Suryaansh Jain
Computer Science & Engineering
Program: M.S. (2027)

email: suryaansh2003@gmail.com
email: suryaanshjai@umass.edu
website: srynsh

Level	Degree	Institution	Year	GPA
Graduate	M.S.	University of Massachusetts - Amherst	2027	3.9/4
Undergraduate	B.Tech	IIT Hyderabad	2025	3.91/4 (9.41/10)

Publications

- *Beyond Consensus: Mitigating the Agreeableness Bias in LLM Judge Evaluations* *(First Author, ICLR 2026)*
- *A bound for the cops and robber problem in terms of k-component order connectivity* *(First Author, arXiv 2024)*

Research Experience

Finding State Abstraction Functions for $c^{th}-$Order Markov Process for STAR *(2025)*
Guide | Prof. Bruno Castro Da Silva *University of Massachusetts Amherst*

- Working on ML models to learn $\phi-$functions such that the reduced state space is $c^{th}-$order Markov.
- Derived theoretical conditions on ϕ and used autoencoder-based models to learn abstractions satisfying these conditions.
- Applied the learned abstractions to off-policy reinforcement learning, improving efficiency and accuracy.
- Preparing the manuscript for submission to **ICML 2026**.

Beyond Consensus: Mitigating the Agreeableness Bias in LLM Judge Evaluations *(2024-25)*
Guide | Prof. Ben Leong *National University of Singapore*

- Extended LLM-as-a-judge frameworks for subjective tasks using statistical modeling and regression techniques.
- Proposed a novel **IRT**–based method with latent variables to estimate the precision of the model.
- Achieved an error rate of **3%** across all LLMs, outperforming all previous benchmarking techniques.

Optimal EFX–MNW Trade-offs under Few Valuation Functions *(2025)*
Instructor | Prof. Subrahmanyam Kalyanasundaram *IIT Hyderabad*

- Prior work studies the trade-off between **EFX** and **MNW** under unbounded valuation functions, with no tight guarantees for a fixed number of valuation functions.
- This work aims to optimize both EFX and MNW for a fixed number of valuation functions, combining previous approaches for an optimal trade-off.

A bound for the cops and robber problem in terms of k-component order connectivity *(2023-24)*
Guide | Prof. Subrahmanyam Kalyanasundaram *IIT Hyderabad*

- Derived upper bounds on the **cop number** of graphs in terms of cover size, improving existing results for graphs with components of size less than k outside the cover.
- Improved the best known bound from $|U|/2+1$ to $|U|/3+9$.

FPT Algorithms for Graph Clustering *(2023, 2024)*
Guide | Prof. Subrahmanyam Kalyanasundaram *IIT Hyderabad*

- Identified and suggested the fix for an error in a proof in the paper *From Data Completion to Problems on Hypercubes: A Parameterized Analysis of the Independent Set Problem.* The **authors acknowledged the contribution** in the new version of the paper.
- Extended the work done in the above paper to non-binary strings.

Approximate Algorithms for Solving the Closest Sub-String and the p-String Problem *(2024)*
Guide | Prof. Nitin Saxena *IIT Kanpur*

- Investigated algorithmic approaches to the **p-string problem** by extending approximation techniques developed for the closest string problem in the binary case $p=2$.

Inter Blockchain Communication *(2023)*
Guide | Prof. Kotaro Kataoka *IIT Hyderabad*

- Published the paper "OTEx: Ownership Transfer and Execution Protocol for Blockchain Interoperability."
- Conducted research **funded by Toyota** on establishing **communication between blockchains** using the OTEx protocol.
- Developed methods for communication between private, public blockchains and decentralized storage for asset and NFT ownership records.

Academic Projects

Robustness of Object Detection Models to Adversarial Attacks | *Course: Computer Vision* *(2025)*

- Surveyed **patch attacks** and **gradient-based attacks**, and implemented novel attacks **(Edge-DPAttacks)** on SOTA object detection models like YOLO and Faster-RCNN.

Graph Neural Networks and Diffusion Models for Graph Coloring | *Course: Adv. topics in DL* *(2024)*

- Designed **diffusion models** and **GNNs** to color 4**-colorable graphs** that achieved a 10% error rate. Extended it to color arbitrary k colorable graphs.

Recommender Systems Using Deep Generative Models | *Course: Deep Learning* *(2024)*
- Surveyed SOTA recommender system models like **DiffRec**, **Diff4Rec**, and **Contrastive Variational AutoEncoder** for Sequential Recommendation. Presented these papers and proposed potential improvements.

Image manipulation DSL | *Course: Compilers-II* *(2023)*
- Implemented a **Domain Specific Language** that aids in manipulating BMP format images.
- The language enables users to draw on images and apply convolution filters to them. It allows users to define drawings that can be applied to images and create videos from them.

Stack Overflow Clone | *Course: Database management systems* *(2023)*
- Implemented a scalable backend system using data from **Stack Overflow's Internet Archive**, supporting efficient storage and query processing at scale.

Firewall and Bandwidth Limiter | *Networking Club at IITH, Kludge* *(2023)*
- Developed a **Firewall and Bandwidth Limiter** using NFQUEUES in C++ for router-based network control.
- Implemented access control policies, including speed limits, configurable data caps (daily/weekly/monthly), and filtering based on ports, protocols (TCP/UDP), and IP addresses.

Wordle on Aptos Blockchain | *Inter-IIT Tech Meet* *(2023)*
- Implemented a fully on-chain version of Wordle on the **Aptos blockchain**.
- Designed and applied data compression techniques to minimize on-chain storage requirements and reduce transaction costs.

Drone motor failure detection | *Inter-IIT Tech Meet* *(2024)*
- Developed an **RNN-based model** for detecting drone motor failures using sensor data.
- Integrated the model in C++ to run in real-time on **PX4** drone hardware for failure detection.

Internships

Bryt | *ML and Software Engineer | 10 weeks* *(2025)*
- Enhanced the online education system with section name aliasing and developed a **conversational chatbot** for addressing student queries using LLMs, involving comprehensive modifications across 100+ codebase files.

Crow Canyon Software | *ML and Software Engineer | 4 weeks* *(2023)*
- Developed a retrieval-augmented generation (RAG) system to answer user queries from PDF-based databases.
- Explored **LangChain, LangGraph** and a custom pipeline to implement and optimize the RAG workflow.

Technical Skills

Programming	C++, C, Python, Java, Bash, Sed, Awk, Solidity, Move, Rust, Dart, ROS
Web Development	JavaScript, Flutter, Express, Bootstrap, aiosql, Django, fast-api, socket programming
Libraries	NumPy, Matplotlib, PyTorch, Pandas, TensorFlow, SpaCy, NLTK, diffusers, clip, Scipy, Sklearn, openai, OpenCV, cuda, docker, OpenGL, LangChain, LangGraph

Selected Courses Undertaken

Undergraduate	Theory of Computation, Discrete Math, Foundations of Machine Learning, Operating Systems, Linear Optimization, Game Theory and Mechanism Design, Information Theory, Deep Learning, Spectral Graph Theory, Convex Optimization, Reinforcement Learning, Cryptology, Quantum Computing, Computational Complexity, Advanced topics in Deep Learning, Computer Vision, Communication Complexity, Approximate Algorithms, Topics in Combinatorics, Calculus, Linear Algebra, Probability & Statistics, Transform Techniques
Graduate	Advanced topics in ML, RL, Complexity Theory, Probabilistic Graphical Models, Robotics

Scholastic Achievements

- Received **OnePlus-Oppo Genius+ scholarship** awarded to **6 students** across India *(2022)*
- **All India Rank of 311** in the IIT-JEE Advanced out of 1,55,000 candidates *(2021)*
- **All India Rank of 458** in the IIT-JEE Mains out of 10,00,000 candidates *(2021)*
- Awarded the **KVPY Fellowship twice** by the Government of India conducted by IISc Bengaluru *(2019, 2020)*

Olympiads

- Secured **All India Rank of 27** and selected for the **Orientation Camp** for the IChO conducted by HBCSE *(2021)*
- **State topper** at the **National Science Examination in Physics conducted** by HBCSE *(2021)*
- Among the **top 300** students selected for **InPhO** the qualifying round for **IPhO**. *(2020)*

Extracurriculars

- **Teaching Assistant** for **Information Theory, Theory of Computation** *(2025, 2024)*
- **3rd Place** in **Math Bowl (CMI) Competition** at **Inter-IIT Tech Meet** *(2024)*
- **Head** of **Web-Dev** Team in Milan *(2024)*
- **2nd Place** in **Math Bowl (CMI) Competition** at **Inter-IIT Tech Meet** *(2023)*
- **Gold** in **Milan Robotics Contest** (RoboArt) and **Web Dev Contest** (Intra-IIT contest) *(2023)*