

## **Title: Semi-Supervised and Unsupervised Learning Methods for Detecting Driver Distraction**

### **Abstract:**

Driver distraction is one of the major causes of traffic accidents. It is important to detect driver distraction based on some observable measures, such that effective countermeasures can be applied accordingly. One popular approach to constructing distraction detection systems is supervised machine learning, which requires a large amount of labeled training data and thus incurs considerable labeling cost.

To alleviate labeling cost, this thesis investigates semi-supervised and unsupervised learning for driver distraction detection. The thesis first answers the research question of ‘which type of Semi-Supervised Learning (SSL) method is more suitable’ by evaluating popular SSL methods on a dataset of drivers’ eye and head movements collected in an on-road experiment. Furthermore, this thesis proposes two novel unsupervised clustering algorithms to generate preliminary labels, such that human experts can use them as a reference to create accurate final labels. Both of the proposed clustering algorithms involve taking advantage of data’s intrinsic local structure and generating better data representations.