[2016 Research Internship Summer Program
Research, Development, and Technology Transfer Program

POSITION 03: AUTOMATIC RECOGNITION OF HIGHWAY LANE MARKS AND TRAFFIC SIGNS WITH DEEP LEARNING FRAMEWORKS

Description

Asset management and maintenance is a difficult task that demands either substantial funding or manpower to ensure the job is done right. Signs, fire hydrants, manholes and other assets are part of the interconnected system of objects that DDOT manages and maintains.

In addition, the District wants to lead in developing connected vehicles infrastructure. The connected vehicles technology plays a critical role in autonomous driving. One of the applications with the connected vehicles is to transmit the MAP data from the dedicated short range communications (DSRC) road-side equipment to the on-board unit within the vehicle. Collection of the MAP data with traditional technology is very costly.

In this research, we will develop an automatic algorithm for lane detection, road sign and traffic sign recognition. In the previous research, various early works based on computer vision techniques were proposed for exploring solutions to research challenges of such kinds. For instance, kernel based classification algorithms such as Support Vector Machines (SVM) was raised for road sign recognition; other works proposed models based on Bayesian inference were addressed for road lane detection. However, most of the early work suffers from lack of resistance towards the noisy image or video data.

This project will develop algorithms based on deep learning frameworks, which with their high performance and noise resistance features can be a promising direction for the research of lane detection and road sign recognition. Utilizing Cyclomedia Globespotter imagery, the proposed research is capable of retrieve the actual geo-location of the lane marks and traffic signs. Specifically, the work will include the following tasks:

• Recognition of lane striping including bike lanes
• Recognition of stop bars
• Recognition of signage
• Recognition of Other assets as directed
• Convert the lane striping and stop line data into MAP messages according to the SAE J3725 standards
2016 Research Internship Summer Program
Research, Development, and Technology Transfer Program

POSITION 03: AUTOMATIC RECOGNITION OF HIGHWAY LANE MARKS AND TRAFFIC SIGNS WITH DEEP LEARNING FRAMEWORKS

Intern Skills:
• Suggested field of study is computer science
• Should have hands on experience with deep learning specifically involving image recognition and image classification.
• Any experience with working on deep learning frameworks like Caffe, Torch is preferred
• Must be proficient in programming languages such as Python, MATLAB and C#.
• The project is more appropriate for a graduate student pursuing a Ph.D.