

Rutgers engineers design cell phone app to reduce distracted driving

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Rutgers engineers have developed an app that senses whether a driver is using a cell phone and takes steps to reduce distractions. Credit: Radu Razvan

(Phys.org) -- Laws that limit cell phone use while driving don't seem to be curbing accidents blamed on drivers who insist on talking or texting behind the wheel.

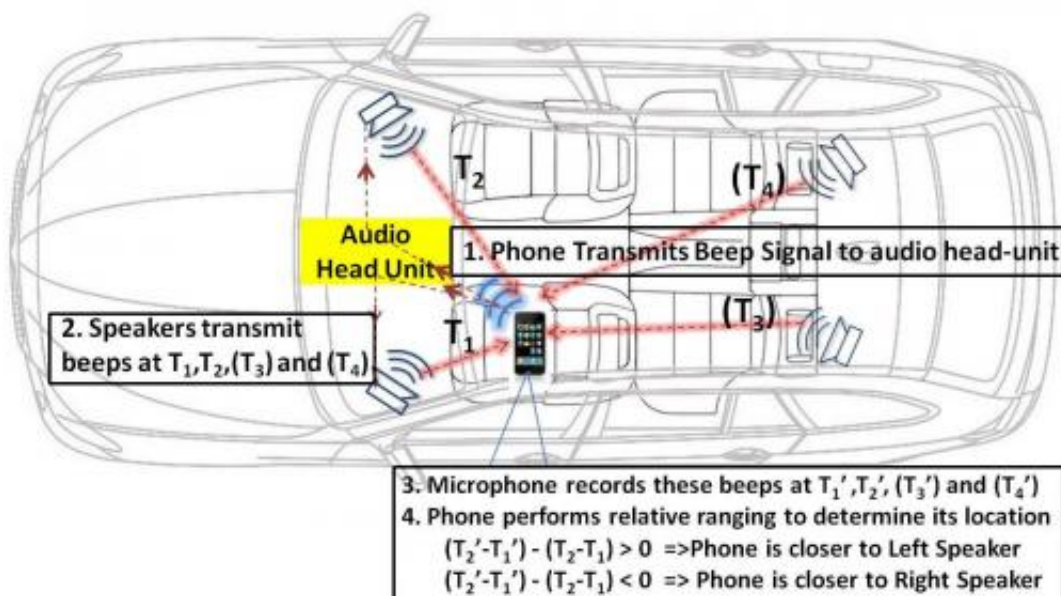
This has some engineers and lawmakers wondering if technology can do what threats of fines or jail time are not. Could cell phones automatically become less distracting while their owners are driving?

Rutgers engineers believe they can. They and colleagues at Stevens Institute of Technology have designed and tested a smart phone application that pinpoints where a [cell phone](#) user is sitting: on the driver's side or the passenger's side.

If the latter, the [app](#) lets the passenger use the phone with no restrictions.

If the former, the app takes several actions that reduce distractions to the driver. For example, it can silently forward incoming calls and texts to message boxes for later retrieval. It could also respond automatically to a caller or texter, saying that the owner is currently driving and will reply later. Or it could offer to put a voice call through if a caller or texter indicates the matter is urgent. For outgoing communication, the app could disable texting and make placing certain calls less difficult, perhaps by offering a short list of frequent contacts shown as large on-screen buttons.

Traffic accidents statistics that account for cell phone use are alarming. The National Highway Traffic Safety Administration estimates that 3,000 fatal traffic accidents nationwide last year were the result of [distracted driving](#). Studies have found that one in 20 traffic accidents involve a driver talking on a cell phone and that talking even while using a hands-free device carries as great a delay in reaction time as having a blood alcohol concentration of .08, the legal limit.



By measuring the amount of time that sound takes to travel from each speaker, the cell phone app can determine whether the phone is on the driver's side or the passenger's side of the car. Credit: Yang et. al., Rutgers University, Stevens Institute of Technology

Earlier suggestions on how technology could fight the problem, such as measuring how fast a cell phone is moving and cutting off conversations above a certain speed, were dismissed as overreaching.

“The trouble was, that would cut you off if you were a passenger in a car or if you were riding on a train,” said Marco Gruteser, associate professor of electrical and computer engineering and a member of the university’s Wireless Information Network Laboratory (WINLAB).

Gruteser and his colleagues devised a way for a cell phone to work with a car’s sound system to distinguish between the driver and passenger. It requires a stereo sound system with Bluetooth connectivity – a capability working its way into the mid-priced car market.

In their lab demonstration, a cell phone generates high-pitched beeps and transmits them to the car stereo over the Bluetooth connection. Beeps come out of left and right speakers at different intervals, and the phone uses its microphone to listen for the beeps it just sent. If beeps from the left speaker arrive fractions of a second faster than beeps from the right speaker, it means the phone is likely in the driver’s hands. A car with four-channel audio can perform the check more accurately, and may one day even be able to distinguish between front- and back-seat phone users.

The concept, while simple, had to prove itself in the cabin of a moving

car, where acoustics are far from concert-hall perfect.

“That makes our 90 percent success rate look pretty good,” said Rich Martin, associate professor of computer science in the School of Arts and Sciences, who is also a member of WINLAB. The team wrote its initial app to run on an Android device and plans to develop one for the iPhone. The concept merited a best paper award at last year’s MobiCom, a leading academic and professional conference for mobile computing and wireless networking technology.

The engineers hope their demonstration spurs cell phone makers to pursue commercial development of the concept.

One question remains – would people accept this technology? Or would they perceive it as yet another “nanny state” action?

Drivers would still have to elect to comply, say the developers, who don’t see their technology as an enforcement technique.

“We’re making it easier for people who want to drive less distracted,” said Gruteser. He believes that many people understand the need to not talk and text, but they simply can’t resist the urge to pick up the handset when they hear that familiar ring or text chime. So their ongoing work, in collaboration with WINLAB assistant research professor Janne Lindqvist, focuses on how they can put the burden on people who call or text drivers. One idea is to alert potential callers via social networking that their friend or colleague is driving, and to hold off on placing calls or sending texts until the driver safely reaches his or her destination.

Contributing to the research from Rutgers were Gayathri Chandrasekaran, Tam Vu and Nicolae Cecan; and from Stevens Institute of Technology, Jie Yang, Simon Sidhom, Hongbo Liu and Yingying Chen. The work was funded by the National Science Foundation.

Provided by Rutgers University

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