Assignment 9

RBE 549 Computer Vision

By:

Nate Dixon

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The objective of this assignment was to create a traffic monitoring application that is able to identify and count cars, bikes and people passing through a crosswalk. The first task was to open the given traffic video in the application which was done using the OpenCV VideoCapture function. The crosswalk was then identified in the video and marked with a yellow boundary.

Figure 1: Image of the Marked Crosswalk

To identify the cars, bikes and people passing through the frame, I used the pretrained YOLO model. This model was able to accurately and reliably identify all of the objects that were present in the frame.

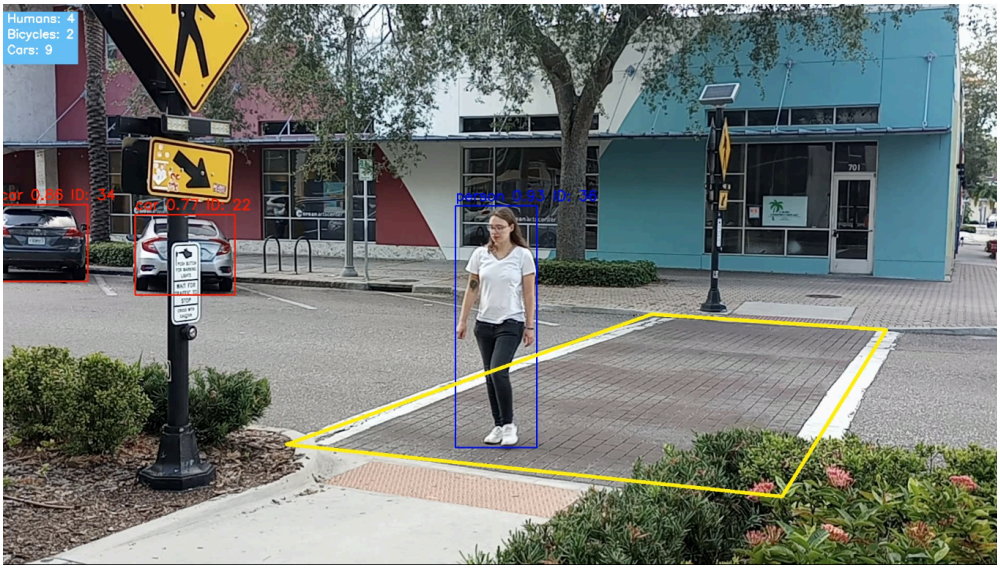

Figure 2: Image of a Person being Identified

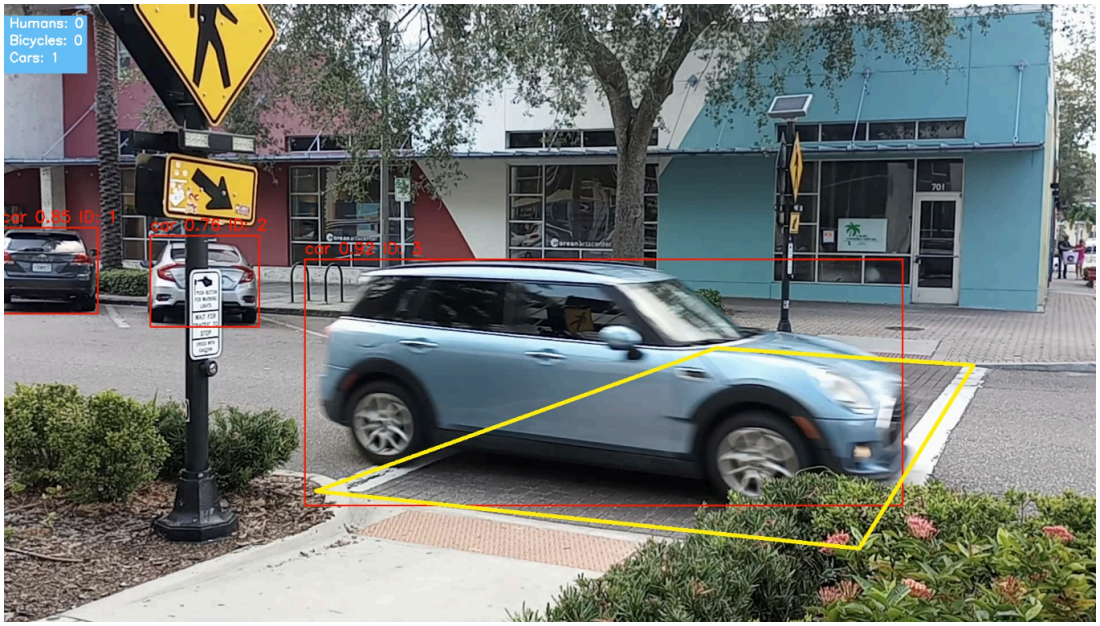

Figure 3: Image of a Car being Identified

Figure 4: Image of a Bike being Identified

The next step of this assignment was to create a counting protocol to accurately count the objects that pass through the scene without missing or double-counting any objects. This was accomplished by first implementing an ID system for the identified objects in each frame. When the YOLO model detects an object, it assigns a unique ID to that object, which remains consistent across the following frames as long as the

object remains in the scene. This unique ID allows the system to track the object's movement and ensures that it is only counted once as it crosses the defined line.

To prevent double-counting, a set of IDs is maintained for each object type (people, bicycles, and cars) that have already been counted. As the object moves through the scene and intersects the predefined line, the script checks whether its ID is in the corresponding set. If the ID is not found in the set, it indicates that the object is crossing the line for the first time, and the count is incremented. The object's ID is then added to the set to prevent it from being counted again in future frames. Finally, to prevent the issue of objects overlapping, the objects are only counted once they reach the middle of the scene to ensure that one object is not covering another when they are being counted. This counting system then displays the current count for each object in the upper left corner of the frame.