Client/Company/Organization: Dr. Joseph Zambreno

Submitter Name: Evan Timmons   **Email:** timmonse@iastate.edu

Project Contact: Same as submitter   **Email:**

Project Title:

Dash Cam Defender (Working Title)

Project Abstract:

Dash Cam Defender is a physical consumer system that consists of a dash camera, a mini computer, a mobile application and a software suite. The concept expands upon typical dash camera functionality by continuously scanning the license plates of the cars around them. The associated software will also include a user reporting feature, allowing a user to automatically upload video of, and comment on driving practices of others. Utilizing the plate information and user reports allows for a large feature set: alerting a user when a hazardous driver is near, assisting police officers tracking criminals with location data, providing insurance companies with additional driving safety records, etc.

Dash Cam Defender would use a mini computer and dash camera sourced from existing companies. However, the software would be proprietary. The system requires three main software components:
A website and associated backend database where user reported videos and comments are stored and can be searched and viewed
A mobile application used to control the system (control the camera, upload videos and comments to the database etc.)
An algorithm (likely using machine learning) to detect license plate numbers from live video frames. The mini computer would then classify images based on this algorithm

The usual resources would be used to create the website and database, HTML, CSS, JavaScript and MySQL or similar languages/software. The mobile application would preferably be developed with SWIFT, allowing for simultaneous iOS and Android development. The machine learning algorithm would be written in Python given the large array of existing ML libraries and support.

For CPR E 491, the project goal would be making a prototype that showcases the core functionality of the system. This prototype may include a blend of student made and existing software. As discussed with Dr. Zambreno, this may mean students focusing on the website and database for the project and using existing Automatic License Plate Reader (ALPR) software to test the system. The deliverables will be explained in more detail below.

Expected Deliverables:

The senior design team will meet about once a week with the client to ensure that progress aligns with the goals of the course. For the course, the senior design team should create a basic functioning prototype of one of the above listed three core software components per semester. For instance, create a basic working prototype of the website in semester one and a basic app in semester two. This is to allow both breadth of concepts explored, but also depth as the team will focus on a single main component for the entirety of one semester. These deliverables may be adjusted in accordance with the client and team's expectations to ensure that the work can be completed realistically.

Specialized Resources Provided by Client:

N/A (Client is ISU)

Anticipated Cost: _____

Financial Resources Provided by Client: N/A (Client is ISU)

Preferred Students for the Project:

☐ Electrical Engineering
☑ Computer Engineering
☑ Software Engineering
☐ Cyber Security Engineering
☐ Other:

Other Special Skills: Typical Computer/Software engineering programming skills are required. Computer engineers may need some basic hardware knowledge for communicating between a mini pc and dash camera.

Anticipated Client Interaction (estimate):

☑ 1 meeting per week
  ☑ In person, ☐ Over the phone, ☐ Web / video conferencing
☐ 1 meeting per month
  ☐ In person, ☐ Over the phone, ☐ Web / video conferencing
☐ 2 or more meetings per month
  ☐ In person, ☐ Over the phone, ☐ Web / video conferencing
☐ 1 meeting per semester
  ☐ In person, ☐ Over the phone, ☐ Web / video conferencing

Meeting ABET Criteria

Please rate the following statements as they relate to your proposed project:

0 – Not at all	1 – A Little	2 – Somewhat	3 – A Lot	4 – Completely

	0	1	2	3	4
On this project, students will need to apply knowledge of mathematics, science, and engineering	☐	☐	☐	☐	☑
This project gives students an opportunity to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	☐	☐	☐	☐	☑
This project involves students from a variety of programs, i.e., CprE, EE, and SE	☐	☐	☐	☐	☑
This project requires students to identify, formulate, and solve engineering problems	☐	☐	☐	☐	☑
This project gives students an opportunity to use the techniques, skills, and modern engineering tools necessary for engineering practice	☐	☐	☐	☐	☑

Project Approval – *for use by ECpE Senior Design Committee*

☐ Approved: _____

☐ Project Assigned:

☐ Advisor(s) Assigned: