

Robodog helps blind see in shops

Pippa Wysong



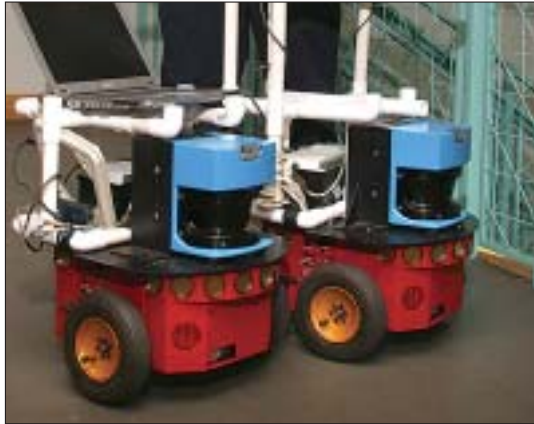
Vladimir Kulyukin

ROBOTS that guide visually impaired people through complex places, such as grocery stores or airports, may be close to becoming a reality. In fact, researchers in the US have a working proof-of-concept prototype that not only guides blind people through grocery stores, but also takes them directly to the products they want to buy.

"In most of the media coverage of our technology it is referred to as a robotic seeing eye dog, which is a misnomer. The device is not intended to replace seeing-eye dogs."

"Many aspects of this technology are in place," said Vladimir Kulyukin PhD from Utah State University. He and his colleagues in the Computer Science Assistive Technology Laboratory of Utah State University have built a prototype robot that allows blind test subjects to do grocery shopping unassisted.

Shopping for groceries provides extra challenges to the visually impaired because products are often moved to different shelves, or cancelled, meaning blind people can't find the items they want unless they ask somebody. It's the sort of effort that white canes or guide dogs can't help with.



Courtesy of Vladimir Kulyukin PhD

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Blind people have a special relationship with their dogs, plus the dogs are able to guide them in outdoor environments. The robotic guide is intended for specific enclosed environments such as airports or large shops.

Radiofrequency tracking robotic base

The main part of the robot consists of computer equipment and a radiofrequency tracking devices mounted on a commercial robotic base. The person using it would first use a Braille list that has the names of items in the store available for purchase, along with code numbers. For instance, Colgate toothpaste might be number 23. Users would then use the computer keyboard to type in the code numbers for the products desired.

Then the robot plans a path and goes to that item in the store. The user holds onto the robot and is guided through the store, directly to the shelf sections that have the desired products. A voice from some small speakers tells the user when it is about to turn left or right.

The second part of the device is a series of small discs that are mounted on shelf sections throughout the store. The discs contain information about the product it sits next to. The robot senses the discs, and directs the user to the correct product.

"Those discs are radio frequency identification tags, RFID. They are very small and are so-called passive sensors," Dr Kulyukin explained.

The need for radio frequency identification tags is another reason the device would not be used outside, it would be next to impossible, and costly, to place the discs everywhere they would be needed.



Sachin Pavithran, a visually impaired assistive technology specialist at the Utah State University Center for Persons with Disabilities, tests the robotic guide in Lee's MarketPlace, a supermarket in Logan, Utah.

Hopefully, some day soon, the robotic device "might be added to the fleet of assistive devices in grocery stores," he said.

In the US, numerous large chain stores, such as Wal-Mart, have assistive devices available for people with mobility impairments. Devices include wheelchairs and special carts to help with shopping.

While the prototype has passed various tests, the robotic device is not yet available in stores.

"Right now we've approached a grocery store that belongs to a large chain. If they give us permission to use their floor for trial tests, we will deploy it in

their grocery store 24 hours a day, seven days a week," he said.

Another environment the robots might be useful in is airports. They could help blind people find terminals, restaurants and public toilets. It could even be made into a cart with a seat that the person would ride to their destination within the airport.

The prototype robotic device cost US\$15,000 to make.

However, once it is mass-produced the cost should come down to about \$5,000 each, Dr Kulyukin said. There are 11-million visually impaired people in the US.

Robots can be versatile helpmates

Because most customers in a shop are sighted and don't need the device, the robot may have some additional capabilities in the future. To make the device more appealing to stores, it can help staff move goods around.

"It can, for example, be used to help grocery stores automate their internal delivery operations. You can pile boxes on the robot, or attach a cart to it then the robot will be carting them all over the store. It will optimise internal delivery operations. And when it needs to guide somebody, it'll guide somebody," Dr Kulyukin said.

"It can be used to help grocery stores automate their internal delivery operations."

As far as he knows, this is the first robotic guide device of its kind for the blind, though there have been other types of robotic guides developed.

One such robot guide is the RHINO robot, which was used for a while at the Deutsches Museum, Bonn, a contemporary technology museum, in Bonn, Germany.

RHINO, a mobile robot, took visitors around the museum and stopped at specific displays. Recordings described what the displays were. On request, the robot would even provide visitors with additional details of exhibits.

The RHINO robot was developed by researchers at the Rheinische Friedrich-Wilhelms University at Bonn, and the Carnegie Mellon University in the US.

Vladimir Kulyukin PhD
vladimir.kulyukin@usu.edu

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