Vibrating steering wheel may rescue driver from blinding glare

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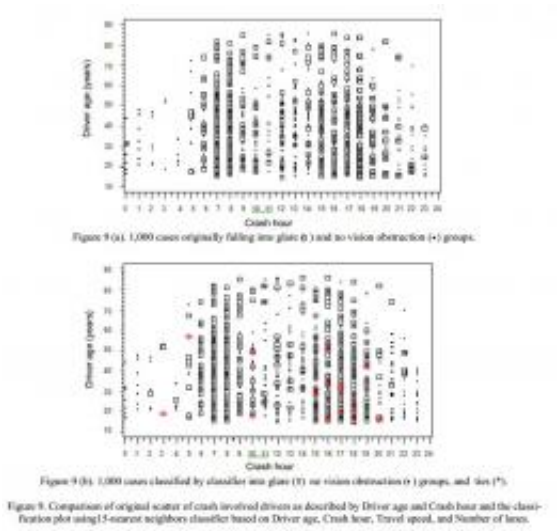

Credit: Eun-Ha Choi and Santokh Singh. "Statistical Assessment of the Glare Issue - Human and Natural Elements"

(Phys.org)—Imagine how jarring the experience can be—blinding light that becomes a visual impairment to the point where the driver cannot manage to drive correctly. In a study titled "Statistical Assessment of the Glare Issue - Human and Natural Elements," Eun-Ha Choi and Santokh Singh wrote that, whether it comes from headlamps or sunlight, the effect of glare affects driving performance. "The challenge for vehicle manufacturers and regulators is to provide the driver with a reasonable level of protection from glare. Empirical research is necessary in order to address this issue," they said.

Recent research indicates scientists continue to focus on the challenge of coming up with ways to combat the problem of glare. A vibrating steering wheel prototype might prevent an accident that could easily result. Eelke Folmer, an associate professor in the Department of Computer Science and Engineering at the University of Nevada in Reno, and Burkay Sucu are the researchers behind a vibrating wheel designed to steer drivers back on a safe path when glare prevents them from safely steering their own vehicles. Aware that temporary blindness from unexpected light, such as the glare in winter or any other type, can lead to accidents, they wanted to provide a solution that could get drivers to proceed safely through tactile cues. They tested their wheel on 12 volunteers in a simulator.

How it works: GPS and lane-keeping cameras map the road ahead. When the sensors identify the driver as drifting from the lane, a vibro-tactile system buzzes. Vibrations are tuned to a frequency sensitive to human skin, to 275 hertz. According to their construct, for example, if a driver drifted left, the left side of the wheel would vibrate. The vibration coming from the left side of the wheel would instruct the driver to steer right. In steering right, the vibration would stop.

Using touch for correcting a driver's lane position is nothing new, however. Last year, researchers at Carnegie Mellon University and AT&T Labs also showed a vibrating steering wheel concept for providing the right directions and keeping a driver safe on the road.

Last year, Ford showed off its Fusion 2013 at the Detroit Auto show, and among its features was a steering-wheel vibration to warn the driver if the car was drifting too close to lane markings.

While haptic steering wheels are nothing new, the Folmer-Suku prototype, according to the two researchers, bears distinctions."Existing haptic automotive interfaces typically indicate when and in which

direction to steer, but they don't convey how much to steer, as a driver typically determines this using visual feedback," they stated.

Their haptic interface involves an intelligent vehicle position system to indicate when, in which direction and how far to steer, in support of steering without any visual feedback. "Our interface may improve driving safety when a driver is temporarily blinded, for example, due to glare or fog."

Their paper, "Haptic Interface for Non-Visual Steering," has been accepted for the International Conference on Intelligent User Interfaces, scheduled for March 19 to22 in Santa Monica, California. According to the paper, Folmer and Sucu performed three user studies. "The first study tries to understand driving using visual feedback, the second study evaluates two different haptic encoding mechanisms with no visual feedback present, and a third study evaluates the supplement effect of haptic feedback when used with visual feedback."

More information: Research paper (PDF): www.fcsm.gov/05papers/Choi_Singh_IVA.pdf

via Newscientist

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