**ABSTRACT**

In this project, a robust method of detecting and analyzing traffic violations of the nature of signal jumps has been proposed. The method has been designed to meet the criteria of efficiency and simplicity. When a scene, particularly a traffic scene is recorded through a camera device, the lag introduced in the footage as a result of the frame rate makes object tracking in the scene, an arduous task. Furthermore, this lag causes the formation of blank and redundant frames, thus compromising the quality of the footage and introduces a significant and unnecessary computational overhead during the process of analyzing the video for signal jumps.

Therefore, to overcome these deficiencies, the proposed method makes use image processing techniques to enhance the quality of the video for violation analysis, while also maintaining efficacy in analysis using robust machine learning tools. The image processing techniques adopted produce highly accurate results, albeit with overwhelming efficiency with respect to use of computational space and time resources.

A combination of clustering and the mean squared error comparison has been used to achieve the enhancement of the recorded footage, more specifically, to achieve the elimination of blank and redundant frames introduced in the video as a result of the lag caused by the frame rate of the video. Following this, a combination of Support Vector Machines and Histogram of Oriented Gradients has been used to recognize number plate information of the vehicles responsible for the violation, thus facilitating filtering of database results containing more detailed information about the vehicle.

The results of the system have been compared to similar results obtained using the de-facto standard method known as the Gaussian Mixture Model and have been shown to be better. The results obtained has been thoroughly tested in various scenarios and the analysis of the results has been documented.