SWAGNIK ROYCHOUDHURY

Robotics Engineer

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SUMMARY

I am currently a Robotics Engineer at a startup in San Francisco. I graduated Magna Cum Laude from New York University with a degree in Computer Science and Data Science. AT NYU, I was a fully funded student researcher at the Ensure Lab, and have held research positions at NJIT and MSU. My work is primarily focused on natural language processing and robotics. I am also a fully trained Indian Classical musician and state-level chess player.

SKILLS

Languages: C++, C#, Python, SQL

Technologies: AWS, CUDA, PyTorch, MySQL, Unity, SolidWorks, IsaacSim, MuJoCo, Blender, XCode,

EDUCATION

2022 - 2025 **New York University, College of Arts and Sciences @ Courant and CDS** **University**
Double Major in Computer Science and Data Science. 3.89 GPA & Magna Cum Laude. NYU Robomasters Robotics Competition Team Lead, NYU Chess Club. Fully Funded Researcher at NYU Ensure Group and Data Science Fellow at NYU Marron Institute.

2018 - 2022 **Middlesex County Academy for Science, Mathematics, and Engineering Technologies** **High School**
Electrical and Computer Engineering Concentration. Member of the National Honor Society and Technology Student Association.

2017 - 2021 **Sarbabharatiya Sangeet O Sanskriti Parishad** **Music Institute**
Completed my Visharad Degree (B.A Equivalent) in Indian Classical Music, with multiple performances in the United States and abroad.

PUBLICATIONS

8/2024 – 10/2024 **DISCERN for Generalized Robotics Contexts** **MSU**
- Worked on generalizing the DISCERN algorithm to any domestic context using rule-based categorization and dynamic configuration settings. Poster accepted to IEEE Big Data with full proceedings.

6/2024 – 9/2024 **The DISCERN Approach for Intelligent and Efficient Discernment of Robotic Task Contexts** **MSU**
- Authored paper that introduces DISCERN (Detection Image System with Commonsense Efficient Ranking Network). DISCERN is an end-to-end robotics task execution pipeline, that simplifies the task ordering step by using commonsense linguistic networks and vision language models for fast classification. Accepted to the MIT URTC 2024 Conference and indexed in IEEE XPlore.

12/2022 – 2/2023 **Applications of BadNets in Spam Filters** **NYU Ensure Lab**
- Authored paper exploring applications of BadNets and backdoored models and their consequences beyond Image Recognition in the domain of natural language processing, such as Spam Filter Detection. Accepted at ICDE 23 Astride workshop.

3/2022 – 3/2023 S^2 **- Information-Theoretically Secure and Highly Efficient Search and Row Retrieval** **NJIT**
- Co-Authored paper that focuses on creating homomorphic encryption algorithms to store data securely and more efficiently than current state-of-the-art systems. Responsible for developing a suite of eighty programs to test, modify, and provide test results for the algorithms. They were implemented in an AWS EC2 environment. Accepted at the VLDB 23 conference.

AWARDS

2023 - 2024 **6x DURF Grant Recipient** **NYU**
- Awarded six research grants by NYU CAS's Dean for my work in fairness and biases in language models, my work in developing NLP architectures for Indian Classical Music, my work in integrating commonsense capabilities into domestic robots, and for my work in sentiment/temporal analysis of the 2024 Indian election. Awarded two conference grants to present my research related to DISCERN at MIT URTC and IEEE Big Data.

2022-2024 **NYU - Dean's List** **NYU**
- Awarded Dean's List for all three years at NYU for exemplary academic achievement.

12/2023 **Goldwater Scholarship Nominee** **NYU**
- One of four students nominated by NYU for the Barry Goldwater Scholarship, one of the most prestigious undergraduate national scholarships. Currently going through the final selection stage.

EXPERIENCE

11/2024 – Current **Robotics Engineer - Stealth Startup** **San Francisco**

- Developing infrastructure for tele-operating robots and training robot policies. Responsibilities include: setting up and creating custom teleop and locomotion systems on Unitree G1 robots, training and deploying VLM Diffusion models, designing robot parts in Blender and printing/finishing them, and directing and filming demos and concept videos for funding rounds. Unable to disclose further details at this time.

9/2024 – Current **NLP Researcher** **NJIT**

- Working with Dr. Shantanu Sharma to perform sentiment analysis on Twitter and YouTube data for analyzing the 2024 Indian election. The winning party was expected to win by a significantly larger margin than the election was actually won by, and we're interested to map and analyze the sentiment of events, people, public figures, and key cities over time to see what caused massively incorrect predictions.

9/2024 – 12/2024 **Brain-MRI Student Researcher** **NYU CDS**

- Developed masked autoencoders and vision transformers to predict downstream neuropsychiatric symptoms of Alzheimer's. The deep-learning models are trained on 3D MRI Scans and Clinical Survey Data.

6/2024 – 12/2024 **Human-Robotics Collaboration Researcher** **Montclair State University**

- Developed the DISCERN approach, which integrates common sense knowledge (CSK), linguistic networks, and vision language model for robotics in a human-robot collaboration environment. This approach doesn't require specialized hardware or training - for example, it is compatible with nearly 20,000 of the classes of ImageNet-21k without any pertaining. This also allows the model to generalize task execution ordering easily without any training and minimal human intervention.

10/2023 – 2/2024 **Data Science Student Fellow** **NYU Marron Institute**

- Worked on data on runaway and homeless youth in NYC in an attempt to disrupt the human trafficking industry. The goal of this project was to identify support services and resources to best aid youth at risk. Presented to NYC Mayor's office and shelter directors across New York.

9/2023 – 1/2024 S^2 **- Demonstration Paper** **Paper, NJIT**

- Working on a demonstration paper for a prior paper we submitted to VLDB 2023. We are working on generalizing the encryption system to any database with variable numbers of columns and rows, as well as supporting string and date data types.

8/2023 – 2/2024 **ICMLM, A Language Model for Indian Classical Music** **Paper, NYU Ensure Lab (Poster)**

- Focused on using SOTA transformer architectures for generating Indian classical music using a handmade, first-of-its-kind, dataset. Additionally, we compared the model's performance against in-context learning and fine-tuning with GPT4, Claude 2, and LLAMA 2. Poster presented at New York University's Undergraduate Research Conference 2024.

6/2023 – 8/2023 **NSF REU Research Internship at University of California, Irvine** **UCI**

- Developed a powerful visualizer for databases that include spatial and temporal data. The tool is able to use wifi connectivity data to precisely estimate the occupancy of rooms, floors, and buildings within a campus, helpful for first responders when trying to evacuate a building during an emergency. Poster Presented at UC Irvine's undergraduate research symposium.

9/2022 – Current **Competition Team Lead @ NYU Robomasters** **NYU**

- Managing a team of 11 members as Competition Team Lead at NYU's Robomasters Robotics team. Responsibilities include developing computer simulations of the competition, developing CV algorithms for our autonomous robots, working on CAD for the robots, training drivers for the competition, and smoke-testing embedded functionalities of our robots. Working with Vision Transformers and ROS.

6/2022 – 1/2023 **Software Developer & Data Science Intern** **INVIDI Technologies**

- Worked on ETL (extract, transform, load) of advertisement impression data that INVIDI collects from its clients in India. Using AWS Redshift, Sagemaker, and S3, I developed RNNs for time series analysis to derive actionable insights from the data.

1/2021 – 10/2022 **Kathak Saangi** **iOS App Store Link | Google Play Store Link**

- Creator of iOS/Android app Kathak Saangi, a companion app for Kathak Dancers. Available internationally, with over 13,000 downloads. The iOS version was developed in XCode with Swift, and the Android version was developed in Android Studio with Dart/Flutter.