

## Challenges of Existing Mobile Applications for Health Care Management and Diet Maintenance

Anil Kuvvarapu<sup>1</sup>, Dheeraj Dass Marneni<sup>2</sup>, Varagiri Shailaja<sup>3</sup>

<sup>1</sup>University of Michigan, MI, USA-Department of Computer science

<sup>2</sup>University of Michigan, MI, USA-Department of Computer science

<sup>3</sup>GRIET, Hyderabad, India-Department of Computer science

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**Abstract:** Many mobile applications have been designed for health conditions and diet maintenance. Mobile computing holds great promise for providing effective support for helping people to manage their health in everyday life. There is a lack of evidence on extent to which these applications actually help. In addition, previous research has reported that mobile health (m-health) applications focus only on fitness, but does not provide effective results for the people by using these technologies [5]. To understand these drawbacks from the mobile applications, we conducted informal interviews with 12 participants (6 male, 6 female). This interview deals with finding problems of existing application for maintaining good health and fitness in their daily life which is used for people who are suffering and adopting behavior changes from many diseases like diabetes, obesity, cardiovascular and many other diseases. In this paper we contribute the design of health service technologies design, which includes providing notifications to diet maintenance, finding nearby hospitals, pharmacies and directory of doctors and details about medicines for particular diseases. In particular, we focused on examining different types of notifications by using mobile phone short message tactile notification technology[7] and information sharing about health issues and diseases by using personal context sharing system that uses SMS (Short Message Services)[6] as a basic communication method which is used to share the information about health issues and diet maintenance.

**Keywords:** Health Management, m-health (mobile health) application, Type of Notifications, Diet Maintenance, mobile phone short message tactile notification.

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### I. Introduction

In this recent era, generally people are using mobile phones to communicate with others. Now-a-days Smart phones are leading human life. By taking this as an instance many healthcare applications came into existence [1]. But existing mobile applications has many drawbacks like sharing information about health, Physical activities to do, finding nearby hospitals, information about medicine etc. So, people cannot access the application in a better way. By taking this as a problem we started a study on this application. As part of this study we conducted informal interviews with 12 participants of different genders and noticed the problems of existing m-health applications and we found out some benefits which are needed to be included. We focused on major improvements that are to be included to the existing m-health applications. Information sharing is very useful to the users so that they can share the information to their friends, families and others. By doing this they can lead a good health. There are different kinds of notifications which are useful to remind about diet on regular intervals like, this is the time for lunch, breakfast including calories of food to take and physical activities to do which would be very much useful to maintain their fitness. Notifications play a vital role because human beings generally forget things in daily life so these notifications will help to remind things like taking of diet and what type of physical activities to do. There are different kinds of notifications like visual, audio and vibration notification which depends on the situation.

It is difficult to find nearby hospitals to many international students as they are new to this place. So we focused on both doctor directory and medicine information which should be included in m-health application.

To accomplish our goal of understanding different users of mobile application, we opted to focus on different kinds of people. So we conducted interviews with 12 participants, during the interview process we found four of them who never concentrated on their diet because of busy schedule in their daily life. If notifications come into existence it would be better to remind them regarding the diet maintenance that can make the people to concentrate on their diet maintenance. Finally, grounded in our findings, we offer design guidelines for mobile applications of health care management and diet maintenance, which can serve the different type of users.

## **II. Related Work**

In this section, we first describe some of the existing applications for health management and diet maintenance. Secondly, we report on the interviews that were closely related to the information about medication in m-health applications. Finally, we focused on information that is shared with friends and family members.

### **2.1 Existing applications for health care management and information about medication:**

There are many mobile applications for health care management such as Sung-Tsun Shih's "Self healthcare management system based on RFID technology"[3] which is radio frequency identification-based (RFID-based) self healthcare management which allows an user to identify his/her identification and record their physiology conditions automatically. The system consists of a RFID tag, a RFID reader, a microprocessor-embedded system, and three peripherals which includes blood pressure meter, ear-temperature meter, and body-weight meter. The RFID tag and reader are used to store and read user's identification as well as physiology data. Despite this, many existing applications have been designed based on these technologies. For example, "Ingram Micro Healthcare Asset Tracking"[4] which is used to give information about medication.

### **2.2 Information sharing technology:**

In modern mobile devices, (such as smart-phones and tablets) there is great potential for growth of many novel, powerful, and also highly demanding applications. However, most mobile devices/users share their information with friends and family members by SMS. Despite, lack of communication in existing m-health apps, a number of studies have been investigated on this problem, this was followed by Juong-Sik Lee who studied how communication is easy for users in mobile phone like sharing personal contextual information through mobile phone which is receiving considerable attentions in a ubiquitous computing applications [6].

### **2.3 Notifications in m-health applications:**

A number of studies investigated on this notifications for mobile applications such as Al Osman H's "Mobile phone short message tacton notification based on mood and urgency"[7]. This application works on tactile haptic support on mobile phones. Tactons to communicate information through the non-visual and non-auditory modality of touch. Tactons are messages conveyed through various patterns of vibrations. By this technique we can get notifications for m-health apps.

## **III. Study Methodology**

We conducted interviews with 12 participants at the University of Michigan-Flint. The purpose of conducting the interviews is to rectify the existing m-health application problems and overcome those problems.

### **3.1 Participants:**

We conducted informal interviews with 12 international students in Recreation Centre at University of Michigan-Flint. We selected this area because, in Recreation center we can find many students who are concentrating on physical activities to maintain good health. We conducted individual interviews and gathered the problems of existing m-healthcare applications. 6 of them out 12 are females and remaining are males of different age groups. Among 12 students 2 from Spain, 6 from India, 1 from china, 1 from Saudi Arabia, 2 from USA.

### **3.2 Informal interviews:**

12 participants were participated in our interview, we first asked the participants about their education and work background. We then asked them more general questions about the existing m-health application. The goal was to find out how people feel about their m-health application. Following this, we asked participants about how they used them, and to describe how they liked and/or disliked them. We noted down the problems what they are facing by the existing mobile applications of healthcare management from the interviews. Some interviews were audio-recorded and some were video recorded. The length of each interview was between 30 minutes to 40 minutes, depending on orientation to details.

### **3.3 Data analysis:**

Whatever the informal interviews and conversations with friends should be included in the data analysis. Therefore, all 12 participants in the study were included in the analysis. We gathered all the information from the participants and reviewed each transcript. After reviewing the transcripts, we started improving the existing m-health applications in a better way to include all the problems which they are stated in the interviews. For this, open coding is used to analyze qualitative data from many data analysis methods like Grounded theory and it is used to analyze textual content code which includes developing and defining

categories on their properties[8]. Qualitative data analysis consists of noticing, collecting, thinking [9]. So, we noticed all the data by observing, recording the interviews as raw data from the participants. In data analysis, go through the data to compare for relations, similarities, dissimilarities and data will be marked into codes. These codes directly generates into conceptual categories build a descriptive framework from raw data by open coding.

Participants	Gender	Age	Problems
Mary	Female	21	No Notifications, No doctors Directory, info sharing
Rajendar	Male	23	No Notifications, No Info Sharing
Carmen	Female	29	No Notifications, Physicians Info, medicine info
Auprey	Female	25	No Notifications, No Info Sharing, info sharing
Janeese	Female	50	No Notifications, No Info Sharing,
Jeff	Male	22	No Notifications, Physical Activities
Arjun	Male	26	Physicians info, Medicine Info, Physical activities
Xuanrong Lu	Female	17	No Notifications, Physical activities
Akmal	Male	19	No Notifications, Medicine Info, Physical activities
Huang	Male	21	Info sharing, Physical activities
Sabrina	Female	22	Medicine info, info sharing, Physical activities
Oghowen	Male	26	No Notifications, info Sharing

**Table: 1** Informal interview participants ,their genders and their problems.

#### IV. Findings

We found several findings from the study of healthcare mobile applications. Most of the people in the world have mobile phones, with these applications people can find whatever they need. Usage of mobile phones are raising instantly. The number of healthcare applications came into existence by increment of the usage of mobile phones. A variety of healthcare mobile applications are used by international students. Day-by-day the usage of healthcare applications raised all over the world, but many drawbacks are still existing. As part of the study of challenges of mobile application on healthcare management and diet, we conducted informal interviews with 12 international students in our university. 10 of the students said that they daily follow the healthcare application in a mobile phone and 2 of them said they do not follow it due to the lack of time.

##### 4.1Types of healthcare applications:

In our findings we found two types of m-health applications, those are:

###### 1. Applications that have only one purpose

- Application that can be used to share information about health management.
- Application that can give notifications about diet.
- Application that gives the list of the physical activities.
- Application that gives information about physicians and medicine.

###### 2. An application that has multi-purpose

- Application that has information about diet and physical activities.
- Application that has information about medicine and diet.

##### 4.2 Problems:

There are different kinds of mobile healthcare applications in existence. We found many problems in the mobile health applications. Most of the m-health applications provide all the information about health issues but notifications for diet and physical activities, information sharing about health issues with friends, family, and neighbors, list of physical activities, information about doctor’s directory, and information about medicine are not provided.

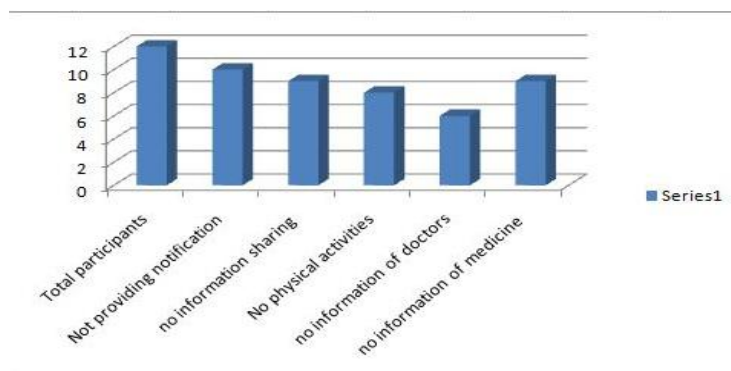


Fig.1 Number of problems shared by the international students

From fig 1 we can distinguish the problems as follow:

1. The major drawback of the healthcare applications are not providing proper notifications to follow. Most of the healthcare applications provide the visual notifications, by this people cannot follow the alerts given by visual notifications because people in the present generation are busy. They also do not provide the visual notifications in time and some provide ring notifications every time which are very disruptive to people.
2. Healthcare applications are not providing the information sharing, most of the applications have lack of sharing information with their family and friends
3. m-health applications are not providing the medicine information for particular diseases.
4. Not providing list of physical activates to do.
5. They are not providing the food choices based on diet
6. They do not provide the information of nearby hospitals and the directory of doctors. With this problem many international students face difficulties to find nearby walk in clinics

## V. Discussions And Design Implications

The goal of this research was to investigate the existing problems of m-health applications and thereby gain insight into how to design a new m-health application which includes all new features in it. After a keen observation on the existing m-health applications the design factors should be done in such a way that, by using different techniques we offer some guidelines to the proposed system in which it will overcome all the problems present in the existing m-health applications. "Tactile" technology is used in order to overcome notification problem. With this technology we can send notifications to users regarding their diet and health care which would be very much useful to remind users at regular intervals.

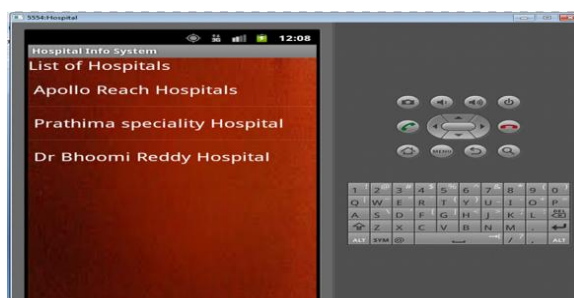
There are three types of notifications in proposed system which is helpful to different kind of people. The three types includes Audio, Visual text and Vibration. Audio type is mainly designed for the people who are visually handicapped and this feature would help them a lot to know all kind of information regarding the diet and health care through audio format. Visual text is used at particular time where mobile phones need to be in silent mode at that time just display the message regarding their diet maintenance. Finally vibration is used to notify the users with vibration mode.

Keeping in view of existing applications we offer novel features to proposed system that is sharing the information through social media applications. There are many social media applications available to share the information to the users some of them are Facebook, WhatsApp, Instagram, Viber, We Chat etc as shown in fig2. Directly from the m-health application we can share the information to our friend and family members by making use of social media applications.



Fig: 2 sharing information by using different social media apps

We can also find nearby hospitals and physicians information. All nearby hospitals will be displayed based on longitude and latitude (i.e. using GPS). Hospital information is available including working days and hours also Physician information and availability of particular Physician is also shown. So that users can choose the physician at their own interest to book an appointment.



**Fig:3** We can view the information regarding nearby hospitals based on their locality

## VI. Conclusion

We conclude that after conducting interviews with participants on existing m-health applications we sort out many problems like not receiving notifications regarding diet maintenance and health care and there is no physician and hospital information. Our motto is to overcome these problems using tactile technology and information sharing technology through media sites. In our findings we found two types of m-health applications such as apps used for only one purpose and multipurpose. Most of the participants prefer for multipurpose applications, so we would like to offer some design guidelines and novel features which is useful to all users.

## Acknowledgement

“There are times when silence speaks so much more loudly than words of praise to only as good as belittle a person, whose words do not express, but only put a veneer over true feelings, which are of gratitude at this point of time.”

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