



Amod Holla

Electrical Engineering

Indian Institute of Technology Delhi

ee1200639@ee.iitd.ac.in

Qualification	Institute	Year	Grades
B. Tech. in Electrical Engineering	IIT Delhi	2024	9.15
Class XII (CBSE)	NPS, Indiranagar, Bangalore	2020	96.6%
Class X (CBSE)	NPS, Indiranagar, Bangalore	2018	94.8%

SCHOLASTIC ACHIEVEMENTS

- **Department Rank** - 4 among a cohort of 192
- **Honoured with IIT Delhi Merit Prize** - For outstanding academic performance in Semester III, V, VI and VII

PUBLICATIONS

- **Demonstration of Synaptic Behavior in a Heavy-Metal-Ferromagnetic-Metal-Oxide-Heterostructure-Based Spintronic Device for On-Chip Learning in Crossbar-Array-Based Neural Networks**, *ACS Applied Electronic Materials* 2023
- **Impact of edge defects on the synaptic characteristic of a ferromagnetic domain-wall device and on on-chip learning**, *Neuromorphic Computing and Engineering* 2023

PROJECTS

- **Analog Neural Network** | *Prof. Debanjan Bhowmik, IIT Bombay* *December, 2021 - Present*
 - Designed hardware accelerators for non-spiking artificial neural networks using emerging memory devices.
 - Used crossbar arrays to perform vector multiplications in $O(1)$ time, using non-volatile memories that store weights.
 - A custom learning algorithm involving quantization and thresholding was devised due to limited device memory.
 - Effect of the non-ideal behaviour of the memory device on training and inference of a FCNN and CNN was studied.
 - Circuit level simulation was performed on Cadence Virtuoso, behavioural simulation was done on python.
- **Random Forests for Medical Applications** | *Prof. Can Li, The University of Hong Kong* *July, 2022 - September, 2022*
 - Semantic segmentation of tumor regions in human kidneys using random forests as a viable alternative to CNNs.
 - Utilized advanced image processing algorithms to extract useful features, and performed selection of best features.
 - Explored using random forests combined with CNNs for increasing segmentation accuracy.
- **Virtual Brain Simulation** | *Prof. Saurabh Gandhi, IIT Delhi* *August, 2023 - Present*
 - Exploration of brain structural connectivity changes in patients with Alzheimer's Disease.
 - Converted raw MRI and DTI scans to structural connectivity matrices, and simulated EEG responses to TMS using The Virtual Brain platform.
 - The electric field induced by TMS on different brain regions was simulated using the SimNIBS tool, and incorporated into the virtual brain simulation.
- **Synthesis of a VPU** | *Prof. Shouri Chatterjee, IIT Delhi* *August, 2023 - November, 2023*
 - Performed synthesis of the Verilog code of a vector processing unit (VPU) using the Cadence RTL compiler.
 - Transformed the synthesized netlist into a physical design using the Encounter Digital Implementation tool.
 - Generated a floor planning layout of the physical design using the Encounter RTL to GDSII tool.
 - Performed a static timing analysis, design rule check and layout versus schematic check on the final layout.
- **Manchester encoding and decoding** | *Prof. Manav Bhatnagar, IIT Delhi* *March, 2023 - April, 2023*
 - Designed and simulated a Manchester encoder-decoder on LTspice, ensuring transmission and synchronization.
 - Translated the simulation design into a physical circuit, implementing the Manchester encoding and decoding.
 - Designed a decoder circuit utilizing 555 timers and logic gates, implementing derived digital logic equations.

INTERNSHIPS

- **Hardware Engineer Intern** | *Aeronautical Development Establishment, DRDO, Bangalore* (December 2022)
 - Interfaced a vibration sensor to a MPC5566 controller, enabling real-time vibration monitoring of onboard avionics.
 - Coded the configurations of the vibration sensor in C, allowing for SPI communication with the microcontroller.
- **Data Scientist** | *Ripik AI, Noida* (May 2023 - July 2023)
 - Leveraged computer vision techniques (openCV) to successfully and accurately identify and classify defects in steel bars, and automating quality control processes, thus eliminating production bottlenecks.
 - Conducted analysis and modelling of key performance indicators in a blast furnace, thus predicting future production. State of the art models (LightGBM, GBR) were used to forecast and predict production levels.
 - Implemented an alarm system that alerts furnace operators in advance to subpar production, enabling quick corrective adjustments. Modelling done on python.

TECHNICAL SKILLS

Languages: C++, C, Python, Verilog, MATLAB

Frameworks: Tensorflow, PyTorch, Pandas, Numpy

Tools: Arduino, Quartus, FreeCAD, Cadence EDA