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## Cars that know their drivers

Express Features

First Published : 24 Sep 2009 09:50:39 AM IST

BANGALORE: A few months back there was a piece of good news for sleepy drivers. A new system was being researched that would make the car keep an eye on them, and could, in a way, enable the vehicle to nudge them back to wakefulness if it found them nodding off.

Aurobinda Mishra of Vanderbilt University, in Nashville, and colleagues Mihir Mohanty of ITER, in Orissa and Aurobinda Routray of IIT, West Bengal had developed a computer program that can tell when the driver is yawning and can prevent road traffic accidents.

Basically, the program is based around an in-car camera hooked to an image-processing software that captures a sequence of images of the driver's face. It then analyses changes in the face and accurately identifies yawning as distinct from other facial movements. The yawn frequency is then correlated with fatigue behaviour and could then be hooked up to a warning system to alert drivers. An interesting way, for sure, to make the roads safer.

Growing wiser Now, it's time for cars to get more 'intelligent'.

As in, the cars can sense their drivers' moods and understand if there is a possibility of an accident.

Scientists from six European countries have developed a new computer system, called DRIVSCO, that allows vehicles to study, and thus learn, the regular behaviour of their drivers at the wheel. The system keeps reading the behavioural patterns of the driver in such a way that it can detect if the driver presents an 'unusual behaviour', especially in a curve or an obstacle on the road. Once it spots the anomaly, it generates signals of alarm which warn him or her on time to react.

The researchers say that this system goes beyond just a computer vision system for driving assistance. The system works on the principle of the car's 'learning' a driver's typical approach to a corner, curve, intersection or obstacle, regardless of their driving style (sporty or conservative) and applying that knowledge to every driving situation.

So a pattern of driving emerges.

For example, during night driving, if the vehicle detects a deviation in his way of driving in face of a curve, it reads it as due to the lack of visibility of the driver (as the driver has a limited visibility of the low beams field, whereas the car's night vision system is much more powerful and has a longer range). Therefore, it generates signals of alarm to warn the driver of his 'unusual behaviour when approaching a curve', or the detection of a potentially dangerous object, for instance.

The emphasis on the night vision, or nighttime driving method arises from the fact that the project researchers say that 42 per cent of car accidents happen at night. This when actual traffic flow drops during the night. One of the factors could be low visibility at night, and another, as the earlier in-car yawn-detection system reminds us, could be drowsiness. This is where, this system can be of most use.

The research group of the University of Granada has developed a system of artificial vision (analysis of the scenario) in an only chip. Such device receives input pictures and produces a first "interpretation of the scenario" in terms of depth (3D vision), local movement, image lines, etc, everything in an only electronic chip. This system can be assembled in different types of vehicles in future. In addition, they have used a "reconfigurable hardware", so that the system can adapt itself to new field of application.

During the tests, a group of drivers drove using the system so that the car could learn from their driving style.

The car had also a differential GPS incorporated, detection systems of wheel turns, braking, etc, so that the research groups managed to check in great detail the style of driving in every case and the performance of the system.

The first tests have offered promising results and have proved the usefulness of the new concept.

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