# VehID – Vehicle Recognition Software
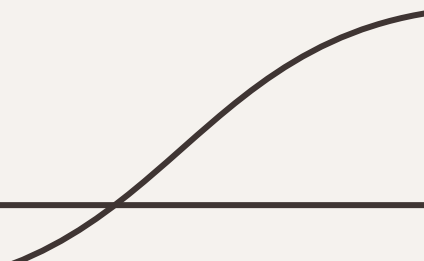
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**Faculty Advisor:** Dr. Silaghi

**Client:** Clayton Levins

# Goal and Motivation

We plan on utilizing machine learning to recognize vehicles based upon a variety of characteristics such as color, make, model, and/or license plate. This technology will be used to aid in public safety in a variety of situations such as AMBER alerts, stolen vehicles, and criminal offenses. This will be an improvement upon the current systems used in these situations which often rely on pure human interaction to spot and report the specified vehicles.

# Approach

| Identify vehicles based upon a given criteria | Identify numerous vehicles in real-time | Report Vehicles when full or partial matches are found |

# Novel Features and Functionalities

## Convolutional Neural Network

Identify vehicles based on characteristics, offering a constant patrol for suspected vehicles used in crimes.

## Existing Network of Cameras

Integrate software with existing network of cameras.

## Vehicles as Identifiers

Rather than using license plate recognition, use vehicles as primary identifier and verify using license plate recognition.

# Technical Challenges

1. Training CNN to meet project requirements, limited knowledge of neural networks will at additional difficulty to this task.

2. Computer vision and recognizing numerous vehicles in a single frame. Model needs to accurately identify every vehicle contained within a given frame.

3. Working with unfamiliar Python packages/frameworks for both neural networks and computer vision

# Milestone 1

- Familiarize ourselves with OpenCV and TensorFlow

- Work on validating our dataset, ensure that collected data will produce our intended model

- Find collaboration tools for software development, communication, and documentation

- Create requirements documentation

- Create design documentation

- Create a testing plan for future features

- Agile sprint planning

# Milestone 2

- Split dataset into training and test groups

- Implementation of color recognition

- Implementation of make/model recognition

- Agile sprint planning

# Milestone 3

- Implement text recognition for license plate identification

- Determine hardware requirements necessary to produce high resolution images/data

- Familiarize ourselves with computer vision framework used to track vehicles

- Adjusting parameters based on milestone 2 results

- Agile sprint planning

# Task Matrix - Milestone 1

| Task | Remington | Spencer | Thomas | Alexis |
|---|---|---|---|---|
| Familiarize with OpenCV and TensorFlow | 25% | 25% | 25% | 25% |
| Sprint planning | 20% | 20% | 40% | 20% |
| Work on training dataset | 20% | 40% | 20% | 20% |
| Determine collaboration tools | 20% | 20% | 40% | 20% |
| Create requirements document | Write 30% | Write 20% | Write 30% | Write 20% |
| Create design document | Write 20% | Write 20% | Write 20% | Write 40% |
| Create testing plan | Write 20% | Write 30% | Write 20% | Write 30% |