Atharv Ramesh Nair

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Education

Indian Institute of Technology Hyderabad — Hyderabad, Telangana, India
Bachelor of Technology in Electrical Engineering — *2020 - 2024*
CGPA : 8.85

Maharishi Vidya Mandir — Chennai, TamilNadu, India
CBSE 12th Grade — *2020*
Score : 97.8%

Achievments

- JEE ADVANCED 2020: AIR 1247
- JEE MAINS 2020: AIR 1585
- KVPY SX SCHOLAR 2019
- Selected as a finalist of 5MICC (5-minute Video Clip Contest) at **ICASSP 2023** (International Conference on Acoustics, Speech and Signal Processing) in Rhodes Town, Greece

Courses

- **Foundational** - Circuit Theory, Digital Systems. Signals and Systems, Matrix Theory, Probability and Random Variables, Semiconductor Device Fundamentals
- **Communication and Signal Processing** - Digital Signal Processing, Digital Communication Systems, Wireless Communications, Image and Video Processing, Information Theory and Coding, Convex Optimization
- **Microelectronics** - Analog Electronics, Analog Circuits, Digital IC Design, Intro to VLSI Design, Intro to HDL
- **Computer Science** -Introduction to Programming, Data Structures and Applications, Computer Networks, Computer Architecture, Embedded Programming, DBMS - I
- **Certifications :** Deep Learning Specialisation by Coursera , ROS by Udemy

Work Experience

Summer Intern at ALOG TECH — May 22 to Jul 22

- Worked as Robotics Software Developer in a startup (Alog Tech) at the Tech Incubation Cell of IITH
- Worked on developing an Autonomous Warehouse Robot for a client of the company using ROS and its navigation stack
- Developed Scripts for Path Planning and motor Control through MODBUS Protocol

Incoming Embedded Software Developer Intern at Silicon Labs — May 23 to Jul 23

Technical Skills

Languages	:	C, C++, Python, MATLAB, HTML, CSS , JavaScript
Libraries	:	Numpy, Scipy, CVXpy, Matlplotlib, Pandas, Scikit-learn, Tensorflow, Pytorch, , scikit-learn, Latex
CAD Tools	:	KiCAD, Solid Edge
Sim Tools	:	LTSpice, NGspice, Cadence
Miscellaneous	:	Robot Operating System (ROS), Gazebo. Arduino, Esp and Raspberry Pi boards

Positons of Responsibilities

Coordinator - Robotics Club IITH — May 22 to Present

- In charge of a group of 25 members who actively participated and brainstormed on developments in the field of Robotics and AI
- Conducted multiple sessions and workshops promoting the field of Robotics on campus.
- Have conducted multiple competitions as part of Inter and Intra College Fests.
- Mentoring club members' projects - Gesture Recognising Smart Watch, Blind-Assistant-Stick, Earthworm BioRobot etc.

Team Lead - Drona Aviation PS Inter IIT Tech Meet 2023 — Feb 23

- Led a group of 10 members in the Drona Aviation Problem Statement and represented IITH at the Inter IIT Tech Meet held at IIT Kanpur

Projects

PID Control of Drone using Overhead Camera

- Developed a Python wrapper to control the Pluto 1.2 Drone using socket and struct libraries in Python
- Implemented pose estimation using ArUco tags on the camera feed from an overhead camera
- Developed PID control of the drone based on the pose estimate

Autonomous Irrigation Robot

- Implemented plant object detection using the MobileNet-SSD V1 Object Detection Model
- Utilized a TensorFlow Lite model for computation on a Raspberry Pi
- Tracked pixel coordinates and distances from plants (using bounding box area) to autonomously water them

Autonomous Warehouse Robot Simulation using ROS

- Designed a custom robot from scratch using URDF files and simulated it in ROS-Gazebo
- Created a custom warehouse in Gazebo and simulated Autonomous Navigation of the robot in the warehouse
- Implemented SLAM (Simultaneous Localization and Mapping) and end-to-end navigation using ROS's Navigation Stack and Lidars
- Deployed this system on an actual warehouse robot while working in Alog Tech

OFDM Channel Estimation using Deep Learning

- Course Project for EE6300 (Wireless Communication) supervised by Prof. Zafar Ali Khan
- This project aims at understanding various methods for estimating the channel state in OFDM (Orthogonal Frequency Division Multiplexing) deployed in modern 4G and 5G Mobile Networks
- Simulation of and end to end single carrier OFDM system was done using comb-type pilot insertion.
- Channel Estimation was done was using Least Squares , Minimum Mean Square and a CNN based technique
- The proposed CNN architecture had superior performance to the LS estimator with just an hour of trainig

Image Denoising using Total Variational Regularization

- EE5606 Course Project (Convex Optimization) supervised by Prof. Shashank Vadetka
- Analyzed total variational image denoising as a convex optimization problem, presenting the mathematical formulation and reviewing existing solutions in the literature
- Implemented and compared iterative methods such as gradient descent and Chambolle's Algorithm, as well as a CVX-based solver for the problem

Review of Image Denoising Techniques

- EE6310 Course Project (Image and Video Processing) supervised by Prof. Sumohana S. Channappayya
- Implemented a range of classical and deep learning-based image denoising techniques.
- Classical methods: Wavelet-based Denoising, PCA-based, Non-local Means, BM3D, WNNM etc.
- Deep learning-based methods: Autoencoder-based, DnCNN, RIDNet, CBDNet, PRIDNet
- Detailed findings and implementation notes available in the project report

EXTRA-CURRICULAR

- I am an avid field hockey player and represented IIT Hyderabad at the 51^{rst} **Inter IIT Sports Meet** held at **IIT Roorkee** in Dec 2022. I have more than half a dozen team and individual medals at several Intra-College Tournaments.
- I am a big fan of chess. Have participated and won several prizes in State Level Chess Tournaments
- I regularly take part in technical competitions related to Robotics like RoboWar, RoboSoccer etc.