

# ORIJEEET MUKHERJEE

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## EDUCATION

Northeastern University, Boston, MA

August 2023-Dec 2025

Masters of Science in Computer Science

(GPA 3.8/4)

Relevant Coursework: Large Language Models, Computer Vision, Data Mining, Database Systems

University of Mumbai, Mumbai, India

August 2019-May 2023

Bachelor of Engineering in Computer Engineering

(GPA 9.3/10)

## PROFESSIONAL EXPERIENCE

Apriqot, Portland, ME | Machine Learning Engineer

July 2024-Jan 2025

- Engineered **Disease based and Food insecurity predictive models** to produce geographically and demographically downscaled population health estimates in the state of Maine.
- Leveraged **agent-based modeling and small area estimation** to derive precise health/food insecurity metric representing an **increase in 5%** of predicted food insecurity from the study by the state officials.
- These results were further used by **healthcare stakeholders**, such as **MaineCDC** and **MaineHealth**, to make major strategic decisions and resource planning.

Institute for Experiential AI, Boston, MA | Data Science Research Assistant

Jan 2024-Present

- Developed a comprehensive framework for **integrating deep learning models** with Boston urban infrastructure (**MBTA**) and strategies for terrorist/natural disaster identification and response, funded by Department of Homeland Security.
- Conducted **resilience analysis of 45 global urban metro networks** using a topology-driven framework, identifying key **structural attributes** that influence network robustness and recovery with a **computationally efficient** resilience modeling approach.
- Improving reliability of resilient systems by 25%** by creating efficient Graph Neural Networks by capturing both temporal dynamics and spatial complexities in urban transportation infrastructure.

Tata Institute of Fundamental Research (TIFR), Mumbai, India | Machine Learning Researcher

August 2022-July 2023

- Initiated a cross-disciplinary project to integrate advanced graph-based **machine learning methods with particle physics research**, significantly advancing the computational analysis of subatomic phenomena.
- Constructed a regression model based on Graph Neural Networks to **capture intricate relationships** within electron trajectories to **predict electron energies** with remarkable **RMSE value of 11.62** in the domain.

## ACADEMIC PROJECTS

Weapon Detection System using Computer Vision

Python, YOLOv8, OpenCV, Twilio, PIL, NumPy

- Gained 91% accuracy** while developing a real-time deployable weapon detection framework using YOLOv8 and OpenCV, **successfully detecting firearms in closed environments**.
- Integrated Phone/Messaging alert system to send immediate alerts upon gun detection, enhancing response times.

DocuFind.ai – A Document and Website Question Answering System

Python, FireCrawl, FAISS, Hugging Face Transformers, Streamlit, PyTorch, LangChain

- Developed a Retrieval-Augmented Generation (RAG) system for **document and web question answering** using FAISS, Hugging Face Transformers (MiniLM), and FireCrawl, **achieving 93.54% accuracy in multi-document query retrieval**.
- Engineered a **scalable vector search** with Llama-3.2-1B-Instruct, enabling real-time QA via **Streamlit Frontend Interface**.

Suicide Risk Detection System Using Transformers and DL Techniques

Python, BERT, CNN, LSTM, SpaCy, Natural Language Processing

- Built an **NLP-based chatbot for detecting suicidal ideation** in 232,074 Reddit posts using BERT, CNN, and LSTM models.
- Achieved an **F1-Score of 96.85%** using BERT with custom Word2Vec embeddings, effectively minimizing false negatives.

## TECHNICAL SKILLS

- Data Science and Machine Learning:** NumPy, Pandas, Matplotlib, Scikit-Learn, TensorFlow, NLTK, LLMs
- Web/Desktop Development:** HTML, CSS, JavaScript, Django, Flask, NodeJS, ReactJS
- Programming Languages:** Python, Java, JavaScript, TypeScript, SQL, Dart, Swift, C#
- Infrastructure and Tools:** PostgreSQL, MySQL, MongoDB, AWS, GCP, Selenium, Git, Docker, Android Studio, PowerBI

## PUBLICATIONS

- Authored "**Resilience of Urban Rail Networks Depend on Mesoscale and Connectivity Attributes**," currently under review for publication at Nature Cities.
- Co-authored "**Rail System Threat Analysis**", prepared for submission to Risk Analysis for peer review.
- Co-authored a paper called "**A Network Perspective Can Deter Threats to Soft Infrastructure Targets**" as a Comment to *Nature Computational Science*.
- Published "**CTR Prediction of Advertisements using Decision Trees-Based Algorithms**" in Isemantic, IEEE, October 2022.DOI: [10.1109/iSemantic55962.2022.9920363](https://doi.org/10.1109/iSemantic55962.2022.9920363)
- Published "**Electron Energy Prediction in High-Granularity Calorimeter of the CMS Detector Using Graph Neural Network**" in ICT4SD 2024, Springer LNNS. DOI: [https://doi.org/10.1007/978-981-97-8591-9\\_48](https://doi.org/10.1007/978-981-97-8591-9_48)