

Ask your car radio!

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In the future, drivers will be able to conveniently retrieve information from the Internet using “natural language.” This has been made possible by a new technology that automatically generates voice applications from Internet information and transmits it to the vehicle via radio signals.

It’s just not your day. You drive by several low-priced gas stations and then, just when you’re on the point of running out of gas, you wind up at a pump where a liter costs five cents more. “Just my luck,” you say to yourself as you reach for the nozzle. But it could all be different in the future. Tomorrow’s drivers will ask their car radio for the locations of the cheapest gas stations along their route. What currently sounds like a fairy tale could one day become a reality. “SmartWeb Vehicle” is the new mobile information system that interacts with drivers in natural

language.

While you drive, the system searches the Internet for any potentially useful information. If you want to know which gas station in Dortmund has the lowest gas prices or how many goals Schalke 04 has scored, you can use SmartWeb Vehicle to retrieve this information from the system by means of voice input. Although it sounds simple, it involves a number of sophisticated technologies that have to be combined into one operational whole. The new system is being developed by experts from the Siemens Corporate Technology Division (CT) in Munich and engineers from the Fraunhofer Institute for Device Architecture and Software Technology (FIRST) in Berlin. The vehicle prototype from the SmartWeb project will be on display for the first time at the CeBIT computer trade show March 9-15 in Hanover. The exhibit can be found in Hall 9 at the BMBF's Human – Technology – Interaction booth A44. Sponsored by the German Ministry of Education and Research (BMBF), the SmartWeb project involves fifteen partners from industry and research cooperating on a utilization of the semantic web under the direction of the German Research Center for Artificial Intelligence (DFKI).

The vehicle system is divided into three basic areas: The first area includes the analysis of data from the Internet and its automatic processing into voice dialog systems. This process is supported by software that is capable of combining individual items of information into sentences and of breaking down spoken sentences into semantic units in order to understand them. The result is natural-language interactions between humans and computers where voice input no longer has to be restricted to a preset menu. The second area of the vehicle system involves transmission of this information to the car via radio signals based on the “Digital Multimedia Broadcasting” (DMB) digital transmission standard. The third step in the overall process is the actual interaction between driver and device in the car.

The researchers in Munich use a “crawler” to generate the voice dialog systems. This type of program searches the Internet for specific information on Web sites. The information that is most relevant for SmartWeb Vehicle is in table form, whether it’s Bundesliga lists or tables of the cheapest gas stations. Once the system finds an appropriate table, the program automatically converts it into a voice dialog application by accessing a phonetic lexicon, as well as a voice model that was automatically generated from the contents previously compiled from the Internet.

Instead of using traditional analog radio signals, the voice dialog application is transmitted by means of the new DMB standard, which is largely being tested and expanded by the Fraunhofer FIRST institute.

SmartWeb Vehicle is not a traditional search engine like those available on home PCs. Users don’t address random queries to the on-board device in their car. Dr. Hans Ulrich Block, head of the “Natural Language Understanding” associated center of expertise at CT, describes it this way: “Besides the usual traffic reports, in the future radio stations equipped with SmartWeb Vehicle technology will also be able to transmit voice dialog applications providing, for example, information on traffic checks or gas prices in the region.” The SmartWeb Vehicle demonstrator at CeBIT shows how this works. As soon as the vehicle enters a radio transmitter’s SmartWeb reception area, an Internet icon appears on the meta-dialog manager’s graphical user interface. To retrieve information, the driver touches the screen or speaks the words “Internet information”. An information menu is then displayed listing all the menu options offered by the radio station via digital radio technology. After selecting an option, the driver can retrieve the information from the on-board device by means of voice input – for example, “Which soccer player has scored the most goals this season?” or “Where is the cheapest gas station in Dortmund?” The Siemens dialog engine responds in complete sentences. With SmartWeb Vehicle, the

individual on-board device doesn't access the Internet directly for each query. Instead, it downloads all the Internet information stored in the radio station's central server in a single operation and then updates it occasionally. The voice dialog is between the driver and the on-board device, meaning that the driver receives the latest information retrieved from the Internet without having to use chargeable mobile telephone connections.

Another special feature of this system is the ability to view video data on the screen. In the future, for example, passengers will be able to browse the "TV programs" menu option and watch the programs currently being broadcast. At CeBIT, visitors will be able to choose between two programs on the demonstrator. According to Friedrich Schön, Head of the Embedded Systems Department at the Fraunhofer FIRST institute, "We can transmit various types of information using the new DMB standard, including traffic reports, electronic newspapers and videos. With SmartWeb technology, we're now able to link data intelligently. The driver can simply retrieve the information from the on-board device on demand." Block estimates that SmartWeb technology in vehicles will be ready for the market in about ten years. This will mean more relaxed travel for drivers, who will be provided with precise information on their current location or the latest news from the world of sports, all in the course of an informal conversation with the on-board device.

Source: Siemens AG

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