

# Nikhil Laxminarayana

GRADUATE STUDENT, ELECTRICAL ENGINEERING, IIT MADRAS

## EDUCATION

### Indian Institute of Technology Madras, Chennai, India

Master of Science, by Research, Electrical Engineering,

Jul' 25 - Jul' 27 (Expected)

GPA: **8.67/10** (First Term)

### Indian Institute of Information Technology Kalyani, West Bengal, India

Bachelor of Technology, Electronics and Communication Engineering,

Jul' 21 - Jul' 25

GPA: **9.45/10** (Overall), Rank 2

## RESEARCH INTERESTS

Deep Learning, Diffusion Models, Optimisations

Computer Vision, Image Processing, Problem Solving, Statistical Inference

## AWARDS & ACHIEVEMENTS

Awarded the **HTRA Scholarship** by the EE Deptt. at IIT Madras.

Achieved **Department Rank 2** in ECE at IIIT Kalyani.

SIH 2024 Finalist representing **IIIT Kalyani** at **IIT Gandhinagar**.

Founding Member of the IEEE Student Branch at **IIIT Kalyani**.

Secretary of the inaugural edition of StatusCode0, **IIIT Kalyani**'s annual hackathon.

Secretary of the Robotics Club at **IIIT Kalyani**.

Management Lead of the Developers Student Club at **IIIT Kalyani**.

## RESEARCH PROJECTS

### Throughput Maximisation in Cooperative Underlay Radios

Supervisor : Prof. Pratik Chakraborty

Jan '23 - Aug '25

- Analytically derived the joint secure-reliable outages under various CSI-availability regimes in cooperative cognitive underlay radio framework.
- Analytical results for statistically optimal power allocation under the presence of an active eavesdropper were derived and tested against simulation results.
- Up to 40% improvement in effective throughput with instantaneous power control as compared to statistically-optimal power control were observed.
- *Part of the work submitted as Bachelors Thesis at IIIT Kalyani, currently under review at TVT.*

### Classifying Medical Images with Quantum SVMs and Hybrid Neural Networks

Independent Project

May '23 - Aug '24

- Developed a variational model for an SVM kernel, based on a unitary transform emulated by a quantum circuit.
- Performed a comparative study of various vector encoding schemes.
- The results outperform classical neural-network based architectures on the benchmark datasets by 10%.

### Throughput Improvements in Backscatter Systems under CSI-based Co-phasing

Supervisor : Prof. Shankar Prakriya, EE, IIT Delhi

May '24 - Jul '24

- Part of the work done during Summer Internship under Prof. Shankar Prakriya at IIT Delhi during Summer '24.
- Studied the effective secrecy throughput of ambient backscatter systems under CSI knowledge based cophasing to counter passive eavesdropper.

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## ACADEMIC PROJECTS

### **spack: A Simple Pipeline for Audio Classification using KAPre**

*Supervisor : Prof. Oishila Bandhopadhyay*

*Oct '24*

- Developed a pipeline for training classifiers over a diverse dataset to classify instrument samples using frequency domain feature extraction with the help of **KAPre** for real-time Melspectrogram extraction with CNN-based feature extractors to classify audio samples.
- Devising solving strategies to reduce verification time on existing backends like CBMC

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## COURSE PROJECTS

### **Comparison of various reward optimisation strategies in multi-armed bandits**

*Course : Probability | Supervisor : Prof. Venkatesh Ramaiyan*

*Oct '25 - Nov '25*

- Compared algorithms like Explore-then-exploit,  $\epsilon$ -greedy and UCB in a probabilistic reward in a multi-armed bandits setting.

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## ADDITIONAL INFORMATION

**Languages:** C, C++, Python, Bash, Verilog, LaTeX, Assembly (x86, MIPS) MATLAB.

**Courses at IITM:** Applied Linear Algebra, Probability, Deep Learning for Imaging, Modern Computer Vision, Image Signal Processing.

**Self Taught:**

**Hobbies:** Table Tennis, Badminton, Football, Reading and Debating

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