

## ABSTRACT

Over time, technology is always evolving rapidly. One of them related to transportation. One of the technologies in transportation is the availability of CCTV on bus. Therefore, with the development of camera technology can also determine the density of passengers in public transport that will be displayed on the LCD

The workings of the application of this technology is that the camera is placed above the door of the bus which allows you to record passengers in and out of the bus. Video data is sent to the computer and processed in matlab using image processing methods is motion detection and background subtraction aims to determine whether a passenger movements in or out of the bus as well as the amount. Motion detection is a method to analyze the movement of passengers while the background subtraction comparing between frames in the video to define the object. Then the data is sent to the microcontroller arduino uno with the combined data from the GPS. Then the data from the arduino uno is displayed on the LCD in the form of writing bus passenger movements whether incoming or outgoing as well as the number of passengers were recorded on camera. As well as the LCD will display the position of the bus.

Results coordinates of the GPS module U-Blox Neo-6 accurate both longitude and latitude coordinates, this can be proved by using Google Maps. For error rate Image Processing result there are 4 conditions, that is the error rate with the threshold value of 0.28 and a value of 25 frames per second which is 7.725%, the error rate with a threshold value of 0.25 and a value of 25 frames per second which is 12.455%, the error rate with values threshold value of 0.28 and 15 frames per second which is 6.68%, and the error rate with the threshold value of 0.25 and a value of 15 frames per second which is 12.63%. Of the 38 video-tested Image Processing results are displayed on the LCD with different conditions there are 6 video to see the results in the LCD does not correspond to the real situation. Therefore we can conclude the success rate of 84.21% from throughout the video being tested.

**Keywords : Image Processing, Webcam, Arduino Uno, Matlab, Global Positioning System (GPS), Background Subtraction, Centroid**