Chapter 22
BlueEyes:
A Pilot Project and a New Way to See the World

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ABSTRACT

As reported by the World Health Organization, an estimated 253 million live with visual impairment that cannot be corrected with glasses or contact lenses. It's necessary to bring awareness and understanding of the challenges blind people face and help to motivate research into new technology to answer those questions. This chapter starts to identify the challenges people with visual disabilities face in their life. The problem of navigation and orientation as well as the different possibilities to deal with the loco-motion situation is also addressed. It describes the traditional navigational solutions as well as other which involves more sophisticated technological devices and their multimodal interfaces. The chapter ends with the description of the BlueEyes project, consisting in a solution using beacons to help blind people moving in a city. The phases of the project are described, and the actual research situations is also slightly explained.

1. INTRODUCTION

The challenges of being blind are in everyday activities like reading, cooking, shopping, going outside, using the internet, withdrawing money from an ATM, determining how much of a liquid is in a glass, handling cash, among others (Andress, 2015). According to the research, "eighty to eighty five percent of our perception learning cognition and activities are mediated through vision" (Politzer, 2015). So, all

the corresponding activities represents a challenge for a person with vision disability and the difficulty to overcome it, can lead to isolation, loneliness and bring along emotional, social and financial impacts on her/his life. Within these varied challenges, it is possible to group them in two lifelong challenges: accessing the world of information and navigating through space. Society has done a far better job of opening the world of information but it has just started to identify and analyse the serious navigational limitations the blind travellers normally face. Unfortunately, these limitations are the ones that have a severe and bigger negative impact on their life development (Baldwin, 2015).

Currently, technology is a way to support some of their needs and has the potential of improving in a certain extent their life. In fact, it can be stated that today's infrastructure technology is accessible to facilitate blind people to join school, jobs and in leisure activities on a par with sighted peers. On the other hand, there is no such progress concerning blind navigation and therefore, management of mobility and orientation represents still a big and important challenge which needs to be addressed and supported by technology (Baldwin, 2015). Reduced visual capacity challenges people's spatial problem solving every day and, in many ways, e.g. how to obtain, recognise, understand, and process information needed in the environment. Indeed, wayfinding can be very stressful and can cause anxiety and become a strong reason not to leave home if it is necessary to visit unfamiliar or complex places, such as shopping malls, train, metro and bus stations, among others (Saarela, 2015). It is vital that public places and community settings will be designed to be secure, as inclusive as possible and accessible for all. It is in this context that the BlueEyes project arises, enabling an easy navigation with the help of objects that already integrate people's daily lives, such as smartphones, allowing a navigation as intuitive and natural as possible. The use of beacons and the associated research foreseen in this project will be of great use not only in the BlueEyes project but certainly in other future projects linked to internet of things.

This chapter is divided into five main sections. First, the introduction of the problem is done, second some theorical information and framework related to current tools and projects to assist blind people in navigation (section 2) and related to multimodal interaction design (section3) are presented and discussed based on literature. In section 4, the BlueEyes project is considered, the main tasks were described and the beacons technology is introduced. In the last section, some conclusions and further work is done.

2. CURRENT TOOLS AND PROJECTS TO ASSIST BLIND PEOPLE IN NAVIGATION

As mentioned before, one big challenge blind people face in everyday life, is mobility and orientation. Orientation refers to the "ability of understanding the spatial properties of an environment and being aware of one's position and his/her relationship with the surroundings"; on the other hand, mobility indicates the "capability of efficiently and safely moving in an environment (e. g. in a city by using public transport) (Giudice and Legge, 2008). As a result, visually impaired people usually are dependent on other sensory information in order to avoid obstacles and to navigate. There are many ways for a visually impaired person to move in the environment. Here are the 5 methods which they used most: (1) Unaidel Travel Techniques, (2) Human-guides Techniques, (3) Cane Techniques, (4) Dog-guides Techniques and (5) Sensory Guidance Devices. In order to get an overview of the current tools which helps blind people in their navigation, these five methods are grouped/ divided in two general categories (Baldwin, 2015): Traditional Systems and Assistive Technology.

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