Florida Department of Transportation Research

Integration of a Robust Automated Pedestrian Detection System for Signalized Intersections

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Current Situation

Improving pedestrian safety and making roadway facilities safer and friendlier for pedestrians are among the top priorities of the Florida Department of Transportation (FDOT). The "button" that a pedestrian may push to get a Walk signal at a signalized intersection has been common for many years. But in recent years, a number of new pedestrian safety features have begun to appear on Florida streets, including rectangular rapid flashing beacons (RRFBs), high-intensity activated crosswalks (HAWKs), and pedestrian signals for midblock crosswalks – all activated by pressing the button.

Research Objectives

University of South Florida researchers studied the use of automatic pedestrian detection systems for activation of pedestrian safety devices at midblock crossings and signalized intersections.

From its high perch, an automated pedestrian detector monitors corners and crosswalks for the presence of pedestrians and the need for crossing signals.

Project Activities

A number of systems are available for automated pedestrian detection. After review of these systems, the researchers chose three systems for testing. Each system was tested under controlled conditions and then field-tested at midblock crossings and intersections. One system met all desired performance requirements.

The selected system was deployed and evaluated at two midblock crosswalks and one signalized intersection. At the midblock locations, the system correctly detected pedestrians an average of 92% of the time. False detections were 2%, but this number is improvable through setup and tuning. At intersections, the system detected pedestrians 94% of the time and placed a pedestrian service call for all but 4% of detected pedestrians.

An important contribution of this research project is the work conducted to connect these automatic pedestrian detection systems to a traffic controller to place a pedestrian call when a pedestrian is detected and to remove the call when the pedestrian walks out of the detection zone before the call is served. Testing showed that the system was able to detect the disappearance of pedestrians 98% of the time and remove the pedestrian call 97% of the time when the pedestrian left the detection zone early. This result showed the capability of the detection system and the controller with a custom script to administer removal of a call (or not place a final call) when it is not needed. This feature is useful for minimizing vehicle delay due to unnecessary pedestrian signal phases.

Project Benefits

This research provided a key step to apply automatic pedestrian detection to further enhance pedestrian safety at signalized intersections and mid-block crosswalks.

For more information, please see dot.state.fl.us/research-center