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# Smart Cars

Chaminda Basnayake is working on the next generation of smart—and safe—cars.

BY JENNIFER SOWA



Chaminda Basnayake with a Vehicle-to-Vehicle prototype car at General Motors.

Chaminda Basnayake, PhD'04, has always loved tinkering and taking things apart. Right from the start, it was clear he was destined to become an engineer.

“During my childhood, I liked building things,” recalls Basnayake. “I wanted to understand how a toy worked. I broke a lot of things!”

He’s still busy trying to figure out how things work, but now he gets paid to do it as a senior research engineer at General Motors Research and Development in Warren, Michigan. Basnayake’s an expert on GPS (Global Positioning System) technology and was part of the team that designed the very first prototype vehicle positioning system for Vehicle-to-Vehicle (V2V) active safety technology.

That laid the groundwork for the next big job—enabling vehicles to sense their surroundings by talking to each other and, eventually, to drive themselves.

Imagine your car telling you how many seconds remain before a traffic light changes; warning you not to change lanes if there is another vehicle in your blind spot; communicating with other vehicles to merge onto a busy freeway smoothly and safely; getting you anywhere you want without you laying a finger on the steering wheel or tapping the brakes. It sounds like science fiction, but most of it will

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be possible in as few as 20 years, according to Basnayake.

Basnayake studied civil engineering at the University of Moratuwa in his home country of Sri Lanka. His passion gravitated towards making cars intelligent: finding ways to actually make them communicate with each other, making roads safer and traffic flow more efficiently in the process. For that, he needed expertise in geomatics engineering.

“I was looking for graduate study opportunities in intelligent transportation systems and related fields and I realized knowledge of its key enabler, GPS, was the way to go,” he says.

In 2001, Basnayake arrived at the University of Calgary, which houses the world-leading Position, Location and Navigation (PLAN) Group at the Schulich School of Engineering. After studying under the supervision of Gérard Lachapelle, Canada Research Chair/iCORE Chair in Wireless Location and completing his PhD, he joined General Motors in 2005.

At 35, Basnayake has already received three top awards from GM R&D and GM OnStar. He also made the 2009 list of Leaders to Watch in the Global Navigation Satellite Systems (GNSS) industry compiled by GPS World magazine. He heads up the GPS-related R&D work in a consortium of five major car companies which was formed to do the groundbreaking prototype development work and standardization of the technologies. It means all vehicles on the road will “speak” the same language.

“One day you won’t have to worry about figuring out what turns to take, what highways to take, and how to avoid other cars, pedestrians and cyclists. Our cars will get us to where we are going safely and with a minimal amount of work on our part.”

Accomplishing this involves a combination of GPS, sensors and complex computer algorithms, which enable different types of technology to work in sync. A major focus is on developing active safety systems and collision avoidance systems. Basnayake has come up with ways for vehicles to communicate with each other and with infrastructure such as intersections and bridges to make cars “aware” of their surroundings and location—and the location of other cars—at all times.

“I can see myself doing this for at least the next 10 or 15 years, until we get past all the hurdles and get the technology to a point where the rest is going to happen automatically,” Basnayake says.

Basnayake’s work isn’t all about the positioning, navigation and location of cars, however. He is also a technical advisor for the charity Leader Dogs for the Blind. The group equips visually impaired people with the latest gadgets, including GPS devices that help them navigate safely.

“I was part of building the basic positioning technology and now other people are using it and developing other applications for it,” says Basnayake. “It’s enabling a lot of others to do a lot of different things. It’s a great thing to see.”

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