Preventing traffic accidents before they happen?

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(PhysOrg.com) -- A new automotive safety systems built by European researchers will alert drivers to potential hazards by using information from the car, other road users and the roadside infrastructure to predict and prevent traffic accidents.

Scientists and researchers across Europe are working in concert to build a new automotive system that fuses information from a wide variety of sources to predict hazardous situations that could lead to an accident.

The system will give drivers early warning of accidents waiting to happen, and thus help drivers avoid crashes and other problems.

A novelty of the system is that it uses comparatively simple and low-cost technologies, many of which already exist. By combining the various information streams and analysing them for potential problems, the researchers hope to develop a powerful safety system that can be deployed rapidly and at little cost.

“We use information from in-vehicle sensors, car-to-car communication and communication with roadside infrastructure to create a picture of driving conditions in real time,” explains Andrea Migliavacca, coordinator of the I-WAY project.

Notable successes

The EU-funded project still has some time to go before completing, but it has already scored a number of notable research successes.

“We are very pleased with our video system for road observation,” reveals Migliavacca. “Our partners wanted a simple, low-maintenance and easy to install unit that could still provide useful information, and we have developed a unit that responds to their needs. They’re very happy with it.”

The external video is used to ensure the driver stays in the correct lane and is one of a series of subsystems used in the I-WAY platform. Some parts, like the radar, have come off the shelf, while other elements, such as the car-to-car communication, were supplied by other European research.

“We did not try to reinvent the wheel,” says Migliavacca. “If there was another European project working on a system we could use, we took that. So we got the car-to-car communication technology from the ‘Car to Car’ communications consortium. They have done a lot of work on this area that we benefited from.”

Recruiting scouts

Car-to-car information turns other road users into scouts. If another car encounters a hazard, it can broadcast that information to nearby vehicles. Similarly, roadside sensors and communication systems, used by the highway control centre to track road conditions, can transmit important information to drivers as they pass by.

Then can warn of oncoming lane closures, temporarily lowered speed limits, road conditions and traffic jams, among others.

Internal sensors complete the package of subsystems. The team

developed in-car cameras to monitor the driver as well as grip and electrocardiogram (ECG) sensors on the steering wheel.

The grip and ECG sensors, combined with the eye-tracking internal camera, can reveal the state of the driver, if he or she is stressed, for example.

Situation assessment

I-WAY has completed the first generation of the basic subsystems, and over the coming months it will integrate these systems and test the control software. “This is a situation assessment software, basing its assessment on the information from all the various sensors,” reveals Migliavacca.

“It is primarily intended for highway driving and it is not aimed at accident mitigation, rather it is intended to anticipate hazardous situations and help prevent accidents.”

The computer that will run the assessment software is another early success of the project. “It is a stack computer,” Migliavacca explains. “It is special hardware to manage all the inputs. It is a very good, well engineered solution and it is so successful that it is already available on the market and selling quite well.”

Migliavacca takes particular pride in this result, noting that it is unusual to develop commercially successful technology midway through a project.

In addition to the integration work, the project will continue to improve the basic subsystems.

The I-WAY project received funding from the ICT strand of the Sixth

Framework Programme for research.

Project pages: www.iway-project.eu/

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