MIT Robot Rides Shotgun to Make Us Happier Drivers

By Chuck Squatriglia November 17, 2009 | 10:21 am | Categories: Cool Cars

Audi and the Massachusetts Institute of Technology envision a future where robots riding shotgun make us happier, safer drivers and create a “symbiotic relationship” between car and driver.

The Affective Intelligent Driving Agent, Aida, would analyze our driving habits, keeping track of frequent routes and destinations to provide real-time traffic info, and make friendly suggestions along the way. It also could give gentle reminders to buckle up, watch our speed or slow down for that school bus up ahead. The idea is to change how we interact with our vehicles and the ever-increasing amount of information we have to process while driving.

“With the ubiquity of sensors and mobile computers, information about our surroundings is ever abundant,” said Professor Carlo Ratti, director of MIT’s SENSEable City Lab. “Aida embodies a new effort to make sense of these great amounts of data, harnessing our personal electronic devices as tools for behavior support. In developing Aida, we asked ourselves how we could design a system that would offer the same kind of guidance as an informed and friendly companion.”

Aida communicates with the driver through a small bot in the dashboard. A tiny video camera allows it to see the driver and respond to what’s happening behind the wheel. Although the technology is still in the earliest R&D phase, Audi and MIT say it won’t be long before cars communicate with us.

“All the technology is designed to be used in a car sometime down the line,” said researcher Mikey Siegel of the MIT Media Lab.
Mikey Siegel with Aida.

The two MIT labs are working with Audi on the project at the Volkswagen Electronics Research Lab in Palo Alto, California.

Aida uses a small laser video projector to convey facial expressions and other information. It can raise, lower and turn its head on a five-jointed neck to face the driver or passengers in the car. The eyes blink and convey a remarkable amount of emotion. It’s eerie how Aida follows your movements using a camera mounted near the steering wheel of the Audi Q5 dashboard being used as a test bench.

“It sees faces, it recognizes faces,” Siegel said, almost proudly. “It knows how far away you are, and it responds. My goal is that someone seeing it for the first time will, within five minutes, feel a connection with it.”

Aida looks a bit like Johnny 5 from the film Short Circuit, or perhaps Wall-E. Siegel sees something else.

“I think it’s more like Eve,” he said, referring to Wall-E’s love interest. “It’s very smooth and slick, and then it lights up and shows reaction. This in my mind was the archetypal robot. It was going to be weird enough having a robot in the dashboard, so we didn’t want to make it too radical.”

Siegel said giving Aida human-like motion and expressions makes it easier to convey information to the driver. Zip through that school zone at 50 mph, and the bot might look alarmed. Forget to fasten your seatbelt, and it might appear worried. Siegel said such tactics would be more effective at modifying a driver’s behavior than sounding an alarm or a buzzer, as happens in most cars when you don’t buckle up.

“When the car can show emotion, when it can relate to the driver, you open all kinds of doors,” Siegel said.

But Aida is more than an electronic nanny. The researchers envision a “symbiotic relationship” between the the bot and the driver so they learn from each other. Think of it as in-car navigation 2.0.

“When it merges knowledge about the city with an understanding of the driver’s priorities and needs, Aida can make important inferences,” said Assaf Biderman, associate director of the SENSEable City Lab. “Within a week Aida will have figured out your home and work location. Soon afterward the system will be able to direct you to your preferred grocery store, suggesting a route that avoids a street-fair–induced traffic jam. On the way Aida might recommend a stop to fill up your tank, upon noticing that you are getting low on gas.”

Siegel realizes giving cars access to that kind of knowledge might raise privacy concerns, and he says consumers will need to be able to limit or manage the information Aida stores and uses. He also knows some people might find a robot in the dashboard distracting, but he argues it isn’t.

“It’s not distracting because it conveys facial expressions,” Siegel said. “Reading a facial expression is instantaneous. We’re designing this as if it’s a passenger in the car, which has actually been shown to improve safety. It’s not conveying text, it’s not conveying maps.”

MIT and Audi have spent the past year developing the system. Next year researchers plan to build a driving simulator for a controlled study to see how people respond to the in-car robot. Real-world tests will follow in 2011 when Aida is installed in a vehicle.

Photos: Jim Merithew / Wired.com

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