Editorial

"VisionTouch Phone" for the Blind

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Abstract

Our objective is to enable the blind to use smartphones with touchscreens to make calls and to send text messages (sms) with ease, speed, and accuracy. We believe that with our proposed platform, which enables the blind to locate the position of the keypads, new games and education, and safety applications will be increasingly developed for the blind. This innovative idea can also be implemented on tablets for the blind, allowing them to use information websites such as Wikipedia and newspaper portals.

Keywords: *Blind, phone, mobile, innovations*

Introduction

Blindness is undoubtedly one of the most challenging handicaps that a person can face. Sadly, the World Health Organisation (WHO) reports that over 285 million people suffer from visual impairment worldwide. The Malaysian Association for the Blind has over 10 000 registered members.

Despite rapid technological advances, little progress has been made toward improving the well-being of the blind. In recent years, the handphone has been reduced in scale from the size of a briefcase to something small enough to be worn as a watch. However, the blind still depend on conventional handphones with physical keypads because they are unable to interface with modern touchscreen smartphones.

The features and countless numbers of applications available for smartphones would be useful to the blind were they not limited by the touchscreen interface commonly employed on smartphones. For the purposes of social obligation, some phone manufacturers have designed phones with special keypads and floatable embossed screens for the vision impaired. However, these products are typically sophisticated, expensive, and unaffordable for the blind community, the majority of whom belong to low income groups. These challenges diminish the possibility of enabling the blind to utilise smartphones. However, the VisionTouch's innovative and economical approach provides a new horizon for smartphone use by the blind.

Mobile telecommunications have revolutionised our lifestyle by making communication easier and more affordable. Unfortunately, visually impaired individuals cannot enjoy advances in technologies such as the smartphones because the blind rely on tactile sensations to use mobile phones with analogue keyboards (Figure 1) by feeling the keyboards with the tips of their fingers to input commands. This tactile method of input is slower and possesses a high margin of error (1).

Worldwide, 285 million human beings suffer from visual impairment (2). Current touchscreen phones available on the market do not provide sufficient tactile clues for a blind person to successfully navigate (3). Furthermore, despite

Figure 1: The conventional keyboard phones used by the blind.

the promising future prospects of voice command software, current implementations are typically primitive and cumbersome to use, being plagued by errors due to voice misinterpretation and background noise.

Smartphones contain a global-position-satellite (GPS), music player, browser with audio features, audio books, and many other features that are useful to the visually impaired. There have been numerous attempts to develop a smartphone for the blind by utilising voice commands, vibrations, and audio signals such as beeps and squeaks (4). However, because these features are typically available only as applications, the visually impaired remain unable to see the location of the digital key buttons and accurately touch a specific point on the smartphone screen. Hence, they are discouraged from utilising these technological advancements.

Meanwhile, an India-based start-up, Kriyate, created a Braille-enabled smartphone with a repressible Braille (Figure 2) display (5). The grid has pins that travel up and down, allowing the visually impaired user to touch them and read the corresponding information. Kriyate's potential breakthrough uses pins that form words and letters for the user to "read" through touch. The device, which is expected to sell for about $184, also produces sounds and vibrates as it carries out various functions (6). Like most inventions that use sophisticated technology, the innovation will be expensive to users. Because the blind are often low income, these devices may be out of their reach.

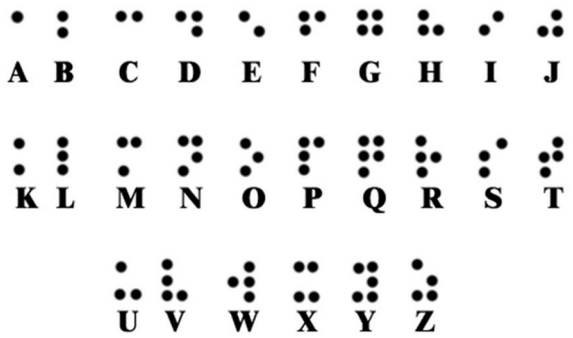

Figure 2: Braille is a tactile writing system developed by a Frenchman, Louis Braille, in 1824 to enable the blind to read and write. Using six dots, the user is able to construct any alphabet to form the words and sentences they desire.

How it Works?

The VisionTouch Phone – knowing where to touch

While others are attempting to create a new smart phone for the blind (7), our simple innovation has enabled the blind to use any smartphone with ease and speed. They are able to key in text as rapidly as a seeing person on their touchscreen smart phones! This is achieved by two simple steps:

1. **Download the 'VisionTouch'** application through the application store on Android. (The application will be available on other operating systems in the near future.) This application will produce the key button layout on the screen. The positioning and layout can be rearranged accordingly. (Figure 3a).
2. **Apply a stick-on skin** (any ordinary plastic screen protector for smart phones) with nine (8) in-depth markings (achieved using a paper puncher) that can be used to identify the position of the keys on the screen according to our application. The users are able to manoeuvre easily with one hand. (Figure 3b,3c).

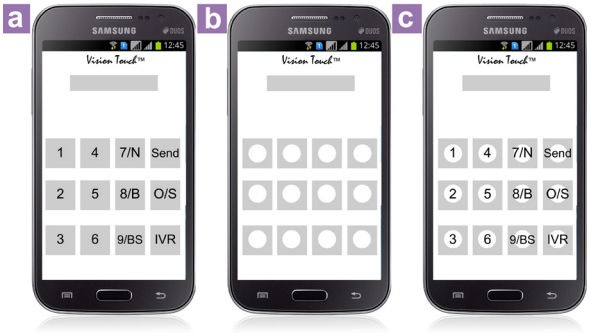

Figure 3: (a) A smartphone with the Vision Touch app. (b) Self-adhesive skin with embossed/in-depth markings. (c) A 'VisionTouch' phone touch screen with apps and skin.

Figure 4a,4b shows Mr Zahari Hashim trying out the 'VisionTouch' on an ordinary smart phone. He described it as an easy and practical approach by which the blind will find easy to master the smartphone.

Features

The user constructs the desired alphabet using the Braille system instead of choosing from the QWERTY keyboard. The Braille system enables the user to construct the desired characters using combinations of the 6 buttons.

A voice will pronounce the lettering constructed when the 'Next' button is pressed.

A voice will pronounce the word when the 'SPACE' button is pressed.

Future Suggestions

An embossed stick-on skin could be used to provide better tactile sensation for the user. With this simple method, the challenge of different screen sizes is solved.

New apps can be built and added to the Leaning Braille system by the user:

a. Digital guide-dog
b. SOS Help alert
c. Spelling games
d. Endless possibilities

Figure 4: Mr Zahari Hashim's experience with the 'VisionTouch BraillePhone'. (a) Using his fingers, Mr Zahari Hashim is typing 'Hello' on the smart phone. (b) The volunteer's expression while listening to the phone in reciting the text message that he just received.

Conclusion

The estimated price of a phone is as low as 150 USD. Developing the 'VisionTouch BraillePhone' as a Social Enterprise project allows us to provide free phones to the blind. Hence, a partnership with generous sponsors will enable us to provide a better tomorrow for the less fortunate.

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Conflicts of Interest

None.

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