

Object Velocity Tracking

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Abstract

Using a stationary camera, with the intent of being mounted on a car, we are attempting to detect objects and determine the speeds of those objects in relative relation to the Observer (camera) .

This will be done by having the camera recognize objects in space and determine their speeds based on the rate at which they travel through the frame. To make this work, we will have to research the varieties of cameras available to use, as well as the APIs they operate with. From this, we will determine the best camera to be used and from there create a object tracking program.

I. PROBLEM DEFINITION

There are many applications for tracking the speeds of moving objects. Current methods include radar guns and laser scanners, however, speed tracking methods like this include various issues.

Primary among these issues is that radar and similar methods suffer heavily from poor weather conditions. Plus the methods that require radar and laser put out a detectable signal that the object being tracked can detect. Methods like these are also only capable of tracking one object at a time. In our modern society, these shortcomings are no longer acceptable. We have used the methods provided to us because there were no other options to work with. We have finally hit a point where we can improve on what currently exists, and as such, we must work to improve.

II. PROPOSED SOLUTION

We are going to use a camera to identify objects and to track the speed of that passing object. The camera will be able to track passing objects and display their current speeds to the user. The camera will also be able to accurately detect the speeds of passing objects during inclement weather conditions, such as heavy fog, in which other methods would return bad results. The camera used is yet to be determined, however we can select the camera to use by examining the strengths and shortcomings presented. After selecting a camera, we will work with the camera's api to determine object recognition. From there, we will gauge the object's speed based on its movement in-frame, so that we can return instantaneous results to the user.

III. PERFORMANCE METRICS

Our solution will be able to identify and detect nearby objects which can be tracked. The camera will then track the nearby object to determine velocity, and return the value within 10% of its actual speed. If possible, the solution will also be able to perform this on multiple objects simultaneously. We will also work to make the results displayed to the user appear instantaneously, with as little required lag as possible.