IR PODCAST

IBM AND THE FUTURE OF DRIVING

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Jim Ruthven and Dr. Roberto Sicconi are two of IBM's most enthusiastic experts on how I/T is changing cars and how we drive them. In this IBM podcast, they discuss how voice-recognition technologies, telematics, new user interfaces and sensing technologies are coming together to change the way we design, build, drive, maintain and insure our cars.

NARRATOR: IBM Podcast.

[MUSICAL INTRO]

EDWARDS: I'm Ben Edwards. Few machines have ever been as widely used or as symbolic as the car. Far more than just a way to get from A to B, cars are symbols of power, status, even of individual freedom.

Computers are becoming a bigger and bigger part of the cars basic infrastructure. And IT is changing how cars are built, sold, maintained and repaired. It's changing how traffic patterns are managed, it's changing the information and entertainment available while we're driving, even how cars get insured.

On this Podcast we're going to be speaking with Dr. Roberto Sicconi and Jim Ruthven. Roberto, who works in IBM Research, is an expert on interior design and automotive cockpits of the future. Jim puts together telematics solutions for IBM's automotive clients.

We're calling this Podcast, The Future of Driving. Welcome, gentlemen.

SICCONI: Thank you.

RUTHVEN: Thank you.

EDWARDS: Thanks very much for being with us today. How prevalent is computing in today's cars?

RUTHVEN: I would say over the course of the last decade or so we've seen an explosion of computing inside of vehicles. We've gone from vehicles that were primarily mechanical in nature to vehicles that today anywhere from 30 to 40 percent of the value of the vehicle is tied up in the electronics and the software. General Motors is on record as saying that the value of the electronics is more than the value of the steel associated with the vehicle. And so we've really crossed the chasm in terms of how computing is impacting the automobile.

SICCONI: The other thing that is very important is, the quality of the user experience has changed over time. Among other technologies that are getting into the car, speech recognition has made an appearance not too long ago and now is getting much more pervasive. It initially was meant to replace simple buttons, but now people are getting used to it.

RUTHVEN: If you think about menu-driven kinds of applications in services, right, voice technology and some element of artificial intelligence will allow automakers to create a much more personalized experience in their vehicle and a much simpler experience in their vehicle. But when you look at the power of this technology to actually be able to take diagnostic information, information about how vehicles are performing in the field, get that information into the hands of their engineers so that they can use that information to either tweak the vehicle in such a way that the consumers are using it to make it more usable or fix quality problems that are occurring in the vehicle so that they don't occur on a pervasive basis, then you really start to get at the power of it and what automakers are trying to drive from their perspective.

EDWARDS: Let's look at the world from their perspective. Why don't we start with automotive design. How is computing, the application of IT, changing, and how is it going to change the way the automobile industry designs cars?

RUTHVEN: I think you can look at it from a number of perspectives, right? Clearly computing technology in the design of vehicles has been around since the 1960s, but IBM was one of the first companies working in conjunction, frankly, with General Motors, to create computer-aided design systems for vehicles.

The advent of things like telematics and the ability to pull real-time information on how vehicles are being used in the field and delivering that to engineers is a relatively new phenomenon.

Automakers used to have to do either test vehicles, or test beds, or provide their employees with vehicles. But they never had access to the real-time data about how their vehicles were performing in the field.

We're working in particular with truck manufacturers. In a particular truck manufacturer here in the US, International Truck, who in one of their pilots was working with a company that upfitted their chassis and their engine capability with tow truck features, things like winches on the front, hooks on the back, the ability to swing the hook back and forth.

And by having the access to this real-time data on vehicle performance they were able to counsel the tow truck purchasers on whether or not they should buy winches. They were buying them for 100 percent of their vehicles; well, it turns out they don't need them on 100 percent of their vehicles because they were only being used 25 percent of the time.

SICCONI: Actually, having access to real-time information can make the speech interface much more powerful. One of the things that is happening is that they're moving from

one-way communications, if you wish, where you talk to the car and you expect the dashboard to perform things that you are asking, to real dialogue systems.

In that case, the dashboard is going to talk back to you, and it becomes like talking to a passenger sitting next to you that you can interact with, can look for information for you, can search things, can play back things for you.

The problem is that you want the passenger to be smart. And think about what you are asking to do, and sometimes possibly not do what you are asking because the situation is such that you should not continue doing what you were doing.

So you want the passenger -- the virtual passenger -- to be aware of what's happening in the car. So all the information coming from speed and acceleration, deceleration, brake signals and other things that you can measure and detect in the car, for the same reasons that Jim was referring to, can also be used as a way to estimate the stress level of the driver in a particular situation.

And that can change every fraction of a second. So the dialogue manager has to take that into account and then decide which messages should get through, which ones should be put on hold and played back later; which services should be offered at some speed and which ones should be denied until you are in a quieter situation.

EDWARDS: So talk us through that technology, Roberto. I mean, first of all, how far off are we from sort of mass adoption of that sort of two-way interaction between the car and the driver?

SICCONI: Two-way interaction is not available in the market yet, but I would say we're getting close. We have prototypes running on the street, we are testing it, we're testing usability issues.

The first thing that happens when you have an entity talking to you is that you're starting to decide whether you like it or not. If you don't like the voice, if you don't like the style, if he's talking too fast, too slow, is not saying the things you're expecting, then you're immediately going to hate it.

And if it's something that's part of your car and you listen to it every day every time you use your car, then it's not going to take long before you go into the dealership and ask to shut down the damned thing.
[LAUGHTER]

So we have to be very careful not to overload the user, not to stress the user, be very sensitive to signals we can detect. The driver himself -- we are starting some work on evaluating emotion with motion detection of the user so that we can tell if the dialogue is going in the right direction or not. And if it's not, we may want to change strategy.

EDWARDS: Isn't that going to be a little distracting, or um ...?

SICCONI: It depends on how you manage it. I'll give you an example. Some of our customers have asked us to be able to not only play back e-mails or messages but also dictate and send them out.

And I understand how useful and powerful it is, and I must admit that occasionally I do it on my Blackberry by using...single handedly. But that's very distracting.

I wish I could do it by voice. Now, the problem is that if you do it by voice you have an additional aspect. Dictation per se requires a lot of attention. So even if you do it right, if you pass a certain

speeds, I would advise people not to do it. So if you have the information about the speed in the car you may say, this service is not available at this time.

EDWARDS: Oh, I see. So this will cut out automatically under certain driving conditions, in the wet, when it's snowing. I see.

SICCONI: For example, yes. So you might be able...

RUTHVEN: That was actually one of the scenarios.

EDWARDS: Is that right?

RUTHVEN: Heading into a hairpin turn, right, on a wet, slick street is not the time you want to get the e-mail that says, your stocks just went down 15 percent.
[LAUGHTER]
That's a bad thing.

And so one of the scenarios we drew up in conjunction, a first of a kind with Ford, right, was, can you...can you eliminate functions or quiesce functions when it's not the appropriate time to receive them.

EDWARDS: So what sort of new challenges does the spread of IT in cars throw out for the auto industry?

RUTHVEN: One that's not necessarily in the public mind but clearly an issue for the automotive manufacturers is, how do you take all of these complex electronic systems and put them together in such a way that they can work together?

We talked about the increasing complexity from a driver point of view, but from the assembly process, we note that over 50 percent of the quality problems associated with vehicles in the automotive industry are as a result of electronics and software.

Wow, that's a big number. And while they can get specific control units reliable, making the system work as a system becomes a bit more complex, especially when you're not used to thinking in that way.

And so you've got problems where vehicles will be driving down the road in the rain with the wipers going, they turn on the left blinker and the trunk pops open. That was an actual problem. It took the company six months to figure out that it was the interaction between various electronic control units on the bus, on the electronic architecture inside the vehicle, that made that occur.

Now, there's a company out there that over the course of their history has learned how to take electronic control units from a variety of different suppliers, architect them on a bus, integrate millions of lines of code from the different suppliers and control them in a very rigorous fashion. And that company is IBM.

EDWARDS: So why don't we go on now to telematics and how telematics sensing technologies are going to be applied?

RUTHVEN: Well, the business model was actually an interesting thing. We learned a lot as a result of our experience in telematics.

IBM's been in the telematics business for almost a decade now. We started with concept vehicles, with major tier 1 suppliers in 1996. So we're one of the oldest companies that has been in the telematics business from this perspective.

Along the way our thinking has evolved in terms of how the marketplace is evolving and what it takes to make up this marketplace. One of our first learnings was that it's an ecosystem, that a variety of companies...that no one company is going to dominate the telematics marketplace or create an end-to-end telematics solution...

Because the things that people want and the things that companies want are so broad and so diverse that one company can't provide it all. So consumers want access to infotainment and information while they're driving in their vehicle, and they want targeted information and infotainment. Right? That's one whole set of partners that needs to be brought into the picture.

Automotive companies want to be able to service the vehicle and they want to be upload and download software updates to the vehicle. That's a whole nother set of partners.

And so this notion of, one of the things we learned was there's this notion of an ecosystem out there, and that in order to accelerate the development of the ecosystem standards were absolutely required.

And it was really one of the drivers that got IBM into this whole notion of open standards.

EDWARDS: And why do you need open standards in telematics systems?

RUTHVEN: In the automotive industry, automotive companies fear being locked out of their own architectures. And so in order to ensure that they have the flexibility and control over the architecture inside of the vehicle, they insist on either themselves having proprietary control of that architecture or purchasing and procuring products and services that have...that are based on open standards so that they have flexibility and choice.

EDWARDS: So you create a community of suppliers who compete to win your business.

RUTHVEN: Absolutely.

SICCONI: Yes. The interesting thing is in the past every car manufacturer used to be very jealous about the end-to-end architecture, until they discovered that [the] forced them to stick to a particular set of suppliers and that killed any attempt at competition.

So to be able to have other competitors who play at the same table they have to open up the interfaces. And that required many car manufacturers to talk to each other and agree upon opening up the standards, which took a long time.

EDWARDS: So in general, Roberto, I mean, how mature is the technology that enables telematics solutions? Is it all there? Is it all mature? Is it all at the right price point for mass adoption?

SICCONI: It depends on the functionality. If you talk about the ability to detect where the car is and report it centrally, which is basic support for emergency services, for instance, it's cheap enough to be put into every car. As a matter of fact, there is one car manufacturer in Europe who is thinking of providing basic telematic services to the entire family of cars.

So the cost of the basic technology is getting to a point where you don't have to think twice before doing it. What has held it back was the fact that there is a connection cost, and somebody has to pay for it.

So you have to find the right business model that pays for the service; you don't want to have to ask the customer to pay for it.

RUTHVEN: So you asked two specific questions, really. One is, is the technology there -- I think the answer to that question is absolutely yes, and it's in production. And is it cheap enough? And the answer is yes, depending on whether or not the vision of the company that's doing the implementation is broad enough to incorporate all of the industries and all of the applications that are enabled as a result of the technology.

So this goes kind of back to what we were talking about before about our learning. One was the ecosystem, the second thing was, this is about business. The original application for telematics was infotainment, and people were going to charge subscribers tens of dollars a month so that they could get personalized news, weather, stocks and sports in their vehicles.

And that model frankly didn't work. The dot-com bubble happened, that model got blown away. But what automakers were left with was, hey, we've got this technology, we've got this capability to connect. And interestingly enough, other industries will now beat a path to our door to take advantage of this ecosystem or infrastructure that we're building.

The first was insurance -- the ability for insurance companies to understand how vehicles were being driven, where they're being driven, and at what time they're being driven...

SICCONI: And how fast?

RUTHVEN: And how fast they're being driven, there's to the how, right?

Enables them to be able to be much better in terms of gauging risk. The better that they can judge risks, the better they're able to tailor an insurance policy to meet your specific driver requirements.

Now, depending on where you fall on that curve you may or may not like that trend, right? My mother, who drives back and forth to church every Sunday and that's about it, would love the fact that she could get a tailored insurance policy for her.

My son, who does not drive only back and forth to church every Sunday and probably exceeds the speed limit, is on the other side of that equation.

And so depending on your driving habits there will be a...what I...not an adverse selection but a positive selection by companies that are able to implement this. And so IBM is working with a company in the U.K. called Norwich Union, now actually implementing this for drivers in Ireland first, right, to get a handle on the risk associated with driving in Ireland and put together insurance policies.

Governments are very interested in using this infrastructure to do things like reducing emissions -- the ability to provide emissions credits to fleets that implement this technology and are better able to maintain their fleets to reduce the amount of emissions that go into the air provides them with economic benefits. And so they're interested in writing off of this infrastructure.

So it's like any ecosystem in the world, that once that ecosystem is built there are a variety of industries. And that was our third big learning. It's not just about automotive companies; it's about a variety of industries.

EDWARDS: Five years, let's just say five years from now, I step into my car, I'm just sort of...it's a kind of midrange car, I open the door, I step in. What's...what's...what's my experience going to be like driving that car that's different than today?

RUTHVEN: I think some of the changes you won't notice. Software problems that you used to have to take in to the dealer to be fixed you won't have to take into the dealer to be fixed, because they'll a) know, and b) fix it before you know. I think the user interface will be better.

SICCONI: And it may also make you feel like a better pilot. There are systems today, that they can compensate for mistakes that the drivers are making: lining the car in the lane, making sure that certain things are not forgotten.

So, essentially taking care of the little mistakes that people may do if they are thinking something else or just are plain beginners.

EDWARDS: So safer.

SICCONI: Right.

RUTHVEN: You may have, depending on the vehicle we're starting to see today biometric capability. As you walk up to the car it knows that it's you, and it will automatically adjust it to your favorite radio station or...the experience will be more personalized, it will be safer.

And so the car that you climb into in five years will probably have the ability to sense that vehicles around you are swerving out of their lane, and either notify that driver or notify you that that's occurring, before you might even recognize it.

SICCONI: The question is whether you want your insurance to know that you recently...

[LAUGHTER]

...fall asleep.

[LAUGHTER]

RUTHVEN: Bingo.

EDWARDS: Well, it sounds like driving has a most interesting future. Jim Ruthven and Dr. Roberto Sicconi, thank you very much.

SICCONI: Thank you.

RUTHVEN: Thank you.

[END OF SEGMENT]