

Helpful Technology for Deaf People Based on Android Platform

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Abstract: Social communication is one of the most important pillars. It is well-known that the language is the only way to communicate and interact with each other. People with special needs are members of the society and have the right to enjoy the environment. This paper aims to provide an interesting application that guarantees ultimate communication with the disabled users and vice versa. The key feature of this application is that of using the Arabic language as a medium of communication. The power of this application appears in two aspects: first of all, the ability of normal people to communicate with the target language. This is either achieved by voice recognition of words or by typing the words in the Arabic language. The application is then displayed in the appropriate image (s). Secondly, and more importantly, people with special needs are the ones who can express their signs and thoughts. Consequently, the collection of images is transformed into a text. We evaluated our application by testing it on real deaf and dumb users. Realistic situations on realistic situations The early results are promising as all deaf found in the technology useful and 90% of them should be used on daily basis.

Keywords: Disabled people; deaf; assistive technology; sign language; mobile application.

1. INTRODUCTION

Deafness and hearing loss is the condition of incapability to hear things, either completely or partially. According to the World Health Organization, 360 million people worldwide (Over 5% of world's population) have disabling hearing loss where 32 million are children ("World Health Organization," 2015). According to General Census of Population and Housing, the number of people with disabilities was the second largest proportion in the distribution. Deafness has a deep impact on the quality of life for the deaf people and their community. Some people think that the intelligence of deaf and dumb people is less than normal people, but what we want to express is that this idea is not true! Deaf and dumb people have sharp intelligence that makes them equal with normal people.

Hearing disabilities differ from other disabilities, due to the presence of another language that compensates for oral or oral language. We can define the sign language, which is used by deaf and dumb people to communicate with each other and other people. Despite the existence of another language The communication between the disabled people and the people This is the reason for the misconception As human you would like to contribute by developing an android application to connect with special needs and other people

Assistive technologies cover a wide range of assistive, adaptive, and rehabilitative devices for people with special needs In the past 20 years, there has been a huge development in the sector of deafness and hearing loss assistive technologies. Assistive technologies are classified in hardware based, software based, and prosthetic implants 1. For many years, people have heard of telephone or telecommunications devices. Assistive technologies allow people who are deaf, hard of hearing, or speech impaired to communicate through a communications assistant (CA) with people who use a standard telephone A CA relays the TTY (text telephone or telecommunications device for deaf and hard of hearing people) 2,3 input to the telephone user and type TTY user to the person's response.

2. DESIGN AND DEVELOPMENT

The new system is comprised of several parts for learning, playing and converting the Arabic text to sign language and vice versa. The first part is used for teaching. Learning is attractive and organized in many groups Each group contains items that are related to each other (e.g. animals, friends and family ... etc). After selecting the group a list view and sign representation. Moreover, a clear explanation Fig.1. show the sequence diagrams for learning and converting signs to text choices. Fig.2. Display some screenshots of the learning and converting options. Clearly the system will refer to two sets of databases. The first database is the database that contains all images of the signs. The second database contains the equivalent meaning for every single sign.

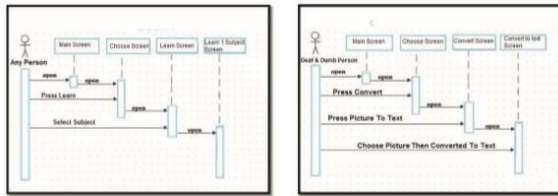


Fig1.Sequence diagram for learning and converting signs in to text

The new application provide an interactive Android game, which is based on finding the similarities between four pictures represent four different things in Arabic sign language. For example: fun, sorrow, restroom and doctor (indicate the word patient). Fig.3. shows screen shot soft he learning game .The proposed deaf game provides a new method to increase the knowledge of the signal language in a fun and attractive way. This game might motivate parents, friends, teachers and any normal people to learn the sign language in order to communicate with deaf person in the family, community or even in the classroom.



Fig.2. displays screenshots of the learning option and converting text option.

- (a) Choose the group
- (b) Learn a static signal language for every element of the group
- (c) Learn detailed sequence of how to move the hands and the facial expression to show signal.
- (d) Deaf person choose the sign images and the application will convert it to readable phrase.



Fig.3. Screenshots of the learning game.

In developing this application, the Android SDK and native development kit (NDK) were used. Android applications are primarily divided into two sections; Java source code and XML layout. The source code is structured via the Java package hierarchy and the XML layout. The XML value files that make up the bulk of non-code assets the application flow chart is simple and does not have many decision nodes, which makes the application fast and responsive.

3.RESULTS AND DISCUSSION

The three different ways First test was performed The second test was achieved by different phone devices. The third test was executed by asking 10 deaf individuals and 15 general volunteers to use the application .In the first verification test, the application was sent. All tests were performed for code verification and library checking on the application without any errors or bugs. No false positives or negatives were recorded. Sony Xperia Z2, Samsung Galaxy S4, Samsung Galaxy S6, and LG G2, which was tested on various devices. In this test, the application works properly

For the third verification test, we used usability test that gives the ability to use real-world users. 10 deaf or dumb people and 15 general volunteers use the application for more than a month. We have carefully created scenarios, or realistic situations for testing purposes. The subjects then tested if their signs are understood effectively and efficiently The questionnaire contains five simple questions with a scale of five answers (1 = poor, 2 = fair, 3 = good, 4= very good, 5 = excellent). The questions are designed to investigate if the application is easy to use. The last question to wish is to learn if the subjects are willing to use it on daily basis. Fig.4. depicts the histograms The resultsshowthat about95%ofthedeafanddumb were satisfied about the easiness of using the system. Interestingly, all the deaf people who used the application found the application useful and gave it 3 to 5 points and all of them were very excited about using it on daily basis. Moreover, the doctors specializing in teaching sign language have agreed that the idea of creating such application is beneficial for deaf, dumb and normal people at all levels.

4.CONCLUSION

In this paper ,I presented a mobile application to help deaf and dumb people in their daily activities .The key feature of this application is that the Arabic language is a medium of communication to learn all sign language terms. The proposed assistive application will allow people to communicate with them .The new application was tested on real deaf, dumb, and normal people. All the deaf and dumb found the application

5.ACKNOWLEDGMENTS

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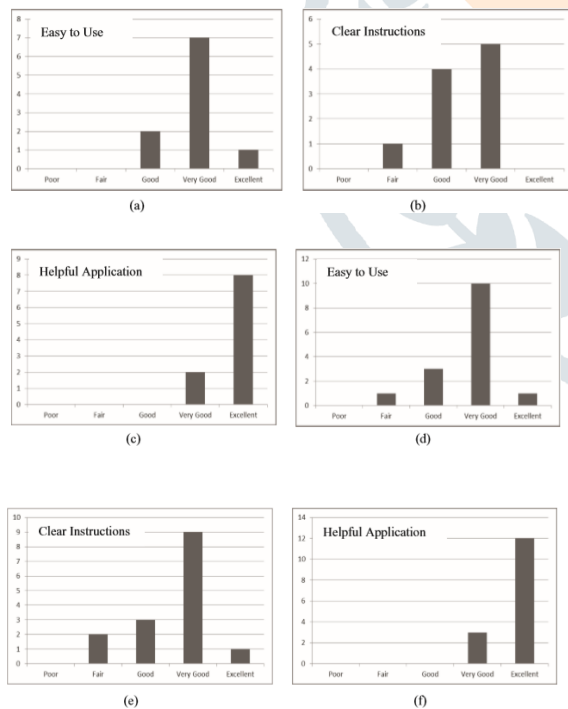


Fig.4. The histogram show the collected data.

- (a).Easy to use
- (b) Clear instruction
- (c) Helpful application collected from of the deaf and dumb people.
- (d) Easy to use
- (e) Clear instruction
- (f) Helpful application collected from normal people.

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