Spandan Das

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Education

Carnegie Mellon University **August 2021 – May 2025**

B.S. Computer Science

Relevant Coursework: (PhD) Intro to Deep Learning [Python], Deep Reinforcement Learning [Python], (PhD) Advanced NLP [Python], Algorithm Design and Analysis, Machine Learning with Large Datasets [Python], (PhD) Convex Optimization, Intro to ML [Python], Intro to Computer Systems [C], Probability and Computing, Statistics and Computing

Experience

NVIDIA **May – August 2024**

Artificial Intelligence Engineer Intern

- Developed an anomaly detection system for NVIDIA TEGRA chip production environment
- Implemented monitoring system to autonomously report issues in build, packaging, and testing processes via email and Slack
- Designed and built a real-time harmless error filter using **ElasticSearch** database and **Flask** web server to perform LLM search over vector database of log embeddings

Apple **May – August 2023**

Machine Learning Engineer Intern

- Wrote **Golang** backend service to automate labeling queries with LLM-based natural language understanding results
- Created LangChain-inspired LLM integration library to filter and annotate semantic search results over 2.3 billion datapoints across various Siri domains including web video ("show me how to bake a cake"), app launch ("open Facebook"), and sentence usage ("use autonomous in a sentence")
- Technologies used: **Amazon Web Services (AWS)**, **Docker**, **Kubernetes**

NASA Goddard Space Flight Center **June - August 2020; June – August 2021**

Research Intern

- Trained machine learning models (**TensorFlow**, **Scikit-learn**, **XGBoost**) on data from NASA's Global Precipitation Measurement mission's Core Observatory Satellite to reduce satellite costs
- Utilized NASA Center for Climate Simulation (NCCS) supercomputing cluster to work with large data (2016 and 2017 annual satellite data) and optimize training of bagging models using multithreading
- Presented research to GSFC Climate and Radiation Lab and at international conference (AGU Fall Meeting)
- Published in MDPI Remote Sensing Journal [`https://doi.org/10.3390/rs14153631`]

Research & Projects

CMU Language Technologies Institute (CX Group) **February – May 2024**

- Developed an active learning based approach for data-efficient instruction tuning for LLMs by utilizing data impact models
- Improved pretraining efficiency and effectiveness by continuously adapting to models' evolving data preferences
- Submitted to NeurIPS 2024 [`https://arxiv.org/abs/2406.06046`]
- Technologies: **HuggingFace**, **PyTorch**

Visual Question Answering with LLMs **May – August 2023**

- Redesigned the Winoground dataset as a visual question answering (VQA) problem
- Designed and evaluated modified data with various multi-modal LMs including MiniGPT4, Salesforce BLIP2, PromptCap, ViperGPT, LLaVA, and GPT4
- Submitted paper to EMNLP 2023 [Link to Paper]
- Technologies: **HuggingFace**, **OpenAI API**, **SceneXplain**

CMU Robotics Institute (AirLab) **May – August 2022**

Research Assistant

- Developed an online camera calibration algorithm for a multi-view stereo setup (6 cameras; Double Sphere model) on drones used to determine real-time depth maps
- Technologies: **PyTorch**, **CUDA**, **OpenCV**, **Docker**

Achievements

- 2021 USA Math Olympiad – Top 2% (Top 550 out of 30,000+ contestants; 232.5 USAMO Index)
- USA Computing Olympiad (USACO) – Top 600 in nation (Gold Division)
- 2022 Goldman Sachs Quantathon – Honorable Mention

Skills/Extracurriculars

Technical Skills: Java, Python, Golang, C, C++, LaTeX, HTML, Linux

Extracurriculars: Tennis, Hindustani Classical Music, CMU Sahara (Bollywood Fusion Dance), Basketball, Card/Board Games