Pedestrian Road Crossing Assintance
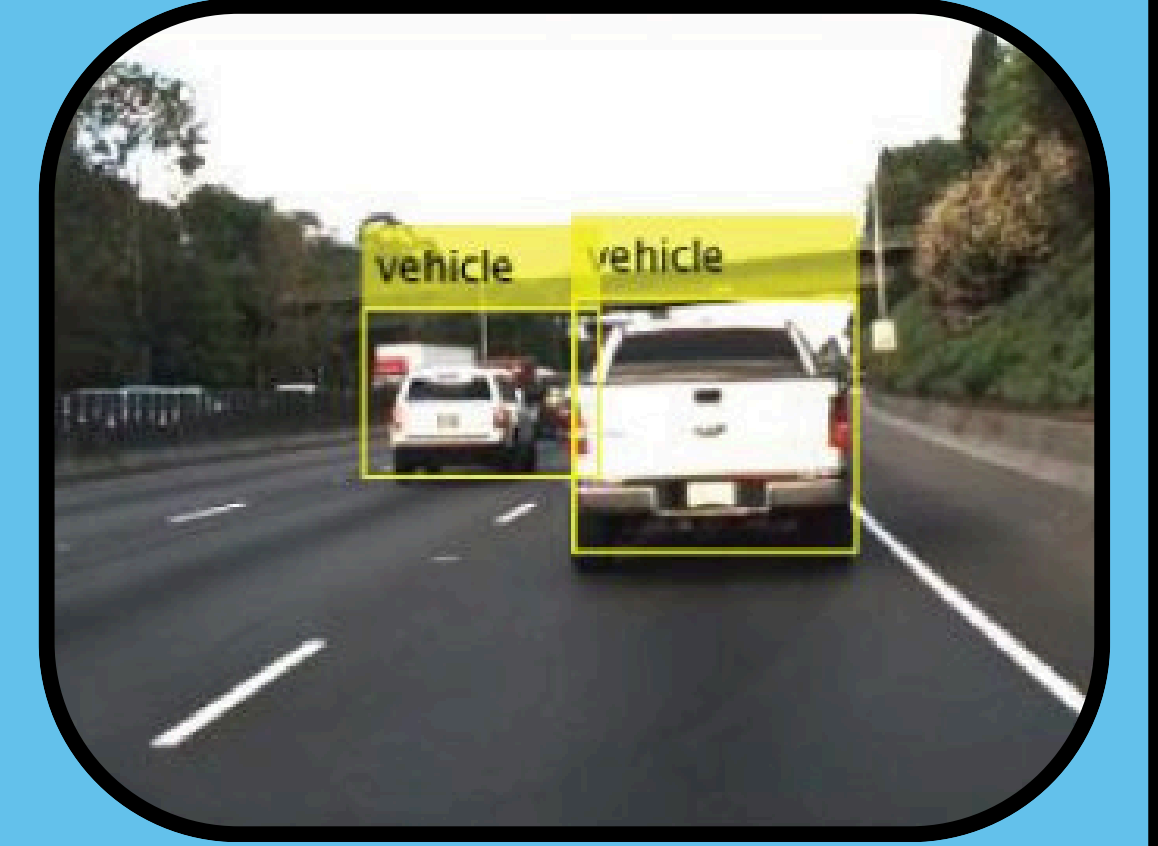
Problem

Road safety for blind individuals is a critical concern.

Hardware Selection

- **ESP32S3 camera** - creates local webserver where we can access the stream and modify its parameters (resolution, color, etc.);
- **3.7 V battery** - life-span of 12 hours;
- **Usb-c cables**
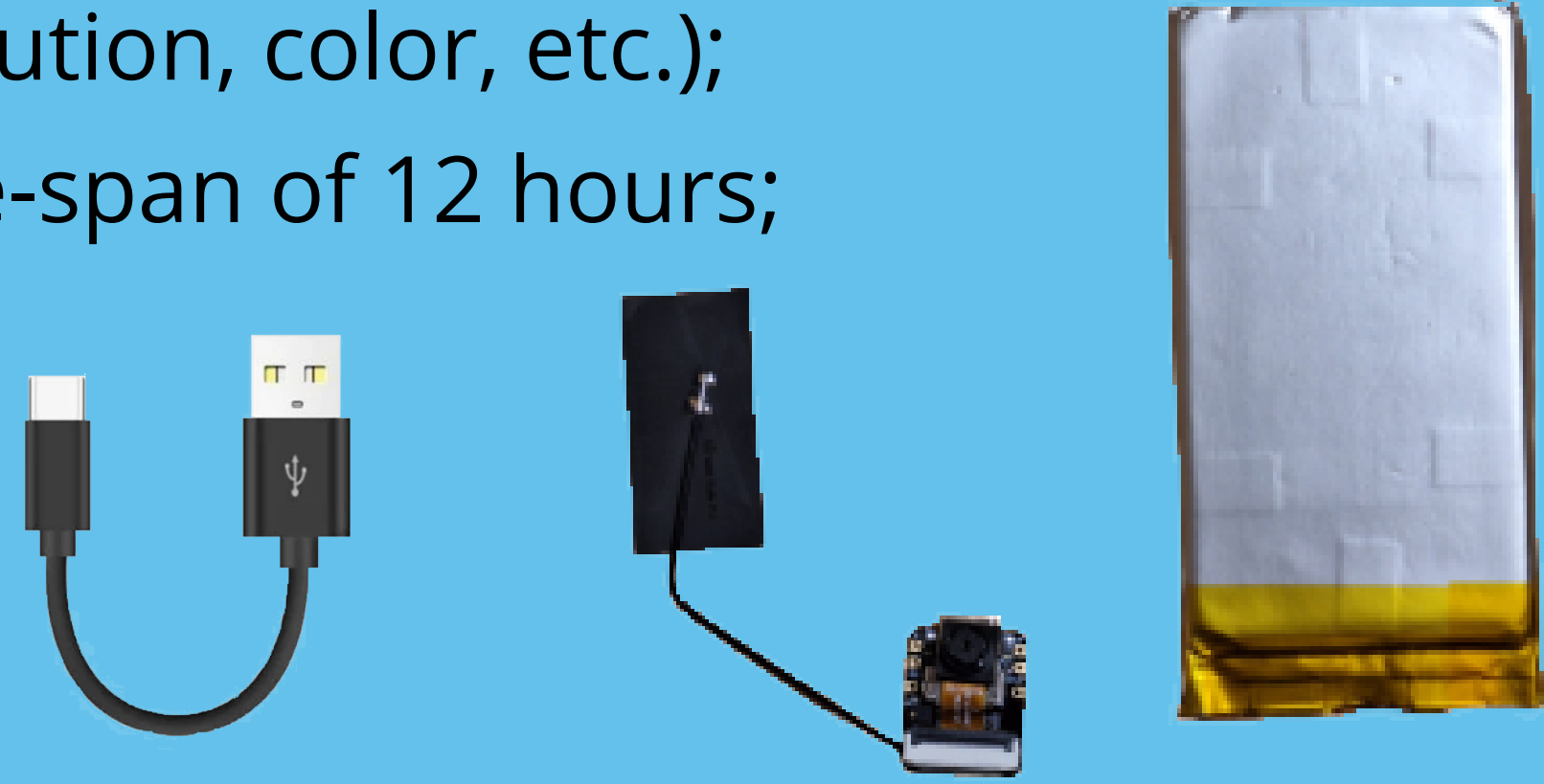
One problem that of our prototype was that the Voltage of the battery and the voltage that the cameras needed where different.

To solve this, we also used a **charger booster Lipo Rider Plus** with an on/off switch that converts the voltage of the battery from 3.1 V to 5 V

Final Product

Our final product has 2 cameras connected to a small computer, where it runs an object detection, tracking and alert system. With that we could develop an app that would obtain all the data from the computer, warning the user if it's safe or not to cross the street.

Benefits

- Its low weight allows the user to carry the device with ease and its small size allows it to be placed in abag.
- Very unique in the current market.

Team 28

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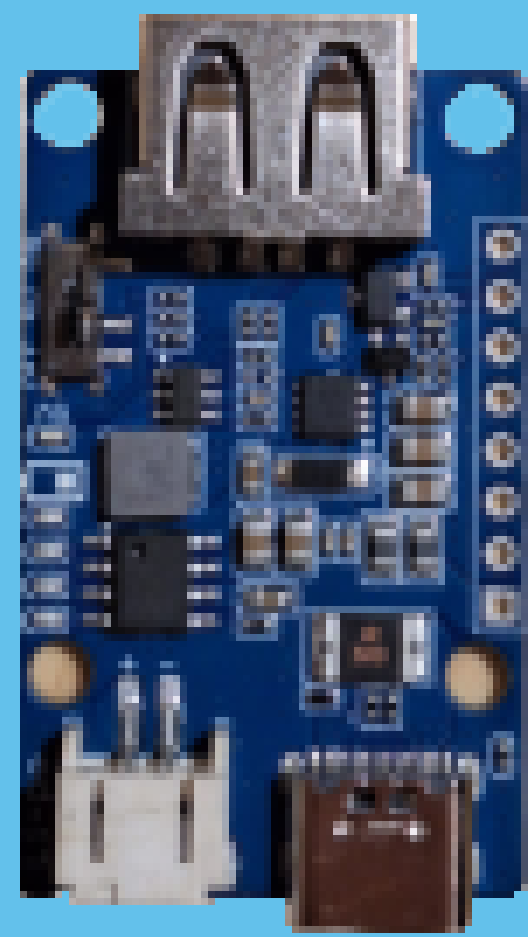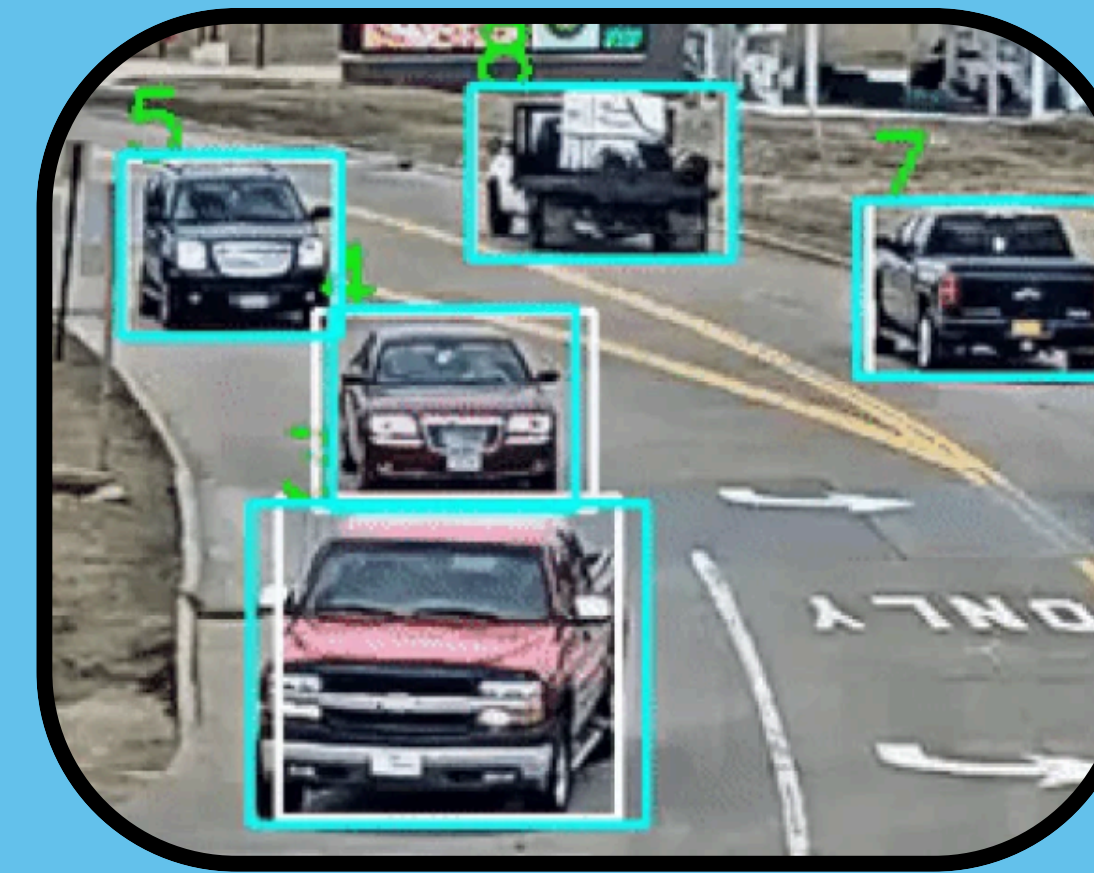Duarte Cardoso
Antonio Neto

Website

Object Detection

Object detection is a technology used to locate instances of objects and its boundaries and locations in images or videos, they typically leverage machine learning or deep learning as a foundation for producing meaningful results.

Object detection is also a key technology behind advanced driver assistance systems (ADAS).
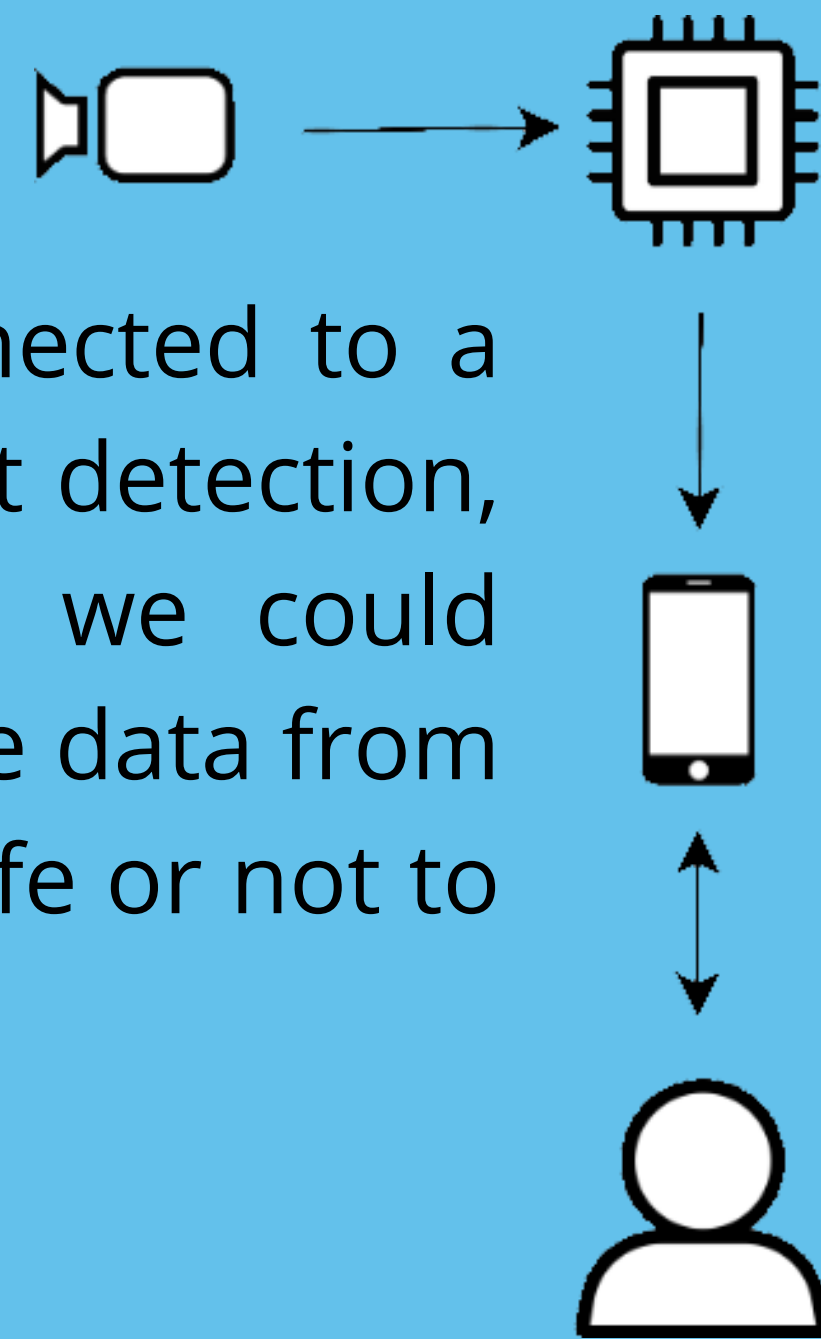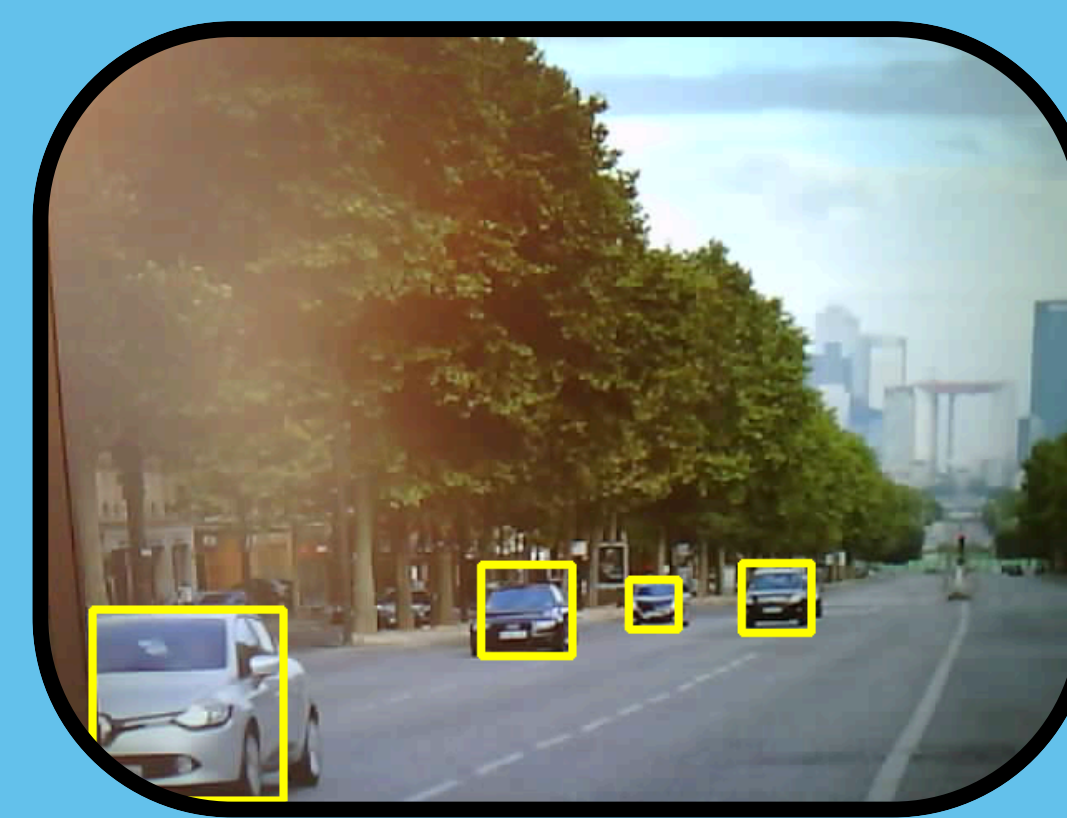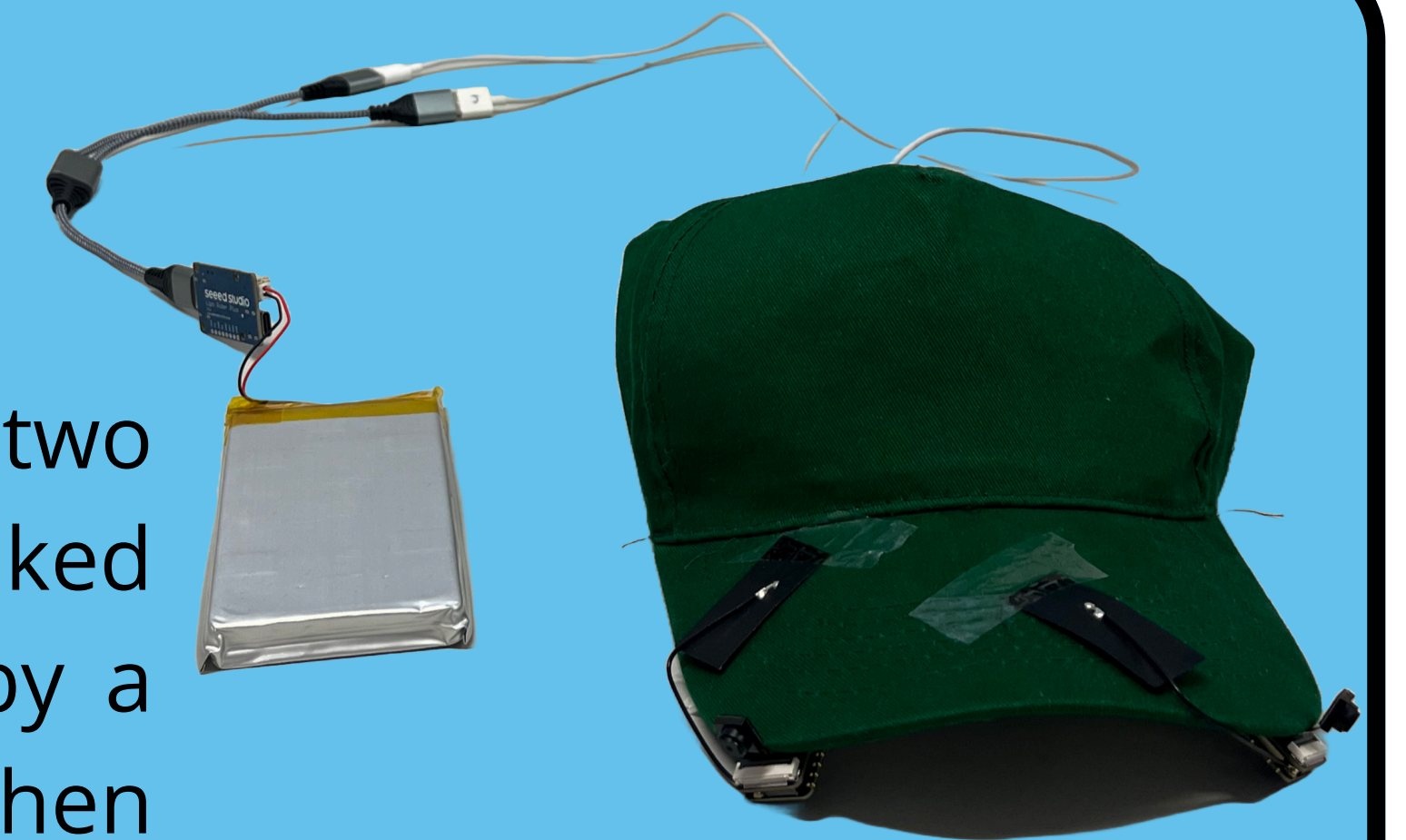
Object Tracking

Object tracking aims to maintain the identity of objects detected as they move through the consecutive frames of a video. It ensures that the same object detected in different frames is recognized as the same entity, to do so it attributes them ID's, allowing for the analysis of its trajectory and behavior over time.

Prototype

Wearable hat containing two separate ESP32 cameras linked to a 5V charging module by a splitter cable which is then linked two a 3.3V battery.

When turned on, each camera creates a webserver to stream the captured footage to. The webserver is then accessed by a separate device with a designated app which is responsible for handling the object detection, tracking and warning systems. The app will store each car with a specific ID in a list and direct the user to wait until the list is empty. A car is deleted from the list if it is no longer detected or if it has been detected more than 3 times.

Conclusion

- We were able to gain valuable insight into the processes behind image recognition, object detection and object tracking.
- We designed a prototype which was capable of accurately detecting vehicles and warn the user if it was safe to cross or not.