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The system “Machine Vision for Traffic Violation Detection System through Genetic Algorithm” was developed by Aaron Christian P. Uy, Rhen Anjerome Bedruz, Ana Riza Quiros, Argel Bandala, Elmer P. Dadios of Gokongwei College of Engineering De La Salle University in Manila, Philippines.

This paper have presented a machine vision algorithm to detect traffic violations specifically swerving and blocking the pedestrian lane. The proposed solution consists of background difference method, and focuses on the genetic algorithm of the system to detect these violations. The general process is that a capture picture is to be subtracted first by the reference image, then the genetic algorithm is run to find the violator, and finally a display is outputted by cropping the image with the corresponding type of violation. The genetic algorithm chooses the best value from initially random population and converge to a single solution. The algorithm is well-suited for real time implementation in traffic detection system. The system inputs were captured photos from a CCTV camera and the outputs were cropped pictures of the car that was detected to have such violations mentioned earlier. At first the input image is subtracted from the reference image and genetic algorithm is performed to give output. It is implemented through Matlab in a computer with a clock processor of 3.4GHz and an 8GB of RAM, to have a nearly optimal program runtime.

The system have detected both the swerving and pedestrian lane blocking. The system was fast for detecting swerving than pedestrian lane blocking detection. The system can only process one data at a time and runtime is also slow.

The system “Traffic Signal Violation Detection System using Computer Vision” was developed by Abu Noman Md. Sakib, Pias Roy students at Department of Computer Science and Engineering of Khulna University of Engineering & Technology in Bangladesh.

This system have used YOLOv3 and tkinter to detect traffic signal violation. The system uses computer vision, GUI with python library Tkinter and basic opencv. The main idea of the project is to detect and track the traffic signal violators.

The System consists of two main components vehicle detection model and graphical user interface (GUI). When the video footage is selected, the moving objects are detected from the input footage using YOLOv3 object detection model to classify vehicles into respective classes. OpenCV and machine learning software library which is used in this project for image processing purpose. It improved the accuracy. Tracking the activity of vehicles, system determines if there is any violation or not.

The GUI makes the system interactive for the user to use. User can monitor the traffic footage and get the alert of violation with the detected bounding box of vehicle. (python awesome, n.d.)

A traffic line is drawn over the road in the preview of the given video footage by the user. The line specifies that the traffic light is red. Violation happens if any vehicle crosses the traffic line in red state. The detected objects have a green bounding box. If any vehicle passes the traffic light in red state, violation happens. After detecting violation, the bounding box around the vehicle becomes red.

This system can only detect the signal violation using computer vision. It uses opencv on python and machine learning to detect the object, classify and detect the violation but does not issue the fine or detect speeding vehicles.