

# RAAVI GUPTA

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## Columbia University

Master of Science in Computer Science (Machine Learning Specialization)

New York, NY

2024 – (expected) 2025

## Indian Institute of Technology (IIT) Bombay

Mumbai, India

B.Tech. (with Honors) in Electrical Engineering with Minor in AI (GPA : **9.22/10.0**; top 10% in class of 200+) 2020 – 2024

Achievements: KVPY Fellowship (Rank: 385/0.1M), JEE Advanced (Rank: 817/0.15M) [’20]; INMO Awardee [’19]

## INTERNSHIPS

### Piramal Capital and Housing Finance Limited | Machine Learning Intern

Summer’ 23

- Achieved **20.4%** improvement in transaction categorization accuracy using a 3-stage pipeline equipped with **LLaMA-7B**
- Institutionalized **2500\$** in annual cost savings by using fuzzy matching on webscraped domain information of **0.8M+** companies | Additionally, saved computational resources by using 7B model instead of 13B for categorization

### FinIQ Consulting | Quantitative Analyst Intern

Winter’ 22

- Formulated a pricing model for low-volatility **Target Redemption Forward** structured products
- Implemented the **Black-Scholes method** for option pricing using **geometric Monte Carlo** simulations
- Designed a **neural network** based **BackSolve** of derivative pricing to maximize payoff in Fixed Coupon Notes products

## RESEARCH AND TECHNICAL PROJECTS

### Hallucination Detection of Large Language Models (in collaboration with Adobe India)

Fall’ 23 - Present

Advisor: Prof. Ganesh Ramakrishnan | Bachelor Thesis

Computer Science and Engineering, IIT Bombay

- Designed** a **novel** method for detecting factual inaccuracies in LLM responses without using external databases
- Surpassed the SOTA AUC-ROC by **12%** (among other results) for Mistral-7B answers evaluated on the NQ Open dataset
- Drafting a **research paper** summarizing results for submission to the ACL rolling review process

### Algorithmic Construction of Lyapunov Functions

Summer’ 22 - Fall’ 23

Advisor: Prof. Debasish Chatterjee | Research Project

Systems & Control Engineering, IIT Bombay

- Devised a novel method to algorithmically construct Lyapunov functions for nonlinear vector fields
- Outperformed** the SOTA SOSTOOLS library in handling non-polynomial continuous black-box vector fields
- Conferred with the **undergraduate research award** (URA 01) | Awarded to **5/200+** students in class of 2024

### Unsupervised Segmentation of Agricultural Crop Fields

Spring’ 24

Advisor: Prof. Rajbabu Velmurugan | Bachelor Thesis - II

Electrical Engineering, IIT Bombay

- Automated** normalized difference vegetation index **calculation** of crop patches | Achieved **0.02 MSE** on custom dataset
- Aligned six-channel multispectral images using MicaSense and segmented the images using the Segment-Anything model

### InterIIT Tech Meet 12.0: Tooling up for Success

Winter’ 23

Problem Statment Lead | DevRev

IIT Bombay

- Spearheaded** a team of **12 members** for creating an LLM-planner customized for DevRev use-case
- Implemented multiple research papers for fine-tuning, prompt-engineering, automated data generation among others
- Secured **third position** overall in the competition among **21 IITs** across India with **1000+ participants**

### Autonomous Underwater Vehicle (AUV-IITB)

Spring’ 21 - Fall’ 22

Prof. Leena Vachhani | Student Technical Project

Systems & Control Engineering, IIT Bombay

A student team which develops underwater vehicles capable of performing naval tasks, competing annually at RoboSub, San Diego

- Implemented Simultaneous Localization & Mapping Algorithm to map vehicle’s path using data from localization sensors
- Achieved 7<sup>th</sup> place out of 39 teams [Robosub’ 22] | Ranked 2<sup>nd</sup> out of 54 teams in Propulsion Design [Robosub’ 21]

## PUBLICATIONS

S. Chattopadhyay, **R. Gupta**, P. Paruchuri and D. Chatterjee, “An algorithmic recipe to construct Lyapunov functions for continuous vector fields,” 2024 Australian & New Zealand Control Conference, doi: [link](#)

## TECHNICAL SKILLS

**Programming Languages**  
**Technologies/Frameworks**  
**Courses**

Python, C/C++ , MATLAB, Bash, SQL, HTML, CSS, JavaScript, VHDL, ARM  
PyTorch, TensorFlow, Keras, Transformers, Docker, Git  
Optimization in ML, Markov Chains and Queuing System, Game Theory, Organization of Web Information, Blockchain and Cryptocurrencies, Reinforcement Learning