# RIYA MAHESH

Indian Institute of Technology Madras

🌐 riya-mahesh.github.io    in linkedin.com/in/riya-mahesh

✉ ee21b112@smail.iitm.ac.in    github.com/riya-mahesh

## 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."[1] Accepted at the *8th International Conference on Data Science and Management of Data (CODS COMAD) 2024*

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

## 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**                                     Aug 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

**Optimization of Traffic Signal Congestion**                                            Sep 2024 - Present
*Prof. Bharath Bhikkaji*                                                                 *Mandark Technologies, IIT Madras Research Park*
- Implemented **Soft-Actor Critic** algorithm for optimal signal control on simulated traffic environment using *Gym*

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[1]https://arxiv.org/abs/2411.13264
[2]https://arxiv.org/abs/2402.00896

## 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\*** and **RRT**, **Aruco marker** detection and **Cone** detection algorithms

### 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

## 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

## EXTRACURRICULAR ACTIVITIES

Memeber of the Drama Contingent, Member of Institute Girls Badminton Team, Fine Arts T-shirt painting winner