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, Google Cloud Platform
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 multimodal ML models with a $125B automobile company's research subsidiary to predict pilot workload.
- Executed IRB-approved user studies with 20 pilots, collecting and processing BVP, GSR, fNIRS, eye gaze data, etc.
- Segmented FPV flight scenes using a transformer-based model to extract semantic information for training models.
- Projected eye gazes onto scenes, reducing projection time from 8 hours to 4 minutes per pilot 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

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
- Applied a rolling multiple linear regression model to 14 financial explanatory variables to predict equity premium, achieved an R_2 of 99.8% and RMSE of 5.8% on average.
- Leveraged Recurrent Neural Networks and Bootstrap Aggregation to enhance model performance, identifying trends in historical data for forecasting future returns and developing expertise in applied ML and large data handling.

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 face detection and expression prediction on human faces using trained model.
- Assessed performance via a confusion matrix and F1-scores.

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