RESEARCH
PROJECT CAPSULE [19-1SA]
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TECHNOLOGY TRANSFER PROGRAM

Evaluation of Counting Device for Pedestrians and Bicyclists

Figure 1
Numina device on a light pole

JUST THE FACTS:

Start Date:
September 3, 2018

Duration:
15 months

End Date:
December 2, 2019

Funding:
SPR: TT-Fed/TT-Reg

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POINTS OF INTEREST:

Problem Addressed / Objective of Research / Methodology Used Implementation Potential

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PROBLEM

Pedestrian and cyclist counts, as well as vehicle counts, are important sources of information for planners and policymakers when dictating transportation planning and infrastructure spending. Current and reliable statistics are essential for evaluating roadway use and for optimizing investment.

A wide range of hardware is available to address the challenges associated with pedestrian and cyclist counting. However, most sensors fail to give accurate measurements of pedestrian/cyclist density. Manual counts performed by humans in the field are common but labor-intensive and inefficient for the large-scale counting programs sought by cities and states today. Accuracy rates for manual counting are prone to human error.

Attention is directed to the development of algorithms that minimize human intervention when counting. Numina is a hardware-software system used for object detection, composed of two component systems: the sensor (hardware) and the data platform (software). It uses a camera to take multiple snapshots per second of a region under study, and then uses image-processing algorithms to count the number of pedestrians and cyclists.

OBJECTIVE

The primary objective of this study is to evaluate Numina's ability to accurately detect, track, and count pedestrians and cyclists under varying conditions (weather, time of day, density, etc.). The researchers anticipate that the results will lay the foundation for the development of a more robust automated system that will replace manual counting for pedestrians and cyclists statewide.

METHODOLOGY

Initially, the research team will obtain and review documentation on the Numina devices, including device manual, technical briefings, device installation and data retrieval processes, the technology/algorithm behind the devices, the graphical user interface, and practical cases where Numina devices can be utilized.

It is anticipated that three Numina devices will be leased for this study and video cameras will be used to obtain ground truth data. Based on Numina recommendations, a two-week calibration period is needed for obtaining maximum accuracy.

The research team will install the Numina devices and video cameras at selected locations and, after the calibration period, will collect pedestrian and cyclist data. Numina personnel will help ensure the devices are mounted for optimal collection of data. Manual counting from video will be performed for comparison with Numina results. Based on the collected data, the research team will assess the capability of the Numina devices in providing accurate pedestrian and cyclist counts.

IMPLEMENTATION POTENTIAL

This study may provide the foundation for developing a statewide counting system if the performance and accuracy level of the Numina devices are determined to be acceptable. The research team will give recommendations for a plan to implement these counting tools. DOTD may become more efficient in its pedestrian and cyclist data collection endeavors at a fraction of current manual count costs.