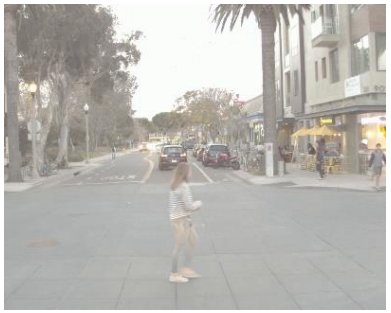
Object Detection, Object Classification and Distance Estimation Using an Infrared Camera

Name: Jiahong Dong
Supervisor: Dr. Martin Von Mohrenschildt, Dr. Saeid Habibi
Program: Software Engineering
Level of studies: M.A.Sc
Presentation Date: 2020/04/30

Project Description

- Detect pedestrians and animals using an infrared camera in highway driving scenarios.
- Produce classification for every detected object.
- Measure the distance from the vehicle to every detected object.
- Improve roadway safety.

Objective(s)

- Develop a system to detect and classify pedestrians and animals.
- Improve the accuracy of the distance measurement of each detection.

Tasks/Plan

- Capture and label thermal imaging data.
- Train a neural network and build a classifier.
- Evaluating potential alternatives to our current approach.
- Collaborate with camera and LiDAR.

Expected Outcome & Deliverables

- Perform an accurate detection and classification in real time.
- Accurately measure the distance to every object in real time.

Progress Report

- Calibrated the infrared camera.
- Recorded test footage.
- Labelled some data by hand.
- Trained a YOLOv3 network using the labelled data.
- Building a SVM as an alternative to the YOLO network.
- Exploring and evaluating other machine learning algorithms for better performance.