Debarshi Chakraborty

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EDUCATION

Ramakrishna Mission Vivekananda Educational and Research Institute
Master of Science - Big Data Analytics   *July 2024 - Present*

Ramakrishna Mission Vivekananda Centenary College
Bachelor of Science - Mathematics Honors; CGPA: 7.63   *September 2021 - June 2024*

EXPERIENCE

Indian Institute of Technology, Guwahati   Guwahati, India
Summer Research Intern   *May 2025 – July 2025*

- Collaborated with PhD researchers to design algorithms for the **Popular Matching Problem** in subcubic graphs and graphs of maximum degree 7.
- Developed and analyzed **greedy-based algorithms** to determine the existence of popular matchings under bounded-degree constraints.
- Gained hands-on experience in graph theory, complexity analysis, and algorithm design in a research setting.

PROJECTS

Real Time (T+0) Trade Settlement for the US Market   June 2025 – Ongoing
Agentic AI — LLM — DLT   *[Link]*

- Designed a permissioned blockchain system using Hyperledger Besu and IBFT-2 consensus for atomic delivery-versus-payment (DvP) settlement of tokenized securities and cash.
- Integrated Agentic AI for real-time trade validation, liquidity checks, and exception handling.
- Utilized large language models (LLMs) for compliance reporting and anomaly detection.
- Incorporated a **human-in-the-loop mechanism** to inspect and override suspicious or anomalous activities flagged by AI agents.
- Designed and ran Monte Carlo simulations comparing T+0 with T+1 models, demonstrating a 91.7% reduction in counterparty risk exposure.
- Planned stress testing to simulate 10,000+ trades/day under peak load to evaluate system scalability.

Deep Learning based Document Summarization and Question Answering   Jan 2025 – May 2025
Deep Learning — NLP — DistilBERT   *[Link]*

- Implemented a GRU-based Seq2Seq model with attention for document summarization.
- Fine-tuned DistilBERT for extractive question answering on benchmark datasets.
- Evaluated using ROUGE, BLEU, BERTScore, and Exact Match metrics.
- Deployed the application using Streamlit for an interactive user interface.

Distributed Inference for Large Language Models   Jan 2025 – May 2025
Distributed Computing — C++ — Python   *[Link]*

- Set up a distributed computing cluster to deploy LLMs such as DeepSeek R1 Distill and LLaMA 3.2B Instruct, achieving a 2–4× increase in tokens/sec throughput.
- Conducted an extensive literature review on LLM inference strategies including tensor, model, and data parallelism.
- Analyzed GitHub repositories of distributed LLM systems; documented architecture, scaling behavior, and memory layout.

Mood-Based Music Recommendation System   Sep 2024 – Nov 2024
Scikit-learn — Pandas — Matplotlib   *[Link]*

- Built a classification model using Spotify data to categorize songs into 7 mood categories with 92% accuracy.
- Developed a content-based recommendation engine using cosine similarity.
- Resolved class imbalance with SMOTE and improved accuracy using ensemble methods.

TECHNICAL SKILLS

- **Programming Languages**: Python, Java, R
- **Libraries & Frameworks**: NumPy, Pandas, Matplotlib, Seaborn, Scikit-learn, PyTorch, OpenCV, Flask, FastAPI, Neo4j, LangChain, LangGraph
- **Tools & Platforms**: Git, GitHub, Docker, VS Code, Jupyter Notebooks, Windows, Linux (Ubuntu)

ACHIEVEMENTS/CERTIFICATIONS

- **Paper Accepted at IEEE WCONF 2025** *July 2025*
  Research paper titled *"Real Time Trade Settlement for the US Market"* accepted at the **3rd World Conference on Communication & Computing (IEEE WCONF)** and will be published in the proceedings.

- **Cleared IIT JAM 2024** *February 2024*
  Successfully cleared the IIT JAM 2024 examination, demonstrating proficiency in the subject and securing a place for higher studies in a prestigious institution.

- **Optimization Theory and Algorithms – NPTEL** *July 2024 – October 2024*

VOLUNTEERING

- **Placement Volunteer, RKMVERI**
  Assisted the Placement Cell for the Batch of 2024–26

- **Perceptron Volunteer, RKMVERI**
  Helped manage and organize events at the University's Annual Tech Fest, ***Perceptron 2025***