VIDHI JAIN

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EDUCATION

Carnegie Mellon University **Pittsburgh, PA**
Masters in Machine Learning Dec 2025
Current Coursework: Advanced Machine Learning (PhD), Statistics and Probability, Deep Learning Systems, Convex Optimisation (PhD)

Netaji Subhas University of Technology (formerly NSIT/DIT) **New Delhi, India**
B.Tech. in Electrical Engineering with a minor in Machine Intelligence May 2023
Relevant Coursework: Neural Networks and Fuzzy Logic, Soft Computing, Big Data (Hadoop and Spark), Data Warehouse and Data Mining

EXPERIENCE

Carnegie Mellon University- AI SDM
Research Assistant - Professor Aarti Singh Sep 2024 - Current

- **Maternal Healthcare Chatbot in collaboration with NIVI:** Formulated and implemented a **RAG pipeline, fine-tuning** an open-source **LLM** on maternal health guidelines to provide evidence-based, personalized healthcare recommendations.
- Refined **FAISS-based knowledge retrieval**, **reducing inference latency by 40%** and improving response relevance by **18%**.
- Developed **predictive user engagement and health risk assessment models** improving **risk prediction accuracy by 23%**.
- **LLM-based Intervention:** Engineered a utility-based intervention system **(DeLLMa)** leveraging probabilistic decision-state modeling, game theory, and LLM-driven personalized messaging to dynamically tailor interventions for undecided voters.
- Designed a pipeline for factual knowledge retrieval, cognitive adaptation, and persuasion strategy selection to optimize decision outcomes.
- **Modeled voter behavior** using advanced **ML pipelines and LLMs** to pinpoint critical factors and accurately anticipate voter decisions.

Wells Fargo
***Program Associate- Foreign Exchange Team* - Wells Spot Award** July 2023 - July 2024

- Accelerated an **SQL database** and **Spring Boot application with Angular UI**, leading to a **10% increase** in query performance.
- Automated **end-to-end testing** with **TestNG** and integrated workflow, improving testing efficiency by **32%**. reducing manual intervention.

Intern Analyst May 2022 - July 2022

- Led development of a **resume-ranking AI agent** using **NLP models**, analyzing resumes with contextual embeddings and semantic matching.
- Reduced manual screening time by **30%,** leading to a **white paper** publication of the algorithm**.** Securing a **Pre-Placement Offer (PPO)**.

Inria France
Research Intern - Mnemosyne Lab Jan 2023 - Mar 2023

- Engineered advanced **audio analytics pipelines** to evaluate the impact of motion and sleep deprivation on **adaptive learning in songbirds**.
- Extracted key behavioral shifts and utilized dimensionality reduction techniques to unveil complex patterns of exploration and exploitation.

International Institute of Information Technology (IIIT), Hyderabad
***Research Intern - Brain, Cognition and Computation Lab, Dr Raju Bapi* [Github] [PDF]** Aug 2022 - Dec 2022

- Performed **saliency prediction** using **deep predictive coding networks** to model **human visual attention** and identify key regions.
- Investigated discrepancies between the **visual human perception and CNN**s, advancing **self-supervised learning** for better representation
- Demonstrated how algorithms can capture complex perceptual phenomena like **shape bias and depth perception** when trained differently.

Google exploreCS Research,
***Research Intern- Indian Institute of Technology (IIT), Delhi- Dr. Naveen Garg* [Github]** April 2022 - June 2022

- Engineered a new integer and linear program for **capacitated vehicle routing** with time windows, enhancing efficiency by **15%** for routes.

AT&T India
Summer Intern May 2021 - July 2021

- Devised an **ARIMA-LSTM-based time-series model** to model blood sugar levels in smartwatches, integrating historical glucose readings and physiological parameters to revise forecasting accuracy by **27.5%**.

SELECTED PUBLICATIONS

1. ***V Jain**** *et al*, **Detecting Abnormal Activity in Daily Living: A Deep Learning Approach with RAT-CNN,** *accepted at IJHCI* [Paper]:
2. ***V Jain**** *et al*, **Ambient Intelligence based multimodal human action recognition for autonomous systems**, ***ISA Transactions*** [Paper]
3. *B. Dhingra**, ***V. Jain**,* *et al*, **RLET, Light Weight Model for Multi-class Network Intrusion Detection,** ***IJIS*** [Paper]:

SKILLS

Programming Languages: Python, C++, C, Matlab, HTML, Java, VHDL, Version Control
Libraries: Tensorflow, OpenCV, Keras, Pytorch, JAX, Numpy, Pandas, Scikit-learn, Matplotlib, Seaborn, Scipy
Frameworks and Tools: Flask, Django, Google Cloud, Springboot, Maven, Jenkins, ALM, TestNG, UCD, Postman, Azure

PERSONAL PROJECTS

Neurascribe: [Link] Spring 2025

- An AI-powered journaling platform that integrates **memory weaving and episodic memory recall** to enhance self-reflection and growth.
- Developed **AI agent** leveraging **LLMs, vector embeddings (Pinecone), and knowledge graphs (Neo4j)** for context-aware memory recall.

Needle: [Github] Fall 2024

- Implemented a **full-stack deep learning library** from scratch with GPU-accelerated operations and **automatic differentiation.**
- **Integrated F-Net**, a Fourier Transform-based alternative to self-attention, achieving **30% lower memory usage** and enabling efficient processing **up to 4x longer** than traditional Transformers, with modular components, **parameterized layers, loss functions, optimizers.**

AWARDS AND ACHIEVEMENTS

- Winner at the **pan-India hackathon** conducted by The Indian Institute of Technology, Ropar (IIT Ropar) among 50 teams. [Github]
- Winner of **Ford COVID-19 Global Challenge** as Director of Enactus NSUT led social impact projects leveraging data-driven solutions**.**
- **1st place CANSAT Competition'21**: Engineered control systems and optimal path-finding algorithms for a UAV.