourier Transform (FFT)*, and an efficient, less calculation intensive, *Goertzel's algorithm* by developing seven filters for the seven frequencies involved.
· The software can decode signals with mark & space time of 20 ms or 25 digits per second. [Project Page]

Hyperloop India *August 2016 - November 2017*
Electrical & Electronics Engineer ***Goa - Bengaluru - Los Angeles***

· Hyperloop India is a student body with the aim of bringing Hyperloop to India. We were the *first* team to have *represented India* and the only two from Asia, who had been selected to race our pod on a mile long track at the SpaceX headquarters in Hawthore, California during August 2017.

My various roles as an Electrical and Electronics Engineer were:
· Writing the software for a majority of the sensors on the pod, as well as the actuation systems.
· Testing the said software in near vacuum conditions
· Writing the software for the part of the State Machine involving the retro-reflective sensors.
· Designing the Schematics for the PCBs of the major nodes on *Eagle CAD*.
· Selection of the sensors for the pod & wiring of various components in the pod. [Project Page]

All Pass Filter Design using Current Feedback Op-Amps *August 2017 - December 2017*
Prof. Dipankar Pal

- Designed a first order all pass filter using a Current Feedback Operational Amplifier.
- Realised the circuit using *45 nm CMOS* technology.
- Simulated the design on *Cadence Virtuoso* from a frequency range of 1 µHz to 1 THz.
- Achieved a gain of 0 dB with variation of 0.023% over the entire frequency range. [Project Page]

hFE tester using the 8086 *March 2017 - May 2017*
EEE F241, Microprocessors and Interfacing

- Designed a system to calculate the beta value of a transistor, using intel 8086 and other peripheral devices on Proteus. [Project Page]

ABU Robocon *March 2016 - March 2017*

- The objective was to deploy a robot that can throw polyurethane frisbees accurately at specified points. My various roles as a member of the team were:
- Writing the software for the controlling actuators and transmitting data among different microcontrollers using I2C Protocol using the Arduino development board.
- Developing the 4 wheel drive base. [Project Page]

TECHNICAL STRENGTHS

Experienced MATLAB, C, C++, Arduino, HTML & CSS, Assembly Language (x86)
Familiar Eagle CAD, Proteus, Cadence Virtuso, Python, Simulink, LaTeX
Comfortable with Linux and Windows OS

RELEVANT COURSEWORK

Major courses: Signals & Systems, Communication Systems, Digital Signal Processing, Data Communication and Networking, Mobile Telecom Networks, Microprocessor and Interfacing, Digital Design, Analog & Digital VLSI Design.

Inter-Disciplinary: Statistical Inference & Application, Calculus, Probability & Statistics, Linear Algebra & Complex Analysis, Ordinary & Partial Differential Equations, Optimization.

SCHOLASTIC ACHIEVEMENTS

- **KVPY** *(Kishore Vaigyanik Protsahan Yojana)* 2015 Scholar
- **All India Rank 1091** among 1.5 million students in *JEE (Mains)* 2015
- **School topper** in National Science Olympiad & International Mathematics Olympiad for several years

MENTORING & MANAGING EXPERIENCE

- **Teaching Assistant** for the course **Microprocessors & Interfacing** for the *Spring semester* of the academic year 2017-2018
- **Panel Coordinator** for *Electrify* during Quark (the Technical Festival), which consists of events related to Electrical Engineering concepts.
- Member of **IEEE** Student body
- **Mentored students** about communication principles using the Arduino and Raspberry Pi development boards, as a part of Quark Summer Technical Project.
- **Mentored students** as a part of an Introduction to Robotics, and designed the capstone project: *Micro Servo Robotic Arm*