

The Development of E- Medical Interpreter during Hajj

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Abstract

The Government of the Custodian of the Two Holy Mosques presents services to pilgrims and visitors in all aspects. One of the aspects is to employ the use of technology for the development of services e.g. health care. Almalki et.al (2011) stated "The government of Saudi Arabia has given high priority to the development of health care services at all levels: primary, secondary and tertiary." Medical staff had communication difficulties with pilgrims of non-Arabic and English speakers, in getting accurate information of the patients' health history, diagnose of diseases, and the delivery of medications. Communication is considered a crucial element for patients' safety and quality healthcare, especially during Hajj season (Alabsi and Taha, 2014). Responding to the issue, and based on the previous research which has been done by (ibid, 2014), this research aims to provide a medical interpreter application supported with images and sounds of the most common languages among the pilgrims such as Arabic, English, French, Urdu, Hindi and Malay. The application will bridge the gap of communication regarding healthcare. A descriptive method and a rubric will be used as an instrument to collect data and evaluate the application in terms of its relevance, organization, usability, engagement, language, sound and images. The sample that the application was tested on were (50) doctors / nurses working in Makkah and Madinah hospitals.

Significance of the study:

The current study is significant for the following reasons:-

1. According to authors' knowledge, there has been no previous application concerning this issue.
2. Providing a medical mobile application to facilitate the communication with non- Arabic / English speakers of pilgrims, patients with special needs, and elderly patients.
3. Improving the patients' health care quality during Hajj and Umrah seasons. It also saves time and effort to present the best medical services.

Introduction

Since health is an important issue for all people, many health care applications, which are suitable to smart phones, have been produced during the last few years. Each application tries to help different healthcare such as Internal Medicine physicians, physician assistants, nurse practitioners, and other clinicians from different specializations.

Many of these applications are concerned with how to monitor patients' health remotely and keep a track on their medical history. Especially those who have chronic diseases and are required to be monitored continuously to provide their doctors with the most updated information.

Other applications focus on providing quick medical reference as a mini-textbook for disease pathologies such as Medscape (Medscape, 1994-2015)

(Satish Misra, 2015) classifies some of top applications based on different category such as best medical calculator, best medical literature applications and image challenges. Also, it updates their list regularly to select the application of the month.

However, there are very limited applications that pay attention to electronic medical interpreter although the interpreter has an important impact on the quality of health care (Flores, 2005), especially if the patients are more satisfied if treated by bilingual staff member.

The most related applications to this study are Xprompt (Blue Owl, 2011), Medical Spanish (Marvo, 2011), MediBabble (NiteFloat, 2013) and Canopy (Canopy Innovations, 2015). Most of their applications translate around 800-1,500 common medical phrases from around nine specialties, which are created by professionals to one or more (up to ten) languages, in order to have a quick communication with the patients. Even though, the application depends only on the text and voice for some languages. Some of these applications require to be paid while others are free.

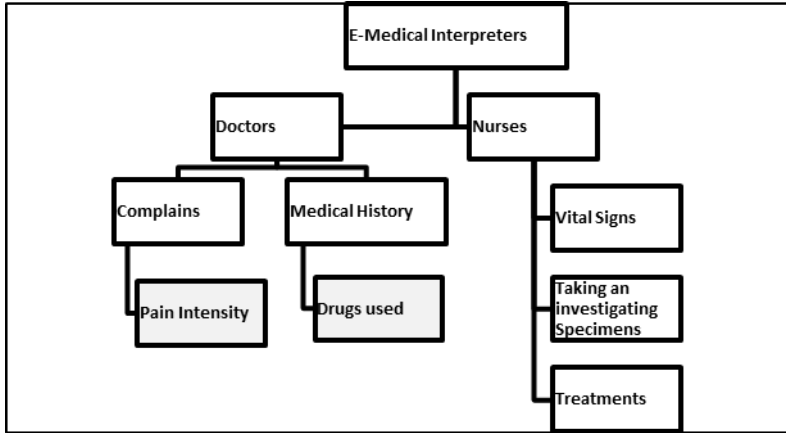
To the best of the authors' knowledge, there is no medical interpreter application concerned with using images or drawings to facilitate communication. This paper introduces images with more details on the design and implementation of the E-medical interpreter.

Methodology

The descriptive method has been chosen to assess the medical staff thoughts in using the suggested App "E-medical interpreter app" to facilitate communication. The application is built based on Android platform since Android is "the platform of the future" as stated by Paras Lakhani (George Shih, 2010). The Android, which is developed by Google is approved as the operating system by consortium of 48 major

companies in mobile phone industry including Samsung, Motorola, Sony Ericson and HTC.

Figure 6: Content of the E-Medical Interpreter Application



E-Medical Interpreter provides an application for the most common languages among the pilgrims' patients such as Arabic, English, French, Urdu, Hindi and Malay. Patients on a Yes, No format answer the questions in order to bridge the gap of communication regarding healthcare.

Accuracy and simplicity are put in mind throughout all stages of designing the application to deal with time issue during Hajj.

Figure 7: Main Interfaces of the application

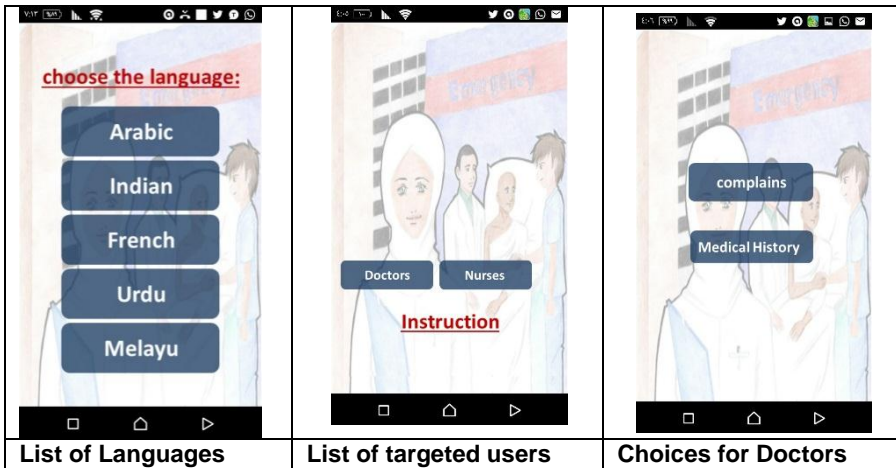


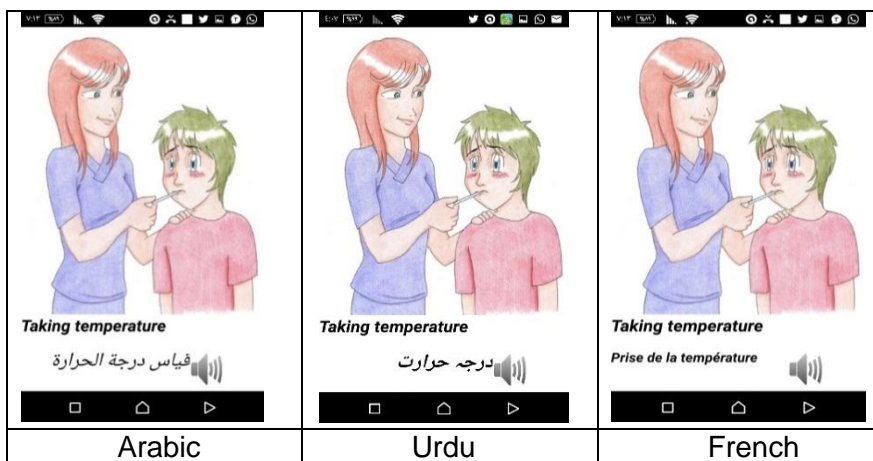
Figure 8: Some features of the App



The App consists of two main sections for medical staff (doctors - nurses) as shown in Figures 1 and 2. The doctors can gain the patients' main 16 complains including pain sites, fever, cough, vomiting and bleeding.

Each symptom is described as an image supported with standard pain intensity measure to gain accurate information of the patients' health history, diagnose of diseases, and the delivery of medications and treatments. Voice icon is associated with every image to interpret the symptom to the patient. Figure 3 and Figure 4 present some of the features and examples of the application.

Figure 9: An example of vital sign in 3 languages



The Instrument

This current study uses a rubric as an evaluation sheet. (Mertler, 2001) defines a rubric as a rating scale as opposed to checklists or form of scoring instrument used when evaluating products resulting from a performance task.

The rubric consists of ten dimensions to evaluate the application as follows:

- Connected to the purpose,
- appropriate for the pilgrims,
- organization,
- navigation of the slides' flow,
- usability
- errors occurred,
- voice
- image
- satisfaction
- time required

Each dimension includes a statement that is rated on a five-point scale: 1= Strongly disagree 2= Disagree 3= Neither agree nor disagree 4= Agree 5= Strongly agree.

Validity of Rubric :

Rubric was shown to a group of professors from College of Computer Science and Engineering. They agreed on the appropriateness of the statements, and that all questions measure points of view about using App in the Hajj season. They agreed that it was suitable for the research sample as it was easy to understand. A few minor modifications were suggested and implemented.

The Sample

The sample was 50 doctors and nurses working in Makkah and Madinah hospitals. Out of 50 there were 14 doctors and 36 nurses. (Wang, 1998) states that selecting a sample randomly is easy to understand and the equations for determining sample size are relatively straightforward. The study was conducted in 1437 H (2015).

Result

Most of the samples (54%) had Android smart phone (Samsung, LG, Sony, HTC), while 46 % of them owned iPhone mobiles. More than half of the participants owned Android, which is considered a good indication for using the app. More details of mobile ownership are shown in Table 1.

Table 4: The type of mobile owned by the participants

Mobile	Doctors and nurses	
	Frequency	Percent
iPhone	23	46%
Android (Samsung, LG, Sony, HTC)	27	54%
Total	50	100%

Furthermore, most of the participants (64.6%) found according to their experience that Urdu was the most common language among patients, while (18%) found Malaya. A few revealed that Turkish pilgrims found difficulty in communication.

Regarding the use of E-Medical Interpreter Application (96%) medical staff found the content connected to its purpose and supported the idea of using the application especially in ER. Moreover, the majority of participants felt that using the application would be appropriate and facilitate communication with pilgrims. Regarding the organization and navigation of the slides' flow, the majority of participants (86%) believed that the application is clear and logically ordered.

While (92%) of participants revealed that the interface of the application was very easy to use and remember and can be launched within the app independently, (94%) of the sample found it was easy to learn and understand. On the other hand, (20%) of medical staff indicated few errors occurred while they were using the application, as shown in Table 2.

(70%) of participants indicated that the voice was clear and the images enhanced the content and created interest. The majority of participants (86%) were satisfied to use the application. According to the time, (94%) found the time to accomplish the tasks of the application was reasonably suitable and fast.

Table 5 Participants' point of view of using E-Medical interpreter

Statements	1	2	3	4	5
	Strongly disagree	Disagree	Neither	Agree	Strongly agree
Connection to the purpose of App	1	1	0	24	24
Appropriate for pilgrims	1	0	3	26	20
slides' organization and navigation	0	2	5	22	21
Usability interface of the App	1	0	3	26	20
Understanding of the App	0	0	3	22	25
Errors occurred in using the App	3	5	2	30	10
Voice of the App	1	3	1	25	10
Images of the App	1	3	1	9	26
Satisfaction to use the App	0	3	4	21	22
The time to accomplish the tasks	1	1	1	26	21

In addition, doctors and nurses were asked to give their general opinion of the application. Figure 5 shows that participants liked using the application to facilitate the communication with pilgrims.

Figure 10: Overall opinion of the application



Conclusion and Recommendations

This descriptive study provides empirical evidence of how E-medical interpreter can be used to develop and facilitate communication during Hajj season, with practical suggestions for decision makers in the Hajj community to use the application. A rubric explores doctors and nurses perceptions about using the application. As the results show, both of them are encouraged to use the application and supported the idea especially in the ER. The power of E-medical interpreter relies on its simplicity through using the images and sounds in addition to its free cost.

Furthermore, the results emphasize that just over half of medical staff owned android, while the other half were using iPhone mobile. It is recommended to extend the app to involve iPhone devices since 46% of the users owned iPhone mobiles. It is recommended by participants to include the Turkish language in the application. Lack of the supported sounds for some languages are considered limitations, as indicated by errors occurred.

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