

ROADWAY SAFETY INSTITUTE

Advancing roadway safety with user-centered solutions

UTC Project Information	
Project Title	Sensing for HOV/HOT Lanes Enforcement
University	University of Minnesota
Principal Investigator	Nikos Papanikolopoulos
PI Contact Information	npapas@cs.umn.edu 612-625-0163
Funding Source(s) and Amounts Provided (by each agency or organization)	Minnesota Department of Transportation: \$97,200
Total Project Cost	\$97,200
Agency ID or Contract Number	UTC Grant Number: DTRT13-G-UTC35 MnDOT contract 99008 work order 91 CTS# 2014051
Start and End Dates	03/11/2014 – 02/28/2017
Brief Description of Research Project	<p><i>Final report abstract:</i></p> <p>The use and creation of combined high-occupancy vehicle/high-occupancy toll (HOV/HOT Lanes) have become more common in urban areas since all types of road users can take advantage of the lane either as a high-occupancy vehicle or opting in to pay a congestion adjusted free. However, to maintain working integrity of the lanes for all users, stepped enforcement to discourage cheating has been needed as more lanes are added. This study evaluated the capability of a novel image sensor device to automate detection of in-vehicle occupants to flag law enforcement of HOV/HOT lane violators. The sensor device synchronously captures three co-registered images, one in the visible spectrum and two others in the infrared bands. The key idea is that the infrared bands can enhance correct occupancy detection through known phenomenological spectral properties of objects and humans residing inside the vehicle. Several experiments were conducted to determine this capability across varied conditions and scenarios to assess detection segmentation algorithms of vehicle passengers and drivers. Although occupancy detection through vehicle glass could be achieved in many cases, improvements must be made to such a detection system to increase robustness and reliability as a law enforcement tool. These improvements were guided by the experimental results, as well as suggested methods for deployment if this or similar technologies were to be deployed in the future.</p>
Describe Implementation of Research Outcomes (or why not implemented)	Nothing to report.

Last updated (9/30/2019)



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Place Any Photos Here	
Impacts/Benefits of Implementation (actual, not anticipated)	Nothing to report.
Web Links <ul style="list-style-type: none">• Reports• Project website	http://www.cts.umn.edu/Research/ProjectDetail.html?id=2014051 http://www.cts.umn.edu/Publications/ResearchReports/reportdetail.html?id=2576