Assistive system for Blind People on Shopping

Karen Duarte, José Cecílio, Jorge Sá Silva, and Pedro Furtado

Department of Informatics Engineering
University of Coimbra, Portugal
ksduarte@student.fisica.uc.pt
{jcecilio,sasilva,pnf}@dei.uc.pt.com
http://www.uc.pt/fctuc/dei/

Abstract. An assitive system to assist blind people on shopping is proposed. *abstract* environment.

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1 Extended Abstract

Public buildings are changing constantly, often people have to take different routes to reach known destinations. New spaces and services are appearing or disappearing according to the market roles. This feature is clearest on shopping centers, as brands and store owners are constantly changing spaces, structures and services to attract and please customers. These changes are almost always signaled and labeled with visual marks and signs. Sometimes other useful information is available through visual means. In this context, blind and partially sighted people are deprived from a strong and widely used information channel, leading to their exclusion from the society.

In this context we propose an assisting technology to help visually impaired persons on theirs trips to public buildings, particularly in shopping centers. The system incorporates robust knowledge capable to guide a person to a specific destination or even to choose one.

Currently, there are several systems designed to assist visually impaired persons in supermarket. For instance, ShopTalk [1], BlindShopping [2], RoboCart [3] are systems designed to help visually impaired people finding specific products inside a supermarket. Those systems guide the user to the desired product with voice based instructions. Typically, they were designed for specific hardware and cannot be easily applied in other contexts.

Different systems based on RFID technology [6] were also proposed to assist visually impaired persons (e.g. BlindAid [4], Smart-Robot [5]). They allow users to travel through the space and to find objects or points of interest as long as they are tagged with an RFID identifier. Each tag is documented and has associated a voice instruction used to guide users. The users device consists on a RFID reader and a headset. A central server is used to perform decoding of

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identifiers and send back the users device the respective information. Outdoor positioning is also supported by some of those systems, using GPS signal.

The main objective of our system is to provide all the information to blind people that they may need to comfortably use public spaces. Our system improves the autonomy, and thus self-esteem, of visually impaired people by enabling them to explore public spaces without the need to ask for help. Another valuable feature is that the user's device is the personnel smartphone, dispensing the cost of learning to use a new device.

The whole shopping is equipped with Bluetooth BLE devices that provide shop and services information. The Bluetooth signal is also used to determine the user positioning. All visual content is translated into textual information and stored into a database. An internet of things infrastructure and synthesizer are used to retrieve the most important information from the database and translate it to voice tips.

The proposed system is composed by four different modules with different characteristics and functions. Voice Module: responsible for the voice interface, remarking the importance of a touch independent and visual independent interface as the system is designed for blind and partially sighted people. Information Module: responsible for providing information about spaces, products or services available. Categories and subcategories are used to cluster points of interest, and one has associated a concise description that may be delivered to the user. Location Module: monitors user's position constantly. It uses Bluetooth BLE technology using a hybrid approach with signal strength and signal recognition for short range emitters. Route Module: responsible for the creation of a weighted graph and the elaboration of routes to guide the user.

In this work, an assisting system based on Bluetooth and normal smartphones is proposed. It aims to enable blind people to autonomously go to an unknown public building and explore it, without feel the need of asking for help.

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