Riya Mahesh

Indian Institute of Technology Madras

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EDUCATION

Indian Institute of Technology Madras **2025**

Bachelor of Technology in Electrical Engineering, Minor in Computing (Computer Science) *Chennai*

- CGPA: 9.27/10
- Department Rank: 7/154
- Perfect 10 GPA in Semester 6

National Public School **2021**

Central Board of Secondary Education, Class XII *Bangalore*

- Grade: 98.6%

National Public School **2019**

Central Board of Secondary Education, Class X *Bangalore*

- Grade: 97.8%

PUBLICATIONS

[1] **Riya Mahesh**, Rahul Vashisht, Chandrashekar Lakshminarayanan. "Transformers with Sparse Attention for Granger Causality." Accepted at the *8th International Conference on Data Science and Management of Data (CODS COMAD) 2024* [arxiv]

[2] Alka Luqman, **Riya Mahesh**, Anupam Chattopadhyay. "Privacy and Security Implications of Cloud-Based AI Services : A Survey." Submitted to *CAAI Transactions on Intelligence Technology Journal* [arxiv]

SCHOLASTIC ACHIEVEMENTS

- **Karnataka State Female Topper** in JEE Main 2021 (out of 1M+ students) with **All India Rank of 128**
- **KVPY SA Fellowship** with **All India Rank of 555** awarded by the Government of India
- **National Talent Search Examination Scholarship** awarded by the Government of India
- **Global 3rd** in 13th SIP **Abacus and Mental Arithmetic** International Prodigy Competition, Singapore

RESEARCH EXPERIENCE

Temporal Causality Analysis for Multivariate Time Series Data **Aug 2023 – Jul 2024**

Prof. Chandrashekar Lakshminarayanan *IIT Madras*

- Proposed a **Sparse Attention** based **Spatio-Temporal Transformer** architecture for **Granger Causality**
- Determined causal links in stationary datasets with random delays improving **F1** and **ROC** scores by **10%**
- Demonstrated improved performance over existing algorithms on **VAR Granger Causality** and **XGBoost regression**

Privacy and Security Implications of Cloud-Based AI Services **May 2023 - Nov 2023**

Prof. Anupam Chattopadhyay *Nanyang Technological University, Singapore*

- Surveyed the existing security guarantees by cloud providers for data at rest, in transit and compute
- Identified the exact stages of the ML model lifecycle vulnerable to **Poisoning**, **Evasion** and **Exploratory** attacks
- Proposed a **taxonomy** for different threat models and **cryptographic defenses** prevalent in the current ML scenario

Cost Optimization for Gossip Learning Framework **Nov 2023 - Nov 2024**

Prof. Anupam Chattopadhyay *Nanyang Technological University, Singapore*

- Worked on optimizing communication cost while training neural network using **Gossip Learning** for **Sparse** graphs
- Designed an algorithm based on **Minimum Spanning Tree** with **Gossip Learning** and experimented on **CNN** model

Mixture Causal Discovery for Non-Stationary Data **Jul 2024 - Present**

Prof. Rose Yu *University of California San Diego*

- Generated synthetic data and implemented **PCMCI** and **Partial Correlation tests** for non-stationary dataset
- Ideating a **Divide and Conquer** based graph clustering algorithm to identify mixtures of SCMs spanning the data

PROFESSIONAL EXPERIENCE

Morgan Stanley - Strats and Quant Intern **May 2024 - Jul 2024**

App Development - Feature Identification and Pattern Analysis for Data Comparison *Mumbai*

- Built a custom **Pattern Finder App**, identifying **clusters** of anomalies for **Credit Risk** and **Bond Risk** Measures
- Performed Feature Analysis identifying **Credit Curves** driving the differences and designed a **UI** using **PyDash**

Indian Space Research Organisation (ISRO) - AI&ML Intern **May 2023 - Jul 2023**

Anomaly detection for satellite time series data using dynamic thresholding *Bangalore*

- Detected anomalies in time series data using **Outlier detection** technique and Statistical methods
- Developed **AutoEncoders** using TensorFlow for detecting anomalies using reconstruction errors
- Modeled **Long Short Term Memory** network to detect anomaly with Non parametric Dynamic Thresholding

COURSE PROJECTS

Information Retrieval System **Mar 2024 - May 2024**

Prof. Sutanu Chakraborti *CS6370: Natural Language Processing*

- Built a custom search engine using **Vector Space Model** and **Bayesian Spell Check** and tested on Cranfield Dataset
- Improved mAP, Recall, n-DCG metrics by 10 % by implementing **LSA**, **Word2Vec**, **Doc2Vec**, **BM25** algorithms

Federated Multi-Armed Bandits **Oct 2024 - Nov 2024**

Prof. Kota Srinivas Reddy *CS6046: Multi-Armed Bandits*

- Conducted simulations and performed ablative study of *FedElim* [link] algorithm for Best Arm Identification

TECHNICAL COMPETITIONS

Autonomous Mars Rover with Drone **Aug 2022 - Feb 2023**

Team Anveshak - Centre For Innovation *IIT Madras*

- Represented the team in the **International Rover Challenge** - 2023 and was placed **14th** in the **Asia-Pacific** region
- Implemented Path Planning Algorithms like **A*** , **Spiral search** and **RRT** for rover traversal
- Worked on **Aruco marker** detection and **Cone Detection** with OpenCV and aruco_ros package

KLA ML Hackathon Challenge **Sep 2024 - Oct 2024**

Anomaly Preserving Image Restoration for Noisy and Blurred Images

- Implemented custom **Residual Channel Attention Network**, Denoising Autoencoders and U-Net models
- Secured **1st** place out of 20 teams by achieving an average **PSNR** of **30.4** and **SSIM** of **99.5**

RELEVANT COURSEWORK AND TECHNICAL SKILLS

- **AI & Algorithms:** Multi-Armed Bandits*, Deep Learning for Imaging*, Natural Language Processing, Machine Learning Foundations, Data Structures & Algorithms, Applied Programming Lab
- **Math & Statistics:** Linear Optimization, Probability Foundations, Linear Algebra, Numerical Analysis (C)
- **Computer Engineering:** Computer Organization*, Digital Systems Testing, Microprocessor Theory, Digital Systems
- **Programming Languages:** C, C++, Python, x86
- **Skills:** RISC-V architecture, NLTK, spaCy, TensorFlow, PyTorch, PyDash, ROS, Scikit, OpenCV, Matlab, Git

* Ongoing courses

LEADERSHIP

Electrical Engineering Research Club **Jun 2023 - Present**

Team Head *IIT Madras*

- Part of 6 member EERC Core team leading 40+ members in carrying research initiatives within the EE department
- Ideated, organized and anchored events like EE Social, Professor Interviews, Scientific Talks and Blog articles

Teaching Assistant **Jul 2024 - Present**

EE3004 : Control Engineering, Department of Electrical Engineering *IIT Madras*

- Helping in course content creation and conducting problem solving sessions for a class of 150 students

Entrepreneurship cell **Apr 2022 - Apr 2023**

Manager, Marketing and Public Relations Division *IIT Madras*

- Brought in **6 Public Relation deals** with prominent organisations like **The Hindu**, **Inc 42**, **Dailyhunt**
- Led **Pyrolysis Drive** by collecting 10kg of **Multi-Layered-Plastics** converted into 8 L of Diesel Grade Oil
- Organised the **sustainability** campaign **Heal-Thy** at E-Summit 2023 with the theme Sustainable Space

SAATHI Mentorship **Apr 2022 - Apr 2023**

Mentor *IIT Madras*

- Mentored and assisted freshmen to navigate academic and non-academic opportunities at IITM