Design and Implementation of a Smart Phone Navigation Application for Blind Persons

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Abstract. Recently, as Smart Phone popularized and IT(Information Technology) developed, there has been a variety of technologies and area which IT is applied. In this paper, it constructs and materializes a voice-based navigation application for blindness, using Android base Smart Phone. The navigation system uses TTS(Text-to-Speech) for blindness in order to provide a navigation service through voice. Also, it uses Google Map API to apply map information. This application tested its performance through Galaxy Player YP-GB1 based on Android 2.2. As the result, the voice support about map information has progressed favorably.
Keywords: TTS, Visually Impaired Persons, Navigation System

1 Introduction

There has been an increasing users of Smart Phones and IT technologies as these popularized and developed more. There is, also, an increasing number of handicapped users using applications or text messages through voice recognition of Smart Phone. There are many tools or products in order to help blind people to walk or move. However, there are troubles in providing practical supports and later, the products fail to provide support.

We could take Braille inducement block or Guide dog as examples. Braille inducement block has to be installed on every walking road. However, it is impractical to have the block on every single road and it can possibly lead to inconvenience for general people. Construction area for installing the block can, also, create a dangerous environment. In case of cane or guide dogs, they provide direct help in life activities and movement but in case of guide dogs, they require enough practices before giving help and interaction between the owner, blindness, is necessary. The application suggested in this paper uses TTS program and Google Maps APIs in order to provide navigation with voices

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2 Navigation System

2.1 Service Composition

The application developed in this paper functions through voices. Smart Phone recognizes the voices, search for destination, routes, and provide the route to the user through voice.

The functions of the application developed in this paper are as followed. The first function is to search destination through voice recognition and Google TTS service. After pressing 'search' button, users say the wanted destination according to the instruction. In case of unclear voice, the message saying 'speak once more' will pop up and users say the destination once more clearly. If the application asks for confirmation of destination, the users say, 'yes', if the destination is correct.

The second function is route research using Google Map. After users have confirmed the destination, the application materializes the map after searching for route from the current location of the user to the destination.

The third function is to guide the users with voice. Using DB of Smart Phone, it sees the route to the destination and it begins to guide by saying travel range, and direction for each section of the route.

3 Implementation and Results

The result of materialization is as followed. The 'favorite' button and 'search' button in order to provide search service by pushing 'search' button and saving the destination by pushing 'favorite' button for future reference. When users push 'search' button, it shows the screen for users to say the destination

After saying the wanted destination and confirming it by saying yes, when the application asked, the application notify the users by a screen that says searching and voice-alarm saying it will search for the destination. After the search has been finished, it marks the route from the position of the users and the destination on maps saved in Smart Phone DB.

When the destination was incorrectly said or accepted, the message saying, "no matching data" comes up on the screen, and the users simply push 'speak again' button to say the destination correctly.

After the route has been completely shown on the map, the application can guide the users after the users have pressed setting button on the device.

5 Conclusion

In this paper, it suggested a navigation application on Smart Phone based on Android. The developed service utilized Smart Phone DB in order to search route between the current location of user to the destination and provide a voice-

navigation. The test of the application functions were done on Galaxy Player YP-GB1 by using Android 2.2. As the result, voice support on route was successfully proven to work without any troubles. Further researches have to be continued in order to provide the users using Mapping, extra function materializations on buttons, and materialization on other software other than OS (iOS and others)

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