Jong Hoon Park

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EDUCATION

Carnegie Mellon University (CMU)　　　　　　　　　　　　　　　　　　　Pittsburgh, PA
Master of Science in Mechanical Engineering – Research | GPA: 3.9/4.0　　　　　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
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 IRB-approved user studies involving 20 pilots, collecting and analyzing biometric data from seven sensors.
- Conducting signal processing on multimodal physiological data and extracting relevant features.

　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 mean displacement error in airplane motion prediction in a 10 sq.km airport by training CNN and MLP models with attention layers, using 200 days' worth of airplane trajectory data.

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 101 cockpit view images across four different airplanes using a flight simulator.
- Minimized sim-to-real gap in segmentation inference via custom data augmentation.

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 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 image recognition 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.

SIDE PROJECTS

Interactive Planar Robotic Arm Control | *Python*　　　　　　　　　　　　Feb 2023
- Developed a GUI for a virtual model of a 3-jointed planar arm end-effector, controlled via mouse interactions.
- Programmed forward and inverse kinematics utilizing Object-Oriented Programming (OOP) principles.
- Optimized joint angles in 21-stage movement, considering elbow-up & down cases and 256 end-effector orientations.

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