Rishik kumar
Electrical Engineering
Indian Institute of Technology, Bombay

16D070028
Dual Degree (B.Tech. + M.Tech.)
Gender: Male
DOB: 10-02-1999

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2021	

Research Experience

HF Radar for Estimation of Ocean Surface Currents Map | **Radar** *(Aug 2020 - Present)*
Master's Thesis | *Prof. Siddharth Duttagupta*

- Reviewed the Method of Obtaining **Doppler Spectrum** received from **Bragg Scattering** by surface waves and various algorithms for estimating its **location** and **velocity** of **current** beneath it
- Working on Design of **Co-located Orthogonal Loops Antenna** for **Bearing Determination** of surface waves

Vertex Coloring using Oscillators | **Neuromorphic** *(Aug 2019 - Nov 2019)*
Supervised Research Exposition | *Prof. Udayan Ganguly*

- Solved Vertex Colouring using **Ring Oscillator** ,modelled vertex as a oscillator and edge as **Coupling Capacitor**
- Solved the same problem using **Relaxation Oscillator** and compared the two methods.

Work Experience

Audio Speech Recognition | **Meru Cabs, Mumbai** *(May 2019 - Jul 2019)*
Guide: Jagrat Khandelwal

- Implemented **Detection of against policy behaviours** from **Call Recordings** of Customers and Drivers by recognising **certain words** and achieved Accuracy of **0.85** on validation dataset
- Trained mapping of **32 cepstral coefficients to phonemes** (from **HMM**) using Fully Connected Nueral Networks and **phonemes to text** by training **Recurrent Neural Network** , achieving accuracy of **0.65**
- Obtained **Auditory Spectrogram** of time bins using **512** point **Fast Fourier Transform**
- Trained direct mapping of above audio Spectrogram **64x64 images** to text by **CNN** , achieving accuracy of **0.85**

Key Projects

Non Invasive Glucometer | **Electronics** *(Apr 2019)*
Course Project | *Prof. Shalabh Gupta*

- Designed Analog Circuit of **NIR Spectroscopy** based Noninvasive measurement of Blood Glucose
- Data collection of **100** Actual Blood glucose against Corresponding Voltage readings of designed circuit and mapped the two using **Regression Model**
- Displayed the real time readings on LCD and delivered a final alternative **low cost solution** for **monitoring blood-related** ailments achieving of accuracy of **75%**

Inverted Pendulum |**Control Systems** *(Apr 2019)*
Course Project | *Prof. Debraj Chakroborty*

- Modeled the **State Space equations** for **2 states** for system and linearize it .
- Stabilised the System by designing **LQR control** and obtain the suitable **2X2 feedback matrix**
- Achieved stable inversion with error in **vertical** and **Base** angle within **3** degrees and **30** degrees

RISC Microprocessor | **Processor** *(Nov 2018)*
Course Project | *Prof. Virendra Singh*

- Designed **Datapath** having **ALU, IR, Memory, Decoders** for **8 Register 16 bit** Microprocessor
- Designed **Level 1** and **2 Flowcharts, FSM of Controlpath** for Set of **14** instructions from given **ISA**.
- Implemented the design in **Quartus** using **VHDL** , simulated in **RTL**, and tested the design on **FPGA**

Technical Skills

Programming	Python, C++, VHDL. Embedded-C, Assembly Language
Area of Interest	Analog Electronics, Processors, Antenna/RADAR systems, Control Systems
Software:	TCAD, Cadence, SPICE, MATLAB, ADS, CST

Extra-curriculars

- **Teaching Assistant** for the course **Introduction to Electronics** to assist the Professor. *(Aug 2020- Present)*
- Completed a year long course under **National Sports Organization** in **Atheletics** *(2017)*
- Secured **AIR 129** and **State rank 10** in **National Science Talent Search Examination - II Level** *(2016)*

Scholastic achievements and extracurricular activities are not verified by the Placement Cell