TRAZER Video Image Processing Software as a Tool for Heterogeneous Traffic Data Collection

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Abstract

Empirical traffic data is the basic input of any traffic related venture be its traffic management, transport planning, or research in the field of traffic engineering. According to its application different types of traffic data are required. The fundamental types of macroscopic traffic data are speed (km/h), flow (veh/h), and density (veh/km). Microscopic traffic data include dynamics of individual vehicles and how they interact with neighbouring vehicles and the road geometry in a traffic stream. Various traffic data collection methods are available for these purposes. Manual traffic data collection is the primary and oldest method used for data collection. But this method is neither cost effective nor consistently accurate. To overcome these issues alternate traffic data collection technologies such as pneumatic road tubes, Induction loops, Videography, Infrared detection were developed.

Videography as a method for data collection is popular because the traffic condition can be visually observed later on. But extraction and analysis of traffic data from a video is a tedious process. Hence software programs such as TRAIS, COUNTcam, TrafficVision, TRAZER, MediaTD, Picomixer STA etc. have been developed.

In this research, the software program TRAZER is used for traffic data collection, and its performance as a traffic data collection tool is analysed. The version of the TRAZER software used for this research provides the user with the facility to detect 4 main vehicle categories; namely, Light moving vehicles (LMV), Heavy moving vehicles (HMV), Three Wheelers (3W) and Two wheelers (2W). HMV's are further classified as Buses (BUS) and Trucks (TRUCK).

Two 1-hour videos were recorded according to the specifications for analysis in this research. One at Pannipitiya (video 1) overlooking the A4 highway from an overhead foot bridge and one at the Colombo-Katunayake (video 2) Expressway overlooking the expressway from an overpass near Peliyagoda.

The software offers options to delete, reclassify and add vehicles to its output thereby giving the user the ability to rectify software errors and raise the accuracy of the count to 100%.

Video 1's initial vehicle count was 62.3% greater than the actual value. (4503 as opposed to the actual flow of 2774 vehicles) This was mainly due to phantom detection of motor cycles. The primary reason for this being the recognition of vehicle side mirrors as motor cycles. Once the incorrectly detected vehicles were deleted the flow value reduced to 2073, which is 25.3% less than the actual value. This was rectified by adding the overlooked vehicles manually. Video 2's output was more accurate. The main reason for this is the absence of motor cycles and three wheelers in the expressway. The initial flow value was 1104 vehicles. Once accidental recognitions were removed, the value reduced to 953 which was 23.9% less than the actual value of 1252 vehicles.

From this, it can be seen that the software provides vehicle counts to an accuracy of approximately 75% once accidental recognitions are removed. An advantage of using the software is that the accuracy can be raised to 100% manually. But a significant amount of time must be spent to identify the vehicles that are not captured by the software. TRAZER also gives individual speeds and trajectories of each vehicle. The speed estimations were checked by manually calculating the speed of selected vehicles from each category by observing the recorded video. The estimated speeds were found to be similar to the values derived manually.

From this research, it can be concluded that TRAZER is an acceptable tool to collect and analyse traffic data even though conclusive results were not observed in the initial runs. This may partly be due to user errors in handling the software and capturing the video or issues unique to the analysed videos. Further studies should be done to analyse the speeds more accurately as well the vehicle trajectories.

Keywords: TRAZER, Video Image Processing, Traffic Data, Data Collection

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