

SIDDHANT DUTTA

[LinkedIn](#) [GitHub](#)

[Portfolio](#) [Scholar](#)

[✉forsomethingnewsid@gmail.com](mailto:forsomethingnewsid@gmail.com)

EDUCATION **University of Mumbai - SVKM's Dwarkadas J. Sanghvi College of Engineering** Mumbai, India
Bachelor of Technology in Computer Engineering & Honors in Intelligent Computing 2021 - 2025

RESEARCH COLLABORATIONS **IRD & UMR Espace-Dev**
Multimodal LLMs | Fact-Checking Research Dec 2024 - Present

- Awarded **France Excellence Charpak Summer Training Scholarship 2025** with the French National Research Institute for Sustainable Development to combat climate misinformation leveraging multimodal fact-checking through sustainable LLM techniques, under the guidance of Prof. Amira Mouakher and Prof. Laure Berti.

Purdue University
Quantum Computing | Privacy-Enhanced Machine Learning Research Aug 2024 - Present

- Working with SECQUOIA (Systems Engineering via Classical & Quantum Optimization for Industrial Applications) on concepts submitted to ICLR & AICHE presentation on *Fully Homomorphic Encryption, Mixture of Experts, Multimodal Federated Learning, Quantum Computing & Machine Learning* with Prof. David E. Bernal Neira from Purdue & Carnegie Mellon University to improve privacy in FL with minimal performance trade-offs.

Capgemini
Elliptic Curve Functions (14H52) | Quantum Error Propagation (81Rxx) Jul 2024 - Present

- Conducting a study on the intersection of rational points on special elliptic curves & prime number theory, and publishing research on the periodic & diminishing convergence properties of *data poisoning & error propagation* in QML. The work, conducted under the guidance of Eldar, CTO of Capgemini Data Insights, and Prof. Bill Buchanan OBE FRSE from Edinburgh Napier University, was recognized by Wolfram Community and featured in their prestigious editorial columns: *Publication Materials* and *Staff Picks*.

Stanford Anesthesia Informatics and Media Lab (Stanford AIM Lab)
Clinical Informatics | Generative AI July 2024

- Developed a Clinical Large Language Model, integrated into Stanford AIM Lab's cloud-based tutorial, designed to teach high school & freshman students core concepts in clinical generative AI, Python programming, & real-world Electronic Health Record (EHR) data analysis as part of the curriculum. In collaboration with *Dr. Alex J. Goodell, MD, MS*, the model was further utilized to generate a set of synthetic patients. The tutorial is accessible [here](#).

New York University Abu Dhabi (NYU-AD)
Quantum Machine Learning Research Jun 2024 - Present

- Researching with *eBrain*, *Center for Cyber Security* & *Center for Quantum and Topological Systems* labs regarding *Quantum Architecture Search and Reinforcement Learning* with Prof. Muhammad Shafique and Post-Doc Nouhaila Innan; Developed *AQ-PINNs* for Carbon-Efficient Climate Modeling presented at NeurIPS Workshop 2024; Designed *QADQN* - a Framework for Financial Market Prediction presented at the *IEEE Quantum Computing and Engineering (QCE) 2024*.

IBM Quantum & MIT-IBM Watson AI Lab
Qiskit Advocate | Graph & Interpretable Quantum AI Research Oct 2023 & Aug 2024 - Present















- Conducting research on drug discovery using *Quantum Graph Attention Neural Networks* and *Quantum Vision Transformers* for image super-resolution towards ICCV 2025, collaborating with Dr. Khadijeh Sona Najafi, also working upon a package called TenQ: Quantum Many-Body problems with Tensor Networks for a diverse set of applications; contributed to the Qiskit Library & presented a seminar on Quantum GAN to over 150 attendees.

University of Southern Denmark & TalTech
Machine Learning Research Intern | Trustworthy & Responsible AI Research May 2023 - Present

- Researching *Neural Scaling law, Multi-task Learning & LLM4SUM (Large Language Models for Smart and Sustainable Urban Mobility)* under the supervision of Prof. Sadok Ben Yahia & Post-Doc Chahinez Oumoughi, on optimal traffic signal control agents; Leading Research at SDU Quantum Hub; Developed a drowsiness detection framework for urban mobility using *Balancing Augmentation Generative Adversarial Networks (BAGAN)* with drift detection, in collaboration with Volvo; Co-authored a thesis presented at the *WI-IAT Conference 2024* on Conformal Predictability of Recommender Systems.

IGDTUW & Danube Private University
Computational Biology Research Intern May 2023 - Jan 2025

- Curated a dataset-based research paper with Dr. Palak Handa and Prof. Nidhi Goel at MISAHUB lab, for the dataset, benchmarking models for the Auto-PCOS Classification.

PROFESSIONAL EXPERIENCE	<p>CRIS - Ministry of Railways, Government of India </p> <p><i>Machine Learning Intern</i> Dec 2024 - Present</p> <ul style="list-style-type: none"> • Intern at the Centre for Railway Information Systems (CRIS), working on developing Speech-to-Speech translation systems for Edge Computing paradigms and multi-modal AI software architectures. Applied advanced algorithms to address customer concerns across India's railway network, improving user experience and issue resolution efficiency. <p>Gaiahub - Project Liepaja </p> <p><i>External SDE Advisor</i> Aug 2024 - Present</p> <ul style="list-style-type: none"> • Collaborating with the Latvian Government to implement a real-time emissions monitoring platform for Liepaja city, focusing on vehicle-specific emissions and air quality tracking. Contributing to developing a public dashboard and city officials' tools for data-driven urban planning. Ensuring privacy compliance with GDPR while leveraging advanced sensors and HBEFA 4.2 methodology for precise environmental insights. <p>Infihéal </p> <p><i>Summer ML Intern</i> Jun 2023 - Sept 2023</p> <ul style="list-style-type: none"> • Integrated Large Language Models into an AWS Chatbot to personalize mental health support, boosting user engagement by 25%. Utilized AWS Cloud services, Docker, & Kubernetes for scalable deployment & streamlined application management. Leveraged Langchain, Haystack, & GPT-3.5 to optimize conversational interactions & ensure reliable performance. <p>Was offered a Data Engineering internship at Bajaj Finserv Health Pvt. Ltd. for the Summer'24 tenure.</p>
JOURNAL PAPERS	<ol style="list-style-type: none"> 1. Siddhant Dutta, ILD Freitas, PM Xavier, CMD Farias, DEB Neira. Federated Learning in Chemical Engineering: Tutorial on Framework for Privacy-Preserving Collaboration Across Distributed Data Sources. <i>Accepted at Industrial & Engineering Chemistry Research</i>, 2024. Q1 Journal  2. N Innan, A Sawaika, A Dhor, Siddhant Dutta, S Thota, H Gokal, N Patel, MAZ Khan, I Theodonis and M Bennai. Financial fraud detection using quantum graph neural networks. <i>Best Paper Award, Peer-Reviewed & Published in Springer Nature Quantum Machine Intelligence Q1 Journal</i>  3. E Sultanow, F Selimllari, Siddhant Dutta, BD Reese, M Tehrani, WJ Buchanan. Quantum Error Propagation. <i>Accepted at EPJ Quantum Technology Q1 Journal</i> 
CONFERENCE PAPERS	<ol style="list-style-type: none"> 1. Siddhant Dutta, N Innan, KS Najafi, SB Yahia, M Shafique. QUIET-SR: Quantum Image Enhancement Transformer for Single Image Super-Resolution. <i>Under Review at International Conference on Computer Vision, ICCV 2025.</i>  2. Siddhant Dutta, N Innan, A Marchisio, SB Yahia, M Shafique. QADQN: Quantum Attention Deep Q-Network for Financial Market Prediction. <i>Accepted at IEEE International Conference on Quantum Computing and Engineering (QCE), QCRL, 2024.</i>  3. Siddhant Dutta, N Innan, SB Yahia, M Shafique & DEB Neira. MQFL-FHE: Multimodal Quantum Federated Learning Framework with Fully Homomorphic Encryption. <i>Under Review at International Joint Conference on Neural Networks (IJCNN) 2025</i>  4. S Zammali, Siddhant Dutta, SB Yahia. Enhancing the conformal predictability of context-aware recommendation systems by using Deep Autoencoders. <i>Accepted at 23rd IEEE/WIC International Conference on Web Intelligence and Intelligent Agent Technology, (WI-IAT 2024).</i>  5. Siddhant Dutta, M Bhanushali, S Bhan, L Varma, P Kanani, M Narvekar. QUESC: Environmental Sound Classification Using Quantum Quantized Networks. <i>Published in Procedia Computer Science 2023.</i> 
WORKSHOP PAPERS & PRESENTATIONS	<ol style="list-style-type: none"> 1. DEB Neira, Siddhant Dutta, ILD Freitas & L Peng. Quantum Federated Learning-Based Collaborative Manufacturing. <i>In 2024 AIChE Annual Meeting Presentation.</i>  2. Siddhant Dutta, PP Karanth, ILD Freitas, PM Xavier, N Innan, SB Yahia, M Shafique & DEB Neira. Federated Learning with Quantum Computing and Fully Homomorphic Encryption: A Novel Computing Paradigm Shift in Privacy-Preserving ML. <i>Accepted at NeurIPS 2024 Workshop on Machine Learning with New Compute Paradigms (MLNCP).</i>  3. Siddhant Dutta, N Innan, SB Yahia, M Shafique. AQ-PINNs: Attention-Enhanced Quantum Physics-Informed Neural Networks for Carbon-Efficient Climate Modeling. <i>Accepted at NeurIPS Workshop 2024: Tackling Climate Change with Machine Learning.</i> 
SKILLS	<p>Languages: Python, Java, C, Shell, CUDA, LaTeX, Rust, Dart, JavaScript, HTML, CSS, SQL</p> <p>Developer Tools: Linux, Kubernetes, Docker, Nano, Google Cloud Platform, Azure, Overleaf</p> <p>Frameworks: Qiskit, Q#, Pennylane, DWave, Click, FastAPI, Pytorch, Tensorflow, PyGeometric, ShadCN, NetworkX, Bokeh, Streamlit, Keras, Flutter, Rocket, PyGeometric, RdKIT, Flwr, TenSEAL</p>

PROJECTS

CurateSage: Personalized Course Recommendation System

Self-supervised | PyGeometric, FastAPI, XAI, ReactJS

Feb 2024

- Developed a course recommendation platform leveraging heterogeneous Graph Neural Networks (GNNs) with PyGeometric to deliver context-aware suggestions by effectively modeling the relationships among students, courses, and their respective grades; Utilized the open-university-learning-analytics and course-reviews datasets; Implemented an Edge-Aware GNN architecture featuring SAGEConv layers, achieving a CPU inference latency of 0.03 seconds; Enhanced model interpretability through the GNNExplainer and CaptumExplainer, facilitating insights into the decision-making process of the model.

Driver Drowsiness Detection with Drift Aware BAGAN-GP

Supervisor: Prof. Sadok Ben Yahia | Tensorflow, Gradio, PyTorch

Jun 2023

- Worked on a Multi-task Learning-Based Vision Transformer project to detect driver drowsiness; enhanced with the implementation of a Balancing Augmenting GAN with Gradient Penalty (BAGAN-GP) for improved detection using the NTHU-DDD dataset; effectively addressed data imbalance and boosted classification performance with the Instance Hardness Threshold Algorithm for optimal sample selection on large datasets.

StockWatch: Stock Recommendation Interface






Self-supervised | DGCNN, ReactJS, FinBERT, LightFM, Selenium, Docker, FastAPI

Jun 2023

- Implemented a stock recommendation & stock-price tracking application with Google reCAPTCHA-v2 & DeepFace face authentication for security; utilized an ensemble of machine learning techniques with BERT model for sentiment analysis of financial news, CNN-LSTM for price forecasting, and hybrid recommendation system using Graph Neural Networks (DGCNN) and LightFM Collaborative Filtering to deliver personalized stocks; enhanced with visually engaging automated stock graph analysis & dynamic trading-view graphs.

More Medium Articles & Projects can be seen here .

AWARDS AND HONORS

- **France Excellence Charpak Summer Training Scholarship 2025:** Recognized among the top 2 scholars out of 35 selected, awarded by the French government to support outstanding Indian students. 
- **Code/Framework Acknowledgement:** End-to-end creation of an Explainable Evaluation Framework for Facial Expression Recognition in Web-Based Learning Environments, published in the Q1 journal *Springer nature's International Journal of Machine Learning and Cybernetics* in collaboration with Prof. Amira Mouakher, with acknowledgement received. Code is available on GitHub  & can be read here .
- **IEEE Quantum Week 2024/Classiq MEGA Challenge:** Received Top 5 Special Acknowledgement - Replicated the work *Symmetry Enhanced Variational Quantum Spin Eigensolver* by Lyu et al .
- **International Winner, Quantum Formalism - Quantum Federated Summer Hackathon 2024** organized by the Zaiku Group earning a prize of 2000 USD.
- **All India Rank 4, Amazon ML Challenge 2024** out of a 75,000+ applicant pool.
- **All India Rank 253, GATE 2024: Data Science & Artificial Intelligence (DA)** out of a 100,000+ applicant pool.
- **National Winner, Smart India Hackathon (SIH) 2023** - 36-hour Hackathon of 200,000+ people organized by the Government of India earning a prize 100,000 INR.
- **International Winner, QWorld-QIntern Research 2023** - Best Paper & Presentation Award 
- **National Winner, Bajaj Finserv HackRx 4.0 2023** - 24-hour Hackathon of 22000+ people by developing a Stock Watch earning a prize of 100,000 INR.
- **1st Runner Up, Lines Of Code - ACM LOC 5.0 2023** - 24-hour Hackathon of 1000+ people by developing Digital Identity earning a prize of 30,000 INR.
- **Top 80 Unstoppable E-School Leaders Across all India, Unstop** 2024

CERTIFICATIONS

- **IBM Certified Associate Developer - Quantum Computation** using Qiskit v0.2X 2023
- **Microsoft Certified: Azure Fundamentals AZ900** 2023
- **Advanced IBM Quantum Challenge Badges** Fall 2022 & Spring 2023, 2024


TEACHING EXPERIENCE

MisaHub Data Structures & Algorithms Bootcamp (2023): Teaching Assistant - Assisted in organizing and delivering a comprehensive 3-month bootcamp, focusing on core computer science topics including graph algorithms, linked lists, pointers, and dynamic memory allocation.

Machine Learning Workshop at Synapse (August 2023): Led a 2-day workshop, covering Python programming from basic to advanced levels, and introduced participants to essential machine learning concepts, including natural language processing (NLP), computer vision, and eXplainable AI (XAI). The workshop engaged 120+ enthusiastic students in interactive sessions and practical applications.

ORGANIZATIONS

Synapse: Head of Machine Learning (Sept 2022 - July 2024)

Hands-on experience with machine learning frameworks & authored a research paper under faculty supervision; Co-led a team of 60+ members at DJS Synapse, the official AI/ML committee of DJCSE; Co-Organized Mumbai's largest college-level hackathon with 1,800+ registrations and a 200,000 INR prize pool; Curated & led 10 lab sessions  to teach Deep Learning, covering transformers and their applications; Designed a structured learning path, enabling a class of 25+ juniors to build & implement deep learning concepts; Co-advised 4 research projects from ML in Finance to Social Network Theory.