MEHAL AGARWAL

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EDUCATION

Carnegie Mellon University   **Pittsburgh, PA**
Master of Science in Electrical and Computer Engineering (AI/ML Systems)   *Dec 2024*
  GPA: **4.00/4.00**
  Relevant Coursework: Machine Learning, Convex Optimization, Visual Learning and Recognition, Deep Learning

Nanyang Technological University   **Singapore**
Bachelor of Engineering in Electrical and Electronic Engineering (Accelerated Program 3.5 years)   *Dec 2021*
  Honours (Highest Distinction), GPA **4.85 /5.00 (3.89/4.00)**
  3*Dean's Lists (2021 – 2022, 2020- 2021, 2019 - 2020); Lam Research Scholarship Award 2020
  Specialization: Computer Engineering and Data Intelligence & Processing

SKILLS

Programming Languages: Python, Swift, C++, C, Java, HTML/CSS, MATLAB, SQL, SPARQL, PostgreSQL, OWL
ML Frameworks: PyTorch, TensorFlow, Keras
Tools: Git, Docker, Xcode, Linux, Latex, OpenCV, Azure, Maven, Tomcat, Blazegraph

WORK EXPERIENCE

Apple Inc.   **Sunnyvale, CA**
Software Engineering Intern (Vision Products Group - Algorithms)   *May 2024 – Aug 2024*
- Designed and developed a scalable and configurable platform using **Swift** to demonstrate and test CoreML models using live data on the **Apple Vision Pro**, released as an internal tool for organization-wide use.
- Engineered the platform to support various modalities, model tasks, multimodal models, and model cascading. Integrated support for configurable pre- and post-processing operations, Python interoperability, and customizable model execution, supported on both **visionOS** and **iOS**. Selected to present to VPG Leadership, Mike Rockwell.
- Collaborated with **3** cross-functional teams to onboard **15** models and conducted **24** high-impact demos, reducing the time required to create a single demo experience from 3 weeks to 10 minutes and significantly improving operational efficiency.

Cambridge Center for Advanced Research and Education (University of Cambridge)   **Singapore**
Software Developer, advised by Prof. Markus Kraft   *Feb 2022 – Jul 2023*
- Devised and developed software tools to support digital twin development in cross-domain city-related applications in the WorldAvatar, a knowledge-graph (KG) based digital twin ecosystem.
- Developed a **knowledge graph embedding**-based Question Answering System for Chemistry, Marie and BERT which operates on multiple KG embedding spaces and uses a **BERT-based entity-linking** model. (**ACS Publications**, Aug 2023).
- Created an **object-graph mapping library** leveraging **Java** to provide an abstract, and object-oriented programming interface for automated manipulation of knowledge graph data, displacing the previous development paradigm of manual query composition for every application, reducing manual processing time by **72%**.

Seagate Singapore International Headquarters   **Singapore**
Machine Learning Intern   *Feb 2021 – Jun 2021*
- Collaborated with the Engineering Team to collect tester data and used **Python** to analyze tester KPIV parameters.
- Developed a methodology using ML models, such as **LSTM** and **XGBoost** to detect aberrant values and temporal shifts in time-series plots, reducing manual investigation by **67%** and improving quality assurance protocols by **35%**.

Rolls Royce@NTU Corporate Lab   **Singapore**
Software Intern   *May 2020 – Aug 2020*
- Designed and developed a Graphical User Interface (GUI) and a data visualization platform for a microgrid sizing tool and aerospace power systems application using **MATLAB** App Design and Programming.

ACADEMIC AND RESEARCH PROJECTS

Understanding Constraint Satisfaction in Generative Models | Independent Study, Advisor: Guannan Qu   *Aug 2024 – Present*
- Using optimization techniques to understand and ensure constraint satisfaction in generative models for various applications.

Enhancing Text to Image Generation with Fine-Grained Semantic Control | CMU, Deep Learning   *Feb 2024 – Apr 2024*
- Implemented and benchmarked AttnGAN, enhancing text-to-image generation with BERT for semantic understanding and CLIP for image encoding, achieving advanced performance metrics.

A Study of Personalized Federated Learning using Hypernetworks | CMU, Optimization   *Feb 2024 – Apr 2024*
- Led a study on Personalized Federated Learning using hypernetworks, to address data heterogeneity, enhance client-specific model performance, and ensure privacy through theoretical analysis and empirical experiments on diverse datasets.

Fine-Tuning Pre-Trained Language Models for Discrete Unit-Based ASR | CMU, Speech Recognition   *Oct 2023 – Dec 2023*
- Achieved a **21.7%** reduction in word error rate by integrating self-supervised LLMs to enhance discrete unit-based ASR.

Key Frame Extraction from a Big Dataset (collaboration with Continental Automotive) | NTU Project   *Jan 2021 – Dec 2021*
- Developed an automatic keyframe filter package for extracting useful sensor data for annotation required in autonomous driving using **Faster R-CNN** and extended the model with a novel visibility detection feature for each identified object.