

Jong Hoon Park

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EDUCATION

Carnegie Mellon University (CMU)

Pittsburgh, PA

Master of Science in Mechanical Engineering – Research | GPA: 3.89/4.0

May 2024

Coursework: AI/ML, Big Data Science, Deep Learning, Visual Learning & Recognition, On-Device Machine Learning

University of California, Davis

Davis, CA

Bachelor of Science, Aerospace Engineering and Mechanical Engineering

Dec 2019

SKILLS

Languages & Frameworks: Python, C++, PyTorch, TensorFlow, Git, Linux, AWS, GCP

A.I.: Deep Learning, Computer Vision, Model Optimization, On-Device ML, Multimodal ML, LLMs

WORK EXPERIENCE

Robot Intelligence Group @ CMU | Graduate Research Assistant

Pittsburgh, PA

Pilot Workload Estimation via Multimodal Machine Learning | Industry Funded Project

May 2023 – Present

- Developing and training multimodal ML models with an \$125B automobile company's research subsidiary to extract and reason on multi-modal representation of biometric data to estimate pilot workload.
- Executed IRB-approved user studies to collect biometric data from 28 pilots, including BVP, GSR, fNIRS, and eye gaze.
- Employed SIFT and KNN algorithms to map eye gazes onto flight simulation scenes by identifying matching features.
- Utilized a transformer-based model to segment FPV flight scenes to leverage semantic information as training data.
- Accelerated computation speed by 30 times for assigning priority scores to eye gazes via parallel computing.

Boeing Airplane Motion Prediction via Airport Context Learning | Boeing Funded Project

May 2023 – Aug 2023

- Transformed airport map images into semantic graph data, analyzing its efficiency and impact on motion forecasting.
- Achieved a 7.8m error in predicting airplane motion within airport by training a MLP with GPT-based attention layers.

Celerity Consulting Group | Engineering Consultant

Walnut Creek, CA

Transmission Line Upgrade Analysis & Mapping Support

Feb 2020 – May 2022

- Piloted a new project assessing integrity of electric transmission lines and recommended repairs to client company.
- Mentored new hires by providing feedback after quality-checking work and identifying areas for improvement.

ACADEMIC PROJECTS

Q&A System with Retrieval-Augmented Generation via LLM | PyTorch, LLM

Jan 2024 – Present

- Built an LLM pipeline integrating Retrieval-Augmented Generation (RAG) to construct a Q&A system using LangChain.
- Used a FAISS database for vector search to leverage non-parametric knowledge to mitigate hallucination.
- Developing a web app for a chatbot with Streamlit to allow users to build a custom RAG pipeline and ask questions.

Cockpit View Segmentation via Domain Adaptation | PyTorch, ML, Computer Vision

Nov 2023 – Dec 2023

- Fine-tuned a pretrained Mask R-CNN to extend its domain for segmenting real-world cockpit views.
- Created a custom dataset by capturing cockpit view images across four different airplanes using a flight simulator.
- Augmented training images by applying four different weather conditions to prevent overfitting.

Machine Learning Model Compression on Device | PyTorch, ML, Model Compression

Sept 2023 – Dec 2023

- Deployed and compressed a 73 million-parameter generative AI model into an NVIDIA Jetson Nano.
- Performed knowledge distillation on a sub-model, reducing size by 58% with minimal performance drop.
- Enhanced inference speed on device by 94% on GPU via post-training static quantization to float16 domain.
- Reduced FLOPs by 66.7% with just 2.1% accuracy drop by down sampling input image size by one-fourth.
- Devised a filter-wise structured pruning method and found sensitive convolution kernels among 1,200 in encoders.

Perception – Vehicle Image Classification | PyTorch, ML, Computer Vision

Apr 2023

- Attained 2nd position in an academic course's Kaggle competition for vehicle image classification.
- Employed end-to-end vehicle image cropping and feature extraction during model training.
- Achieved 69% classification accuracy by fine-tuning a pre-trained ResNet18 model with 7,573 driving scene images.

Human Facial Emotion Recognition | PyTorch, ML, Computer Vision

Oct 2022 – Dec 2022

- Built a CNN from scratch for emotion prediction from 291,650 facial expressions, attaining 70% prediction accuracy.
- Implemented and showcased real-time emotion recognition and assessed performance via a confusion matrix.

LEADERSHIP

LLM (Large Language Model) Project Team Lead, Course 24-782, CMU, Pittsburgh, PA

Jan 2024 - Present

Advanced Modeling Aeronautics Team Section Lead, UC Davis, CA

Feb 2018 – June 2018

Artillery Gun Section Squad Leader, Republic of Korea Army, Paju, South Korea

Sep 2016 – Jul 2017