Nithin Murali

Machine Learning · Computer Vision · Networking

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Education

Indian Institute of Technology Bombay

4th year Undergrad in Electrical Engineering - CGPA 7.3 — *2013 - PRESENT*

Honors & Awards

- Awarded **Institute Special Mention** (Technical), for outstanding contribution towards Robotics and Technical activities in campus
- Awarded **Ericsson innovation award** 2016, for developing a Visible Light Communication based LED beacon
- Awarded **Best Research Award** (1 of 122) for Institute Technical Summer Project - Refreshable Braille display

Professional Experience

Google Summer Of Code

Mentor: Luis J Manso

Student Developer | Robocomp — *May. 2015 - Jun. 2015*

An open-source Robotics framework providing tools to develop software components that communicate through interfaces

- Restructured the building and deployment system of Robocomp, making it capable of building whole project in one go
- Designed and implemented a **workspace environment**, decoupling development of components from source tree
- Developed tools to ease navigation of workspace, building components without breaking dependencies and running tests

Technology Consultant Intern

Manager: Praveen

OLA (ANI Technologies Private Limited) — *May. 2016 - Jul. 2016*

- Saved **14+** man-hours/week by automating the workflow of dashboard updation from Hadoop servers
- Developed and simulated a customer matching algorithm for shared rides
- Developed and incorporated customization layer to the messaging API for notifications service

Research Experience

Head | Image Processing And Machine Learning

Prof. Leena Vachhani

AUVSI foundation and US Office of Navel Research | Budget **7 Million** — *Jul 2014 - Apr 2016*

*Designed and Developed **Autonomous Underwater Vehicle** (AUV) funded by Ministry of Defence (MoD) in a team of 20 students*

- Achieved Notable improvement in **80%** of tasks by Refactoring vision module into **pipeline architecture**
- Developed proprietary algorithm based on **Kalman filter** & Meanshift for efficient tracking of objects
- Implemented motion compensated filtering to remove sunlight in shallow images; significant impact in 4 tasks
- Achievement : **2nd position** at International RoboSub Competition San Diego 2016, among **46** teams from 10 nations

Visible Light Communication

Prof. Kumar Appaiah

Research Project — *Jan 2016 – Feb 2017*

End-to-end solution to facilitate communication between modified LED bulbs and mobile device for indoor navigation

- Developed receiver module using low power photodiode, cascaded amplifiers and active filters in ultra-low form factor
- Implemented B-FSK modulation scheme with **custom PHY & MAC protocol** to achieve **10 Mbps** data rate
- Received offers from **L&T** for further product co-development; Featured in media outlets – **TOI**, Business standard
- Awarded INR **1.3 million** from Ericsson India Ltd for product R&D

Keyboard side channel attacks: Deep Learning Approach

Prof: Kumar Appaiah

Master's Thesis — *Jul 2017 - present*

- Inferring keyboard keystrokes from a compromised mobile device using acoustic emanations and vibrations
- Working on improving the efficiency of inference through fusion of various mobile sensors and acoustic emissions
- Implementing **Convolutional Neural Network** to predict keystrokes from the Spectrogram of acoustic emanations

Online Adaptive Modulation And Coding

Prof: Kumar Appaiah

Supervised Research Exposure — *Jul 2017 - Apr 2017*

- Implemented **Online SVM** and KNN to dynamically choose the best modulation and coding scheme in a wireless network
- Achieved **50%** improvement in throughput and **58%** improvement in Frame Error Rate

Major Technical Projects

Revisiting Ajanta

Prof: Sumant Rao

Senior Developer | Budget **24.6 million** — *Mar. 2015 - June. 2017*

- Developed an Android app which facilitates **Virtual Reality** tour of Ajanta caves with narrative storytelling
- Worked as **system administrator**, setting up and maintaining Linux server which hosts website and application backend
- Worked in a team of 10+ designers and developers, Led a team of 3 developers

AI Game playing Agent

Prof: Ganesh Ramakrishnan

Course project — *Jul. 2016 - Nov. 2016*

- Developed generic game playing agent based on **Reinforcement Learning**, which takes game screen as sole input
- Implemented **Deep Q convolutional Network** in **TensorFlow** and tested on Flappy bird

Bharatnet

Prof: Abhay Karandikar

Research and Development project — *Jul. 2017 - Apr. 2017*

- Worked in planning commission for deployment of 5G/broadband connectivity in **250,000** villages throughout India
- Worked on the back-end of Bharatnet planning tool which generates fiber route and wireless links along with its feasibility
- Developed and implemented algorithm for mapping villages to gram panchayat data

Refreshable Braille display

Mentor : S. Karthikeyan

Intel Embedded India challenge 2014 — *Apr. 2014 - May. 2014*

- Designed and developed a working prototype of Refreshable Braille Display which could read from both print and electronic media and produce both audio and tactile display
- Intel India Embedded Innovation Challenge 2014 **Finalist** (top 10 out of 2000 teams) across the country

Flow based Image Cartoonification

Prof: Ajit Rajwade

Course Project — *Jul 2015 - Nov 2015*

- Implemented image abstraction using iterative flow-based Difference of Gaussian (DoG) filtering for line extraction, and flow-based Bilateral Filtering for region-smoothing

Pygsheets | open source python package

- Developed a python package that acts as a wrapper for the Google Sheets API, significantly reducing complexity
- Has 450+ github stars and an active community

Other Open Source Projects

- Occasional contributor of **Firefox** browser and related Mozilla tools
- Developed an Idea Tracker Android app adhering to **Clean Architecture**
- Developed a **facial recognition** system using Principal Component Analysis and KNN (Course Project)
- Developed an open source **platform game** and level editor from scratch using SDL in c++ (Course Project)
- Designed a device for **Hepatitis detection**, quarter-finalist TI Innovation Challenge

Positions of Responsibilities

Institute System Administrator | IITB

2017 - 2018

- Maintained Networking and Wireless infrastructure of the Institute and Administered three servers
- Developed IITB Android App back-end on Django
- Headed a team of 12 hostel system admins

Tech Counselor | Hostel 15

2013 - 2014

- Led a **team of 9** tech representatives, with the vision of promoting tech activities in the hostel
- Established hostel tech room, Developed and maintained hostel website, Conducted informal tech events

Teaching Assistant | Data Analysis and Interpretation

Jul 2017 - Nov 2017

- Conducting weekly tutorials and grading quizzes for 150+ students
- Mentoring a group of 14 students, Assisting them in academics

Extracurricular Highlights

- Awarded **'A' certificate** for clearing NCC level 1 exam
- 4th in Intra-college technical general championship for developing automatic bicycle parking
- **Volunteered** as tutor for Computer Literacy Program, teacher for **underprivileged kids** under NGO Asha
- Guided and mentored a team for doing Institute summer technical project
- Successfully completed volleyball camp under National Sports Organization

Skills

Programming Python, C/C++, Android, JAVA, R[1], SQL, Bash, CMake, C#[1], VeriLog-HDL

Web Django, Flask, HTML5, Javascript, PHP[1]

Tools Matlab, OpenCV, TensorFlow, OpenGL, Beaglebone, 8051, Unity

Relevant Courses Image Processing, Foundations of Machine Learning, Computer Graphics, Microprocessors
Communication Networks, Computer and Network Security, Operating systems