JOONHO LEE

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EDUCATION

University of Washington March 2021 - Present
5th year M.S. in Computer Science GPA: 3.8

University of Washington August 2017 - March 2021
B.S. in Computer Science with Honors, Minor in Mathematics GPA: 3.77

PUBLICATIONS

*Equal Contribution

Amirreza Shaban*, Xianyun Meng*, **JoonHo Lee***, Byron Boots and Dieter Fox. Semantic Terrain Classification for Off-Road Autonomous Driving. *Conference on Robot Learning (CoRL)*, 2021.

RESEARCH EXPERIENCE

SARA: Scalable, Adaptive, Robust Autonomy project May 2020 - Present

· Contributing to development of a robust autonomy stack for offroad autonomous driving.
· Engineered perception pipeline for detecting terrain traversability using **ROS** and **Pytorch**.
· Improved scene understanding for challenging off-road terrains by developing multi-sensor semantic pipeline that processes Image and LiDAR data into a semantic bird's eye view map.
· Investigating extensive use of bird's eye view representation with multi-sensor input for improved generalization and data efficiency.
· Advised by Professor Byron Boots and Professor Dieter Fox.

Into the Wild: Robust Offroad Driving with Deep Perception September 2020 - March 2021

· Undergraduate Honors thesis completed during contribution to the SARA project.
· Investigated Image and LiDAR Semantic Segmentation for offroad terrain traversability analysis.
· Thesis supervised by Professor Dieter Fox.

Research Assistant, Human Centered Robotics Lab May 2019 - June 2020

· Researched in a lab focused on end-user robot programming, robotic tool use, and assistive robotics.
· Enhanced perception component for robotic cleaning system by implementing general-purpose semantic segmentation network and video prediction model in **Pytorch**.
· Supervised by PhD student Vinitha Ranganeni, Professor Dieter Fox and Professor Maya Cakmak.

RELEVANT EXPERIENCE

Founder of Autonomous RC car club October 2018 - Dec 2019

· Founded and led student collective to research and develop modern autonomous vehicle technologies.
· Delivered prototypes using RC cars that learn to drive on marked track environment by developing an end-to-end neural network controller.
· Communicated with the Personal Robotics Lab to receive their MuSHR autonomous driving platform for further research & development.

Computer Vision Engineer at Advanced Robotics UW October 2018 - Oct 2019

· Designed and developed object detection pipeline for 1/6th scale mobile robots.
· Implemented single stage object detector YOLO to detect robot armor plates.
· Deployed detector on robots for DJI Robomasters competition.

PROJECTS

Kaggle 6 DoF Car Object Pose Estimation Jan 2020

· Placed 45th/833 (top 5%) in the final leaderboard.
· Improved car pose estimation by developing an end-to-end 6D pose estimation network.
· Implemented CenterNet, an object detection network, to detect and regress pose of vehicles on road.

Kaggle Lyft 3D object Detection November 2019

· Placed 72nd/547 (top 14%) in the leaderboard.
· Implemented segmentation network to process bird's eye view projection of LiDAR data.
· Experimented with pipeline that detects 3D bounding boxes from bird's eye view representation.

Kaggle Diabetic Retinopathy classification September 2019

· Placed 81st/2943 (top 3%) in the leaderboard.
· Improved accuracy of automatic diagnosis system of Diabetic Retinopathy, a complication in the retina that causes blindness.
· Experimented with EfficientNet, one of the state-of-the-art image classification networks, to train a classification network.

AWARDS

1. Dean's List, University of Washington, 2017-2021
2. DubHacks Best Transportation Hack, 2018
   - Developed visual object tracking with OpenCV.
   - Demonstrated algorithm with an item following task using a camera attached RC car.
3. DefHacks #NeverAgain Category Award, 2018
   - Developed gun detection & SMS alert system with Microsoft Custom Vison API and Twillio API.

SKILLS

Programming: Python, C++, Java
Robotics: ROS, OpenCV
Machine Learning: Pytorch, Keras, Scikit-learn, Pandas, Numpy, Numba