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++, HTML, PyTorch, TensorFlow, Git, Linux, AWS, Google Cloud Platform
A.I.: Deep Learning, Computer Vision, Multimodal ML, On-Device ML, Model Compression, ML Optimization

WORK EXPERIENCE

Robot Intelligence Group @ CMU | Research Assistant Pittsburgh, PA

Pilot Workload Estimation via Multimodal Machine Learning | Industry Funded Project May 2023 – Present

- Collaborating with a $125B automobile company's research subsidiary to develop multimodal machine learning models for estimating pilot workload during flight operations.
- Executing user studies involving 20 pilots playing a flight simulator, processing biometric data from seven sensors.
- Projecting eye gazes onto flight scenes to extract semantic information for model training.

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 airplane motion prediction in a 10 sq.km airport by training a MLP with 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. Suggested repairs to client company.
- Mentored new hires by providing feedback after quality-checking work and pinpointing improvement areas.

ACADEMIC PROJECTS

Cockpit View Segmentation via Domain Adaptation | *PyTorch, ML, Computer Vision* Nov 2023 – Dec 2023

- Placed 2nd for best project presentation in 16-824 Visual Learning & Recognition course at CMU.
- 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.

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.

Quantitative Modeling and Forecasting of Excess Return | *Applied ML, Big Data* Apr 2023

- Created 7 explanatory variables for a rolling multiple linear regression model to predict equity premium, using 9 financial variables collected monthly from 1871 to 2005. Achieved an R_2 of 99.8% and RMSE of 5.8% on average.
- Leveraged Recurrent Neural Networks and Bootstrap Aggregation to improve model performance, identifying trends in historical data to forecast future returns. Developed expertise in applied machine learning and handling large data.

Perception – Vehicle Image Classification | *PyTorch, ML, Computer Vision* Apr 2023

- Attained 2nd position in a Kaggle competition for vehicle image classification during an academic course.
- 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 face detection and expression prediction on human faces using trained model.
- Assessed performance via a confusion matrix and F1-scores.

LEADERSHIP

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