

## ***Abstract***

*A Method to analyze the traffic density in one lane at traffic lights intersection using real-time video stream has many problem like falling weather, variant illumination, and others that caused the background is not staic. Moving shadow also can reduce the accuracy of the system, so the system cannot perform in the way that it should be. Also there is no congestion detection and handling that could support the system to perform optimally in any condition.*

*So in this final project, a system was developed to solve these problems. System is developed by combining some method for solving the problem that mentioned earlier. System using surveillance camera that placed in a corresponding lane that close to the traffic light intersention to count the vehicle that passing through the lane. The image processing is done frame by frame using methods called Improved Improved Adaptive Gaussian Mixture Model Background Subtraction and Haar-Like Features. The main purpose of these methods are real-time tracking for object that moving in dynamic background that mainly caused by falling weather and variant illumination. Then the objects that successfully tracked are counted if the objects is crossed the virtual detector. Meanwhile, the Haar-like Features is used for detectiong any congestion that could happen in that lane by detecting object in the background. For the final step, the number of vehicle that pass through the virtual detector or detected by the congestion detection are classified into 5 level of densities to give an analysis for the desity level of corresponding lane for each state of light sequence in traffic lights*

*By using these methods, system could perform optimally for analyzing the traffic density in one lane at traffic lights intersection using real-time video stream in any wheather or illumination condition.*

***Keywords:*** *Real Time Video Stream, Improved Adaptive GMM Background Subtraction, Haar-like Features, congestion detection, classification, virtual detector.*