Saurabh **Bhandari**

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Summary

I am a third-year Computer Science student at BITS Pilani, deeply passionate about Machine Learning. My project experience spans Computer Vision and Natural Language Processing. I am particularly intrigued by the application of Machine Learning in the field of Quantitative Finance and also have a keen interest in Graph Machine Learning. My academic journey equips me with a strong foundation in Computer Science and specialized expertise in Machine Learning.

Education

Birla Institute of Technology and Science, Pilani   *Pilani, Rajasthan*

Bachelor of Engineering in Computer Science   *Oct. 2021 - May. 2025*

   CGPA : 9.67 (out of 10) | Top 1% of my batch

Work Experience

Xu Labs, Carnegie Mellon University

Research Intern   *January 2024 - Present*

- My focus lies in leveraging advanced technologies to revolutionize medical concept normalization, a critical component in the realm of healthcare data analysis.
- Currently I am working on exploration of hyperbolic embeddings for UMLS concepts, aimed at enhancing medical concept normalization. Leveraging fine-tuning techniques with SapBERT, I orchestrate the adaptation of embeddings to the specific nuances of medical and clinical texts.

TRexQuant Investments, USA

Global Alpha Researcher   *October 2023 - Present*

- I specialize in pioneering mid-frequency algorithmic trading signals (alphas) grounded in statistical arbitrage principles. My role revolves around constructing market-neutral portfolios.
- I lead the creation of high-impact trading strategies in Futures and US equity markets. Leveraging a multifaceted approach, I integrate fundamental, technical, and sentiment data to craft robust algorithms.
- I leverage Machine Learning techniques to extract actionable insights from complex datasets. By applying advanced regression and clustering techniques, I accurately forecast returns post-Earnings Announcements, culminating in the development of a highly profitable trading strategy.

Nucleus Softwares

Industrial Project, guided by Prof. Poonam Goyal   *August 2023 - December 2023*

- Led a project dedicated to forecasting potential loan defaulters through the examination of call records, enhancing precision in assessment and risk management within the financial sector.This project was undertaken for Nucleus Softwares, a leading firm in banking services sector.
- Applied unsupervised speaker diarization techniques for the efficient segregation of speakers in calls, guaranteeing language-agnostic functionality.Utilized multimodal classification methods customized for the financial domain.
- Developed a novel Graph Machine Learning-based architecture, crafted to capture the sentiments of individual speakers based on multi-speaker audio based data.

William O Neil, India

Quantitative Research Intern   *May 2023 - July 2023*

- I achieved an 85% accurate market recession prediction utilizing a Random Forest classifier, leveraging FRED economic indicators. This predictive model served as the foundation for developing a highly successful trading strategy, further refined through Mean-Variance Optimization techniques
- I developed an intelligent stock trading agent using the Advantage Actor Critic (A2C) algorithm. This agent, trained on a self-made trading environment and fueled by FRED economic indicators, demonstrated exceptional performance, achieving an impressive Compound Annual Growth Rate (CAGR) of 31.5%.

Skills

Programming	C/C++, Python, Java, MySQL
Tools/Frameworks	PyTorch, Numpy, Pandas, Stable-baselines, Gym, Cvxopt, Sklearn, Git/Github, Gazebo, Networkx
Area Of Interest	Deep Learning, Computer Vision, Graph ML, Algorithmic Design, Competitive Programming, NLP
Relevant coursework	Graph ML, Probability and Statistics, Linear Algebra, Multivariate Calculus, Data Structures and Alg., Logic in CS, Theory of Computation, Operating System, Database Systems, Object Oriented Programming

Honors & Awards

Feb. 2022 - Present	**Merit Scholarship Holder,** Recipient of the prestigious 100% institute merit scholarship at BITS Pilani, recognizing academic excellence within the Top 1% of the batch throughout all semesters.	*BITS Pilani*
Sep. 2022	**1st Place- INAE SERB Youth Conclave Ideathon,** Pioneered the utilization of Neural Radiance Field (NERF) to revolutionize the educational system through Mixed Reality, triumphing over 700 participants.	*IIT Jodhpur*
Jul. 2021	**KVPY Fellowship Holder,** Recipient of the prestigious National Research Fellowship awarded by the Government of India for outstanding performance in the KVPY examination, securing an impressive All India Rank of 1020 out of 50,000 candidates.	*Government of India*
Mar. 2021	**State Topper,** Recognized as the State Topper in the Indian Olympiad Qualifier in Chemistry, achieving distinction among the top 1% of 2530 candidates in Maharashtra.	*Government of India*
Apr. 2023	**ICPC Regionalist,** Qualified for the prestigious ICPC Kanpur-Mathura Regional Round, ranking 55th in the Qualifier round and securing the 44th position in the Regional Round 2023 at IIT Kanpur.	*IIT Kanpur*
	Competitive Programming Achievements, Attained the esteemed title of Candidate Master on Codeforces with a rating of 1907 and achieved 5 Stars on Codechef with a rating of 2076, showcasing prowess in competitive programming.	

Projects

Graph ML-based Semi-Supervised Text Classification

GRAPH LEARNING | NATURAL LANGUAGE PROCESSING   *October 2023 - Present*

- Engineered a cutting-edge semi-supervised text classification model by integrating Graph Learning techniques with Siamese BERT architecture.
- Surpassed industry benchmarks with a remarkable accuracy of 90.5% on the MR dataset and 81% on the Ohsumed dataset, demonstrating superior performance over traditional BERTGCN methods.

Classifying Hate Speech in Tamil Text

GRAPH ML | NLP | DL | EACL 2023   *Nov. 2023*

- Applied advanced techniques in Natural Language Processing and Deep Learning to tackle hate speech classification in Tamil text.
- Utilized state-of-the-art pre-trained sentence transformers and innovative training methodologies to achieve a competitive 0.81 macro F1 score, ranking 4th position in EACL 2023.

R-Tree Optimization

DATA STRUCTURES | REINFORCEMENT LEARNING   *April 2023*

- Pioneered an optimized variant of the R-tree data structure for spatial data retrieval, leveraging insights from Antonin Guttman's research.
- Revolutionized the optimization task by formulating it as a Reinforcement Learning challenge, resulting in an impressive 85% memory optimization compared to the conventional R Tree implementation.

Intelligent Hangman Strategy Design

PROBABILITY, INFORMATION THEORY, NLP   *August 2023*

- Designed and implemented an intelligent strategy utilizing N-grams and LSTM techniques to solve the classic game of Hangman with a success rate of approximately 65% on unseen words.
- Applied principles of Probability, Information Theory, and Natural Language Processing to develop an effective and innovative solution.

Autonomous Path Planning and Obstacle Avoidance

ALGORITHMS   *June 2022*

- Implemented and optimized the Virtual Potential Field algorithm in Python, leveraging advanced algorithms to simulate autonomous path planning and obstacle avoidance.
- Executed simulations in Gazebo environment, demonstrating proficiency in robotics and autonomous systems.

Hotel Operations Management System

DATABASE SYSTEMS   *Mar 2023 - Apr 2023*

- Implemented a robust Hotel Management System using Python and Tkinter, streamlining operations for reservations, guest information management, room allocation, and billing.
- Empowered hotel staff with a user-friendly interface, enhancing customer service and operational efficiency.

Auditorium Ticket Booking System

OBJECT ORIENTED PROGRAMMING   *Oct 2022 - Dec 2022*

- Developed an intuitive Ticket Booking System using Swing GUI and Java, providing a seamless experience for event reservations.
- Designed interfaces tailored for both users and administrators, facilitating efficient event management and administration.

Position of Responsibility

Apr. 2023 - **Apogee Coordinator**, IEEE, BITS PILANI STUDENT CHAPTER | Organised ML treasure hunt (80+ registrations)
Present   at APOGEE 2023, BITS Pilani, and hosted a series of Research Talks with 25-30 ML enthusiasts

Aug. 2022 - **Computer Vision Researcher**, We are a team of highly motivated students, currently working on advancing
Present   the state-of-the-art in real-time semantic segmentation

Mar. 2023 - **Teaching Assistant**, Facilitated engaging programming labs and played a role in administering the course
Present   on Computer Programming (CS F111), catering to 500 students

Jan. 2022 - **Core Team Member- Competitive Coding** , Coding Club | Delivered sessions on algorithms and data
Present   structures, Problem setter for various campus-wide coding contests with 200+ registrants

Mar. 2022 - **Core Team Member - Machine Learning** , CS Association | Organized DATAGEDDON (100+ registrations), an
Present   ML event during APOGEE 2023, the all-India inter-collegiate technical festival of BITS Pilani