MANISH GHOSHAL

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EDUCATION

University of Melbourne (UniMelb), Melbourne, Australia
Master of Data Science, specialization: Computational Data Science *March 2025–Present*

Jain (Deemed to be) University (JU), Bengaluru, India
B. Tech. in Computer Science Engineering, specialization: Artificial Intelligence and Machine Learning *July 2020 – June 2024*
GPA: 8.85/10.0 (3.6/4.0 when converted)

PROFESSIONAL EXPERIENCE

Wolf Tech, Bengaluru, India | *Lead AI Engineer* *December 2023 – August '24*

- Leading a cross-functional technical team of 9 to develop ATOM, an AI-driven options trading bot leveraging reinforcement learning, deep learning, and ensembles, achieving ~98% accuracy and generating 10%–12% monthly profits over 8 months
- Architected a multi-agent automation framework using Groq and Mixtral-8x7B with Crew AI, customized using QLora and Lora, and enhanced accuracy by ~40% as compared to common time series algorithms
- Developed and implemented trade signals using Vasicek, CIR, and Hull-White Models, and developed a tailored HyDE-based RAG LLM integrated with a Mixture of Experts model, leveraging conditions and sparsity to accelerate inference by 40%
- Backtested models with 20+ years of historical data and integrated Brownian Motion as a Wiener Process for stochastic variability, enhancing the model's adaptability by 35% and predictive accuracy by 28% compared to traditional static models

Futurense Technologies, Bengaluru, India | *AI Engineer Intern* *January 2024 – May 2024*

- Developed and deployed a medical chatbot using BioMistral 7B, PubMedBert, Qdrant, Langchain, and Llama CPP, resulting in a ~40% surge in user engagement
- Enhanced model performance by fine-tuning Llama-2-7b on a resource-constrained 15 GB GPU in Google Colab, and implemented parameter-efficient techniques like QLoRA and 4-bit precision to address VRAM limitations and optimization
- Achieved 40% quicker data analysis for hospital data by combining advanced SQL with optimized Docker pipelines

Central Automation & IT, AM/NS India (a leading Indian steel manufacturer), **Surat, India**
Software Development Intern *January 2023 – April 2023*

- Developed and deployed "PlateMill LIVE," a full-stack web application with real-time equipment data visualization and predictive maintenance features; coordinated with other departments for integration with existing systems, such as MES and ERP
- Incorporated a Model-View-Controller architecture using FusionCharts, C#, ASP.Net, HTML, Bootstrap, and Oracle SQL Server, resulting in 25% better performance; reduced downtime by 40% by implementing database backup and restore processes

The Sparks Foundation, India | *Data Science & Business Analytics Intern (Remote)* *May 2022 – June 2022*

- Improved stock price predictions by 25% by developing a Python-based hybrid model; leveraged pandas to manipulate data and TextBlob to analyze sentiments from the news; practiced exploratory data analysis and visualization with Python libraries

CONFERENCE PARTICIPATION

S. M. L, A. Kashyap, D. Devadiga, **M. Ghoshal** and R. S, "Self Defence and Safety Monitoring System," 2022 4th International Conference on Advances in Computing, Communication Control and Networking (ICAC3N), Greater Noida, India, 2022, pp. 1472-1476, doi: 10.1109/ICAC3N56670.2022.10074098.

KEY ACADEMIC PROJECTS

Driver Drowsiness Detection System | *CNN-LSTM, GAN* *January 2024 – May 2024*

- Architected and trained a CNN-LSTM hybrid model for real-time drowsiness detection and deployment in resource-constrained vehicular environments. Achieved over 90% accuracy through iterative learning and refinement
- Integrated ternary accumulations and modified Gated Linear Units that reduced memory usage and quickened training by 25.6%
- Reduced inference time by 30% with a GAN-based technique for data-limited model robustness and an attention mechanism

Information Systems and Smart Agriculture | *IoT, Prophet, RNN* *September 2023 – February 2024*

- Investigated the latest developments in smart farming (SF) data collection, transmission, storage, and analysis, and IoT integration for wide-ranging functionalities including weed detection, irrigation, harvesting, seeding, and livestock management using ML
- Developed ML models for edge devices and integrated cloud and local processing, culminating in 20% improvement in prediction accuracy for crop yield and a 15% reduction in false positives for disease detection (manuscript under review)

Hyper-Personalized E-Commerce Reccomendation System | *Autogen, MoE, LLM, DQN* *November 2023 – March 2024*

- Engineered an AutoML framework that automates feature selection, embeddings, interactions, and model training, achieving a 40% improvement in recommendation accuracy based on a user's clicks, purchases and ratings compared to expert human tuning
- Implemented reinforcement learning, neural architecture search, and evolutionary algorithms to optimize the neural network architecture, with experimental results surpassing industry benchmarks by 25% while reducing computational costs by 35%

DynAUV: Dynamic Underwater Target Tracking in Robotic Systems | *ROS, AutoGrad, MAF* *May 2023 – December 2023*

- Built a reinforcement learning algorithm to optimize navigation and positioning of surface vehicles tracking submerged mobile targets; validated algorithm efficacy through simulations with varying oceanic current conditions
- Executed three-dimensional (3D) path tracking for underactuated autonomous underwater vehicles and leveraged the Serret-Frenet frame and line-of-sight guidance law, achieving an accuracy of 89.57% while avoiding obstacles

MetaMetric: AI-Driven Product Length Prognostication | *DL, MiniLMs, LightGBM* *July 2023 – September 2023*

- Developed a product length prediction system to enhance packaging and storage, and optimize for warehouse efficiency
- Integrated multilingual models, which improved processing efficiency by 40% and preserved semantic meaning across languages
- Achieved 50% faster inferences and 30% higher accuracy by combining miniLM models and an ANN leveraging Hnswlib

Self Defence and Safety Monitoring System (review paper) *May 2022 – December 2022*

- Designed a theoretical architecture for a smart safety device capable of generating automatic alerts and actions using voice and pulse sensors, GSM, GPS, and a Bluetooth connectivity system, coupled with emotion recognition to trigger the system
- Reviewed 150+ articles on multi-modal biometrics, real-time emotion recognition, low-latency architectures, and data privacy

AgriLens: Advanced Disease Detection | *TensorFlow, InceptionV3, Socket.IO* *December 2021 – February 2022*

- Pioneered AgriLens.AI, empowering farmers with cutting-edge disease detection via image recognition, support for 113 languages and a chatbot, resulting in a projected increase in crop yield by 35% and reduced economic losses by 40%

TECHNICAL SKILLS

- **Programming languages:** Python, Java, C#, HTML/CSS, Javascript, ReactJS, SQL
- **Technologies and frameworks:** Keras, TensorFlow, Tableau, HuggingFace, Prophet, FastAPI, Flask, ASP.NET, MongoDB, AWS, SpaCy, Selenium, Stable Diffusion, LangGraph
- **LLMs:** RAG, Langchain, ZerveAI JinaAI, MoE, CrewAI, Autogen, Llava, LoRa/QLoRa, Unsloth, Pinecone, RunPod, Autoglon
- **Developer:** Git, Docker, GCP, AWS, Anaconda, Jenkins, Kubernetes, Command Line Tools, VirtualBox, MongoDB, VS, VS Code
- **Cybersecurity:** Linux, Encryption (AES, RSA), Nmap, Wireshark, Metasploit, Snort

COMPETITION PARTICIPATION

- Runner-up, 24 Hours Honeywell Hackathon by Jain University, competing against 75+ teams *April 2024*
- 1st place, Online International FDP on Interdisciplinary Insights: Data Science, Machine Learning, and Cyber Security by Jain University with over 700 participants *February 2024*
- Top-15 finish globally, Amazon ML Challenge, competing against over 1500 participants *April 2023*
- 5th place, Futurense Techathon 2023, real-time network anomaly detection system *May 2023*
- Top-15 finish, South Zone Regionals of Google Cloud and GeeksforGeek's Solving for India *March 2023*
- Semi-finalist, Mastek DeepBlue Hackathon Season 8, computationally efficient underwater gate detection system *November 2022*

VOLUNTEERING (MENTORSHIP)

Chegg | *Subject Matter Expert for Computer Science* *October 2023 – Present*

- Provided online assistance to ~200 queries per month by high-school students on a range of computer science topics

Code in Place by Stanford University | *Section Leader* *April 2023 – June 2023*

- Mentored 10+ students and conducted Python programming sessions, leading to improvements in students' project outcomes

Jain University | *Peer Mentor* *February 2023 – December 2023*

- Guided 7 classmates in academic research, resulting in the successful publication of 2 research papers

ACADEMIC AND PROFESSIONAL DEVELOPMENT

Amazon ML Summer School *September 2023 – October 2023*

- Learned about advanced machine learning techniques and concepts, complex data analysis and pattern recognition

EXTRACURRICULAR ACTIVITIES AND LEADERSHIP

Bach Flower Therapist (Certified) *August 2022 – Present*

- Certified by the Skill Strengthening for Rehabilitation and Development of Persons with Disabilities and the National Skill Development Corporation in incorporating Bach flower remedies for overall wellbeing; treated 37 people till date

Turing Club, JU | *Core Member, Special Interest Group Member for NVIDIA and GeeksforGeeks* *August 2021 – May 2024*

- Co-organized hands-on training programs on data science, software development, open source and robotics and collaborations with GeeksforGeeks, NVIDIA's Deep Learning Institute, Holoworld and DataCamp Donates with as many as 200 participants

ENIGMNA, JU | *Core Technical Member* *September 2022 – May 2024*

- Co-organized 10+ events, such as workshops with industry experts, and the annual Tech Bonanza, with over 300+ students