

INTERESTS

Embedded software development, Linux kernel development, Deep Learning on embedded devices, ML for Systems

EDUCATION

- **International Institute of Information Technology, Bangalore (IIIT-B)** Bangalore, India
Integrated Masters in Electronics and Communication Engineering; CGPA: 3.49/4 August 2016 – Present
- **Pace Junior Science College** Mumbai, India
Grade 11th and 12th - Science with Electrical Maintenance; Percentage: 88% June 2014 – May 2016

WORK EXPERIENCE

- **IIO Driver for ADXRS290 Gyroscope** 🌐 ([Project Description](#)) [The Linux Foundation](#)
Student Developer - Google Summer of Code 2020 May 2020 - Present
Working on crafting a device driver for Analog Devices' ADXRS290 gyroscope under the IIO subsystem of the Linux kernel. The ultimate goal is to merge the driver upstream with support for channels, buffers and triggers for both its pitch and roll axes.
- **Computer Vision for Fashion** [Tuzo](#)
Intern January 2020 - March 2020
Deployed deep learning models trained with the DeepFasion dataset for predicting clothes' category (multi-class classification) and attributes (multi-label classification) from an image, on a web-server using a Django back-end.
- **Autonomous Flight Controller for UAVs** [Siemens R&D](#)
Research Intern May 2019 - December 2019
Constructed a cascaded PID controller which given the global co-ordinates of the destination, commands the appropriate thrust and angular velocity of each axis over a ROS topic on the MIT's FlightGoggles simulator. Extended the project by integrating this controller with Deep Reinforcement Learning to achieve a hierarchical model-free controller capable of efficient vision-based trajectory-planning on Microsoft's AirSim.
- **Evaluating the emotional state of a person using facial landmarks** [Guide: Prof Madhav Rao](#)
Summer Research Intern May 2018 - July 2018
Computer vision rooted approach to detect the emotional state of a person; might be a patient in a hospital or a person facing indignation in public. Equipped with pre-trained Haar Cascades for face detection, I used the existing model of the ensemble of regression trees to extract 68 facial landmarks and further engineered trigonometric, eccentric and linear features to train a machine-learning model (Linear SVM) that notifies if the emotions expressed are "negative".

COURSE PROJECTS

- **Review of TVM** 🌐 ([Review Paper](#)) [Guide: Prof K K Subramaniam](#)
Reading Elective January 2020 - May 2020
Understood the internals of TVM, an end-to-end compiler stack for deploying deep learning models for various hardware back-ends. Operator fusion, nested parallelism with cooperation, tensorization, explicit memory latency hiding, etc. are some of the optimizations to the computational graph that were explored.
- **LLC replacement policy to mitigate CSCA** 🌐 ([Project Link](#)) [Guide: Prof Nanditha Rao](#)
Course: Processor Architecture May 2020
Crafted a LLC replacement policy on ChampSim (by initially making the caches inclusive) which has the ability to mitigate cache-based side channel attacks (CSCA) by restraining cross-core evictions in SMT environments. The replacement policy is inspired from SHARP.
- **Drone Dynamics and Control** 🌐 ([Project Link](#)) [Guide: Prof Sachit Rao](#)
Course: Interdisciplinary Robotics January 2020 - Present
Initialized the project by comprehending the drone dynamics and designing a PID controller from scratch in MATLAB that enables one to stabilize the drone given the initial conditions. Ongoing effort is to implement a controller based on Model Predictive Control (MPC) for drone navigation.
- **Controlling projector automatically from Raspberry Pi** 🌐 ([Project Link](#)) [Guide: Prof K K Subramaniam](#)
Course: Device Driver Development November 2019
Devised a virtual misc (HDMI) device as a kernel module that generates an appropriate uevent when a HDMI connector is inserted by reading the state of the Hot Plug Detect (HPD) pin through the VCOS in RaspberryPi 2B. A matching rule with the said uevent further triggers an action which sends a POWER signal to the CASIO projector through an IR Transmitter.

Extending objects in OVM

Guide: [Prof K K Subramaniam](#)

Course: *Virtual Machines*

April 2019

Extended the capabilities of an object-based virtual machine, OVM, by performing dynamic dispatch on an object's method. This was achieved by the help of the underlying message-passing model, enabling me to send appropriate messages to the dispatch table of the object whose behaviour has to be extended.

Low-frequency Data Transmission (Project Link)

Guide: [Prof Priyanka Das](#)

Course: *Digital Communication*

March 2019 - April 2019

Tailored a solution to dispatch messages (decimals) from one computer to another by means of audio waves. Relied on techniques such as binary encoding, modulation (FSK), channel coding (Hamming 7,4) and symbol-level synchronization to devise a concrete program even in cases of constrained bit rates.

Data Dump Through 8051 Serial Port

Guide: [Prof K K Subramaniam](#)

Course: *Microprocessors and Microcontrollers*

October 2018 - November 2018

Designed a program, in machine code, to dump a range of memory address from one machine into a different RAM location on a different machine over the built-in 8051 serial port using "null modem" connection. Utilized the Intel Hex format including 'checksum' to verify correct reception of blocks.

Two Sigma Connect: Rental Listing Inquiries (Project Link)

Guide: [Prof G Srinivasaraghavan](#)

Course: *Machine Learning*

September 2018 - December 2018

Worked on rental listing data from RentHop to predict the interest level of a new listing. Initialised the project with data visualisation, data preprocessing and then turned my attention towards feature engineering; handling categorical columns, geographical data and text data. Some of the classifiers tried were Logistic Regression, Random Forest and XGBoost.

SKILLS

- **Programming Languages and Scripting:** C, Python, C++, MATLAB, bash
- **Tools:** Git, \LaTeX , gdb, vim, tmux
- **Hardware:** Raspberry Pi, Arduino, ESP8266
- **Libraries and Frameworks:** ROS, TensorFlow, Keras, OpenCV, Scikit-learn, Pandas, Numpy

LEADERSHIP ROLES

- **Teaching Assistant** for the course 'Digital Communication', for the Spring semester (2020)
- **Teaching Assistant** for the course 'Microcontrollers and Microprocessors', for the Fall semester (2019)
- **Student Mentor** for the fresh batch of undergraduates, for the year 2019.
- **Editor-in-Chief** of IITB's magazine '8Bit', for the year 2017-2018
- **Core Committee Member** for 'Infin8', IITB's techno-cultural fest, for the year 2017-2018

ACHIEVEMENTS

- Awarded Linux Foundation's **LiFT scholarship** under the '**Linux Kernel Guru**' category (2020)
- Amongst the **top 25 teams** in the country in Unlimit's IoT interThrone Hackathon (2019)
- Secured **1st position** in inter-college Basketball tournament at SIBM (2018, 2019)
- Secured **99.16 percentile** in JEE Mains amongst 1 million+ candidates (2016)

RELEVANT COURSES

Real Time Operating Systems, Device Drivers Development, Processor Architecture, Virtual Machines, ARM Architecture, Interdisciplinary Robotics, Microprocessors and Microcontrollers, Deep Reinforcement Learning, Visual Recognition, Digital Image Processing, Signal Processing, Mathematics for Machine Learning

OPEN SOURCE CONTRIBUTIONS

- 17 accepted [patches](#) in the **IIO subsystem** of the **Linux kernel**.
- 3 merged [PRs](#) along with contributions to [issues](#) in **Embox**, a lightweight modular RTOS for embedded systems with restrained access to resources.

VOLUNTEER EXPERIENCE

- **Make A Difference (MAD)** Bangalore, India
Academic Support Volunteer *August 2017 - April 2019*
Carried out the responsibility of teaching English by incorporating activity-intensive lesson plans to Grade 7 students every weekend at their shelter home.
- **International Basketball Federation (FIBA)** Bangalore, India
Hospitality Volunteer *July 2017*
Administered and aided the help-desk for the international coaches at the Women's Asia Cup, India (2017).