

Friend Forever – A Healdery Partner

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ABSTRACT

In this paper we present an application that helps to motivate the elderly in maintaining an independent healthy life style. With this application elderly people don't need to memorize the details – they will be informed round the clock about their diet and exercise schedules-freeing their memory for something else. The application was designed and implemented in a participatory manner. The early results from the evaluation show that the application has potential in enabling the elderly to maintain a healthy life style.

Categories and Subject Descriptors

H.5.2 [User Interfaces]: User Interfaces – *evaluation /methodology, user-centered design, prototyping.*

General Terms

Design, Economics, Experimentation, Human Factors.

Keywords

User-centered design, elderly, prototyping.

1. INTRODUCTION

In almost all first world countries, the population of elderly is growing rapidly and it is estimated that by 2020, one out of 4 Europeans will be above 60 [4] and in the next 40 years number of people above 75 will double. In industrialized countries elderly are the key users of health services resources. Aging gives rise to a number of challenges for the elderly e.g., social, economical and most importantly health related. It is quite difficult to maintain good health for them especially in isolation. Malnutrition or poor eating habits is an important area of concern for elderly as it results in progressive decline of health, reduced cognitive and physical strength which results in an increase of the utilization of public health services and admission in elderly homes [2]. In America the ratio of eating intentionally unhealthy food without exercise is high, in particular in women. Most of the elderly are not happy with their eating and exercise practices and are not content with their current weight and want to reduce it with little effort. A good amount of research has been done from different perspectives for elderly [1] e.g. for understanding the

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technological needs of elderly in different contexts, proposing design principles and important factors for designing technologies for elderly [3], general daily life monitoring application for maintaining a good life style and specific applications or technologies for people effected with particular diseases. But to the best of our knowledge, there does not exist any interesting application for the elderly, which supports round the clock the intake of healthy nutrition and exercise. Furthermore, most applications focus on helping elderly once they have been effected by a particular problem and there are relatively less number of applications for helping elderly in maintaining a healthy life style, so we need more precautionary technologies then curing ones.

2. USER STUDIES

From the literature, it was clear that elderly have malnutrition problems and they are divided into two groups. One group of elderly cannot eat healthy food at their own because of their severe diseases and health problems but the other group can actually eat a healthy food but just don't do it. To find out the reason why people do not eat nutritious food and avoid daily exercises, we carried out preliminary user studies in Bonn-Germany where our focus was on those people who do not have severe physical diseases but lack of motivation for healthy life style. The requirements were gathered from an elderly home. Interviews with 8 people were conducted where 5 were females (avg. age 73) and 3 males (average age 75.5). The major findings are as follows: 1) The only exercise assistance provided is one time step-by-step guidance from their doctor. They get the routine exercise schedule from doctors and trainer but at one point they fail to motivate themselves. 2) They are not aware of the pros and cons of eating a particular food. They cannot track precisely that what they have eaten. The presentation of different ingredients and other details (fat amount, cholesterol amount) is not user friendly as they are only interested in those details, which can affect their health. 3) They are not able to cook the healthy food of their choice. There are no known alternatives for a particular non-healthy ingredient. 4) One of the biggest problems is a weakening short-term memory. They need something to keep track of their activities, and which reminds them if they have not completed a scheduled task. 5) If anything happens, they must be able to contact doctor or caregiver immediately.

3. CONCEPT DESIGN

The inspiration of "friend forever" is to aid and facilitate the elderly towards an organized quality life, by acting like a companion, guiding them in health related problems, related to their diet, exercise and emergency situations.

The key features of the "friend forever" application was that it should be run on a PDA or a mobile device so they could carry it

all the time. Food profiling was the main feature identified, such that it can provide details about specific dishes with particular details e.g. fat ratio, cholesterol amount etc. It also generally stated the effect of a particular dish on the health (pros and cons). Interactive exercise reminders were also identified as one of the key features, where a user can play a video of a particular exercise. We developed a low fidelity prototype – with paper, pencil and printed pictures of different mobile devices (different size and layouts). We then visited the same elderly house as before and tried to run the paper prototyping session with users. The session was not a big success as it was very difficult for the elderly to envision the future system from the paper prototype. As a replacement of this we developed a prototype in FLASH. The prototype was run on a tablet PC and it was shown to 5 users individually for 20 minutes each. At the end, there was a joint discussion session that had dual purposes. It was a participatory design session where the users commented on the design and on the ease of use factors and also told us that how do they envision such application.

3.1 Implementation

The high fidelity prototype was developed using MS embedded visual C++ and the application was run on a HP PDA (Figure 1). For connectivity an Ad-hoc wireless network was created which connected the PDA with a local PC, which was connected to the Internet. For testing purposes a SIP client was configured on the PC which had VOIP embedded (to simulate calls to doctors in emergency situations).

4. User Testing

The evaluation of the prototype was carried out in the common room of the elderly home with 7 users (four male and three females). There were two sessions in the user test. In the first session users were asked to browse through the application freely. In the second session they were asked to perform two tasks: 1) View and edit their daily food intake for week 27 and 2) Place an emergency call in the case of high blood sugar. Users performed the two tasks and later on the experimenter asked a few questions about their experience.



Figure 1. Main screen for the users (left), Adding the medicine for a particular disease by admin (right)

5. Results

Almost all users completed the tasks without any major problems. There were few usability problems but no major technical or functional problems. Overall almost all users appreciated the idea of diet and exercise management. Most importantly they liked the idea of food and exercise profiling and the association between the two. The system recommended a particular type of exercise based on the recently taken meal. Users appreciated the icon based approach on the main screen and that the screen was not cluttered. We divided each menu into multiple sub-menus and focused on designing each screen for a particular task. One user

commented about this “I feel confident that I am doing things step by step and there will be no mistakes”. User also recognized that the text was assisted by meaningful icons. Users were able to choose a different icon for different actions from the big pool of icons. User said that once they chosen the icon of their choice, they would not change it. We learnt that it is preferable to have more screens rather than cluttering one screen. The participants of our evaluation also liked the idea of calling a doctor or personal caretaker using one button. They said it is really good as they do not have to open a diary for dialing the doctor’s number (or browse through mobile contacts). Touch screen does not seem to work well with this user group. They were really afraid of tapping hard on the screen and sometimes the clicked on the screen really hard. One user said “I feel stupid when I have to hit so hard on PDA and nothing happens”. Another stated, “I will prefer to work on this screen using my finger rather than this small stick (stylus) which is difficult to hold”. We gave a free choice to users to choose between a stylus or their fingers and most of them were comfortable with their fingers assisted by arrow keys, since the action items were large enough.

In terms of features, users were positive about the fact that their food intake and exercise record is sent to the doctor on a daily basis and the doctor can respond to them using the same system. They were also optimistic about timely warnings in case of any inappropriate food intake. They liked the idea of playing exercises before actually doing it. Those elderly who had TV in their room asked us if the exercise videos could be played on the TV, which was an interesting remark.

6. CONCLUSION AND FUTURE WORK

In summary, users like the idea of managing their food and exercise using a specialized mobile device that is always in their pocket. As compared to other devices, which they are afraid of to use, they found themselves very comfortable with 'friend forever' because of its ease of use. This shows that such an application has potential if the information is presented in an understandable fashion keeping in mind the strong requirements of elderly. In the next step, we would like to connect this study with another project which aims to support the mobility and social exercising of elderly. In terms of technical enhancement, we would like to transmit data from weight machine directly to the home server so that we could keep track of the weight change on a daily basis for long term weight monitoring.

7. REFERENCES

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