Graduate student exploring ways to make riding a motorcycle safer using connected driving data

November 5 2014, by Cathy Grimes

Virginia Tech master's student Alexandria Noble is using connected-vehicle technology and research to find ways to improve driving safety for motorcyclists. Her work explores having cars and other vehicles share information on road conditions with data receivers that can relay that information to a motorcyclist."

What if cars could talk to motorcycles, alerting them to road hazards that might be annoying for drivers of four-wheel vehicles, but dangerous to

motorcyclists?

Alexandria Noble, a master's degree student in the Charles E. Via Jr. Department of Civil and Environmental Engineering at Virginia Tech, is exploring that idea, using instrumented vehicles.

"The idea is that motorcyclists are particularly susceptible to injury and death," said Noble, who hails from Newark, Delaware, and earned her bachelor's degree at West Virginia University. "A pothole for a car is a bump, but to someone on a motorcycle, it could be fatal."

Noble has been part of a team of students and faculty exploring the use of connected-vehicle technology and naturalistic driving research to improve [transportation safety](link) and reduce crashes.

Naturalistic driving research involves studies in which participants use vehicles instrumented with transportation institute-developed data acquisition systems that allow researchers to record vehicle and driver information when the vehicle is moving.

Researchers at the Virginia Tech Transportation Institute have added data acquisition systems to a wide range of vehicles, from cars, trucks and buses to motorcycles and bicycles. The data collected has informed many policies regarding distracted driving and has been used by several organizations and companies to educate people about the dangers of distracted driving.

All participants in the studies sign up to have the data collected and are protected under confidentiality agreements. They often are compensated for their participation. Noble has worked on instrumented vehicle studies with participants.

Noble also is the first student enrolled in the Virginia Tech

Transportation Institute's Human Factors of Transportation Safety graduate certificate program

"We are excited about the program," said Professor Jon Antin, director of the institute's Center for Vulnerable Road User Safety and Human Factors of Transportation Safety certificate program coordinator. The certificate is interdisciplinary in nature and "offers an opportunity to work with faculty here and in collaboration with other affiliated departments on campus, including civil and [environmental engineering](#), industrial and systems engineering, psychology, and statistics."

It also provides students an opportunity to blend academics with research while focusing on the human factor of transportation safety, he added.

Noble said her research is in the early stages, but she recently presented an overview of the proposed project at the Fourth International Symposium on Naturalistic Driving Research at Virginia Tech. Noble said the connected-vehicle technology the transportation institute explores – cars that talk to other cars, to stationary receivers along a route, to other technologies that could send data to external sensors – offers the possibility of making motorcycle riding safer.

"It's an innovative way to use naturalistic data," she said. "You have the potential to reduce single-vehicle accidents, property damage claims and fatalities and injuries."

Noble said the transportation institute has motorcycles equipped with Data Acquisition Systems used in naturalistic test track, and on-road driving research. The units are small and unobtrusive, sitting either on the sides of the bike or at the rear, or mounted near the windscreen.

Noble has been involved in Virginia Tech Transportation Institute research exploring ways to bring static alert systems, such as traffic

signage and signals, into the vehicle with the connective technology. But the idea of vehicles acting as "scouts" for motorcyclists and other vehicles could provide warnings for unexpected hazards, such as pot holes, downed trees and other debris.

"The passenger car would be a probe, continuously sampling the road surface, and could send that data to external sensors," Noble said. "We could technically do this now. We have GPS, and other systems however, the connected vehicle component will require many vehicles sampling the road surface, but the tools required for the real-life application are available today"

Antin agreed, saying connected vehicle technology can be integrated to present sound or visual alerts to drivers. In cars, those alerts could be transmitted via dashboard signals or sound. Motorcyclists would need a different mechanism to safely warn riders, Noble said.

Both agreed the final factor regarding the success of such a system is perhaps the most variable.

"We have the technology to be successful," Antin said. "We need to work on the human factors."

Noble became fascinated with traffic safety while at West Virginia University.

"I met a professor who did crash reconstructions who said I could shadow him," she said. "He'd point out things that were out of place at crashes."

She later heard Tom Dingus, director of the Virginia Tech Transportation Institute and the Newport News Shipbuilding Professor of Civil and Environmental Engineering, at a conference and looked up

his work.

"I found out he was professor here and decided this is where I wanted to go," she said. "I wanted to study naturalistic driving data."

Noble said as soon as she began her studies in June 2013, with Dingus as her advisor, "I was thrown into a project. Right from the get go I was working on designing experiments. We get a real sense of ownership of our work. You have to manage a research project and work with human subjects. But there is always someone to go to if we get stuck."

Noble has worked with human subjects in several projects on the institute's Smart Road. She and Antin noted most of her work has been "extremely interdisciplinary" because of its focus on people. Noble said she likes working with faculty and students across fields. "It's very good to be able to work with all of them and ask questions."

Noble is aware that she is a woman in a traditionally male field, but that trend is changing, she said. "The number of women in the transportation industry will increase." She also is comfortable upsetting stereotypic images of women within science, math and engineering.

"When I was growing up I was told girls are good at English and history and boys are good at math and science," she said. Initially she had difficulty with math, but said she realized she was being taught the subject in a way at odds with her learning style. So she taught herself.

"I really wanted to learn. I was determined to because I was tired of being told I wasn't good at it," she said.

Noble said she plans to pursue her doctoral degree at Virginia Tech after completing her master's degree and continue her work with Dingus.

She already is thinking beyond her motorcycle research to exploring using connected data with pedestrians.

Provided by Virginia Tech

Citation: Graduate student exploring ways to make riding a motorcycle safer using connected driving data (2014, November 5) retrieved 7 May 2024 from https://phys.org/news/2014-11-student-exploring-ways-motorcycle-safer.html