Feasibility Study for Using Video Detection System Data to Supplement Automatic Traffic Recorder Data

Michael Hunter (PI), Angshuman Guin (Co-PI), Wonho Suh, James Anderson

Overview
The Georgia Department of Transportation (GDOT) continuously collects traffic data using Automated Traffic Recorder (ATR) stations, Video Detection System (VDS) cameras, and Remote Traffic Microwave Sensors (RTMS). ATR stations are utilized by GDOT’s Office of Transportation Data (OTD) while the VDS and RTMS systems are used for the Georgia NaviGAtor Intelligent Transportation System by GDOT’s Office of Traffic Operations (OTO). This research compared the automated traffic counts from these three technologies to manual traffic counts, counted using a proprietary Android application, to determine their accuracy and the feasibility of incorporating the VDS and RTMS counts into the OTD data streams to enhance Federal reporting.

This research focused mainly on VDS, as it is one of the more widely used vehicle sensors in the Atlanta area. Furthermore, many VDS locations were tested to find the effects of the various mounting styles and offsets on the accuracy of vehicle counts.

Site Selection

1st Round
- ATR: on I-285 near Orchard Road
- VDS: Pole Mounted with 24 feet offset on I-285 near Orchard Road
- VDS: Gantry Mounted on 285 near Orchard Road
- RTMS: on US-78 near Idlewood Road
- VDS: Pole Mounted on I-75/85 Connector

2nd Round
- VDS: Pole Mounted on I-285 near US-78
- VDS: Pole Mounted with 36 feet offset on I-285 near US-78
- RTMS: on US-78 near Idlewood Road
- VDS: Gantry Mounted on 285 near Orchard Road

Selection Criteria
- 1st Round Site was chosen based on proximity of ATR and VDS to each other as well as two nearby PTZ cameras.
- 2nd Round sites were selected based on VDS mounting styles, sensor type (RTMS), and proximity to a PTZ camera.

Results

Vehicle Count Comparisons
- Each detection technology’s counts were compared to manual counts.
- Box plots show that the average difference of the counts for each technology from the baseline manual counts were within 10% of the manual counts.
- Wider variation of deviations from the baseline were observed VDS and RTMS counts than ATR counts.

Vehicle Count Comparisons
- Screen displays the accuracy of vehicle counts.

Conclusion
- Comparing vehicle counts from ATR, VDS, and RTMS to manual counts showed that all of these systems’ counts were generally within 10% of the manual counts.
- It was also discovered that VDS count accuracy varied slightly between different mounting styles and offsets.
- Furthermore, VDS camera viewing angle and number of lanes covered can significantly impact the vehicle count accuracy. Therefore, candidate VDS units must be checked for vehicle count accuracy before incorporation into the Office of Transportation Data’s data streams for Federal reporting.
- Certain maintenance activities, such as roadway repaving, may cause the OTD blind on these sections as ATR systems may be damaged or removed during these activities. The Office of Traffic Operation’s detectors use non-intrusive technology and can provide an alternative data source for OTD under such conditions.

Images Courtesy: Wonho Suh
Images Courtesy: GDOT

Data Collection

Tablet Counting Application
- Allows data collectors to count vehicle by tapping specified detection zones as vehicles pass under it.
- Video playback can be controlled by data collectors.
- When reviewing counted video, the detection zones light up to indicate previously recorded vehicles.
- Videos can be reviewed by a second data collector to increase manual count accuracy.