Mainak Mallick

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EDUCATION

Georgia Institute of Technology, College of Computing *Atlanta, GA*
Major: Master of Science, Computational Science and Engineering, **GPA**: 4.0 *May 2026*
Important Courses – Deep Learning (CS 7643), Computer Architecture (CS 6746), Data Mining (CSE 6470)

Indian Institute of Engineering Science and Technology *Shibpur, India*
Major: Bachelor of Technology, Aerospace Engineering (**Minor** - Computer Science), **GPA**: 8.67/10 *May 2022*

TECHNICAL SKILLS

Languages: Python, R, VBA, MATLAB, SQL, Java, SAS, JavaScript, HTML, CSS, NoSQL, C++
Libraries: NumPy, Pandas, MatplotLib, Scikit-Learn, PyTorch, Open CV
Tools: Git, GitHub, AWS, MS Excel, MS PowerPoint, Tableau, Kubernetes, PowerBI, Apache Kafka, Airflow, Spark, Hadoop, Docker, CI/CD methods, MS Azure, VS Code, Linux, LLM
Frameworks: ReactJS, NodeJS, NextJS, Django, Bootstrap, Tailwind CSS, Angular, Flask, MongoDB

WORK EXPERIENCE

Development of Autonomous vehicle sensor suite monitoring system **GeorgiaTech**
Position - Graduate Research Assistant *(Supervisor – Dr. Seung-Kyum Choi)* *Dec 2024-Present*
- Developed a deep learning model to predict maintenance requirements in autonomous vehicles sensor suite.
- Integrated Vision Transformers for feature extraction and Few-Shot Learning for limited data scenarios.

Predictive maintenance of Robotic Hand with Digital Twin and MAML algorithm **GeorgiaTech**
Position - Graduate Research Assistant *(Supervisor – Dr. Seung-Kyum Choi)* *Aug 2024-Dec 2024*
- Generated synthetic sensor data using Isaac Sim to simulate real-world movement of a KUKA LBR robot arm.
- Created a meta-learning pipeline using the MAML algorithm to predict maintenance requirements in joints.
- Achieved over **76.4%** testing accuracy by optimizing the model with a minimal dataset.

Managed Collections and Recoveries Decision systems **HSBC Bank**
Position - Data Scientist *July 2022-Aug 2024*
- Managed large-scale data-driven decision systems for the HSBC UK market.
- Used SQL in SAS to pull and analyse customer data from Teradata Warehouse with Python, R and MS Excel.
- Deployed **24**+ business critical code changes in SAS EG and SAS ID env., impacting over **£3 million** in assets.

PROJECTS

Fine-Tuning LLaMA 3B for Code Completion: LoRA vs IA3 Comparison *Jan 2025-Present*
- Fine-tuned LLaMA 3B on CodeSearchNet (6M code snippets across 6 languages) for code completion.
- Used Hugging Face Transformers, PyTorch, and PEFT (Parameter-Efficient Fine-Tuning) to optimize training efficiency on A100 GPUs.
- Evaluated LoRA vs IA3, with IA3 showing 10.7% improvement in perplexity in generating correct code.

Volumetric Occupancy Prediction and Semantic labelling in Indoor Scenarios *Aug 2024-Dec 2024*
- Developed an ISO model-based framework for volumetric occupancy prediction in indoor environments.
- Integrated YOLO for real-time object detection and segmentation, ensuring accurate spatial delineation.
- Employed CLIP for semantic labeling, enabling contextual understanding of segmented indoor spaces.

AI-Powered Research Paper Recommender *Jun 2022-Aug 2022*
- Developed an AI-powered research paper recommender using React, Node.js, MongoDB, and OpenAI API to suggest and summarize papers based on user preferences and search queries.
- Integrated external APIs (arXiv and Semantic Scholar) to fetch research papers and used OpenAI API for generating personalized summaries and recommendations.

PUBLICATIONS

- *M. Mallick, J. Yim, S. Choi.* "EMOG – Ensemble based MAML with Optimal Grouping for Imbalanced Dataset ." *MDPI, Sensors, Yet to be published.*
- *M. Mallick, A. Chakrabarty, N. Khutia.* Volume 54, Part 3, 2022. "Genetic algorithm-based design optimization of honeycomb sandwich panels of AA7075-T651 aluminium alloy for aerospace applications." *Materials Today.*

AWARDS AND ACHIEVEMENTS

- **All India Rank 28** in GATE(Graduate Aptitude Test in Engineering)(Computer Science) 2022.
- **Academic Excellence Award(IIESTS)** , awarded to the top 10% of students.
- **INAE Innovative B.Tech Project Award and SURGE Project Award**