

A Pervasive system for enabling older adults to cope with depression by motivating them to socialize

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Abstract

We report on the design of a home-based ubiquitous computing system that helps elders to prevent and reduce the onset of depression by managing their social lifestyle with the family members. We propose that through a Social Calendar, elders are encouraged to socialize by receiving invitations and suggestions generated by the system when it detects that in the last two weeks the communication patterns with one or more of their children have been altered, or that it has detected those elders may have a symptom of depression.

Key Words: home-based ubiquitous, depression, elder.

1. Introduction

Growing old is often accompanied by the loss of close companionship that may cause older adults to face feelings of loneliness and depression. Some medical studies suggest that disturbed sleep patterns, particularly early morning awakening, can be used as a reliable indicator of depression in older adults [1]. Specific depression symptoms are: sleep or appetite changes and social isolation. Some research works have proposed monitoring and displaying elder's activities to provide awareness of their well-being. For instance, the aim of the CareLab project is to increase feelings of connectedness between elderly and their children by means of an awareness system, which is a class of computer-mediated communication [2]. The Digital Family Portrait (DFP) Display presents a qualitative visualization of elder's daily activity [3]. Intel's CareNet addresses the needs of the elder's support network by displaying icons that represent the occurrence of important events specific to the needs of the elder such as meals and medications [4].

Our approach is to provide a system that based on ubiquitous computing technology helps elders to prevent, as well as to reduce the onset of depression by managing their social lifestyle. Our system is a SocialLife Calendar that enables elders to perceive their children are aware of and worried about their well-being.

2. System design

To achieve the aim of our proposal, we identified the following system requirements:

- Elders and their relatives should be aware of a possible presence of depression.
- The system needs to monitor three specific conditions of the elders' lifestyle: i) the patterns of communication among the elders and their children; ii) elders have gained or lost weight and iii) variations in sleep patterns.
- Encourage frequent social contact by suggesting activities that can be performed by the elders along with their families.

Figure 1 presents the SocialCalendar view that has been personalized for the elder. It presents the activities that are planned or suggested for the current month. Each family member is represented in the system by a picture and depending of the activity, each action is represented by a specific icon (i.e., watch a movie, go to the theater, go to dinner, shopping, make or receive a phone call). The activities recommended by the system are based on the elders' preferences. These recommendations are represented by a yellow light bulb. Elders can access the system through a touch-based display.

The SocialLife Calendar is also personalized for the children. They can be aware of the activities that they canceled and the activities that were canceled by the elder, which are marked with a red cross in Figure 1. With this view of the SocialLife Calendar, an elder's relative gets a perception of the elder current state. For instance, how active his/her parent has been recently, and how he/she has contributed to the well being of his/her parent.

In Figure 2 we present the variations in the elder's sleeping patterns. This system interface enables relative to identify changes in the sleeping patterns of the elder. The system indicates how many times the elder is awake (out of his bed) or resting (on his bed) during the day and nights. In this case, the diagram of Figure 2 represents that the older adult was awake from 11:22 pm to 3:12 am. Based on this information, the SocialLife Calendar can suggest the children to take the elder to the doctor. The following scenario illustrates the functionality of the system and how the user interacts with it.



Figure 1. Social-Life calendar



Figure 2. Record of the sleeping patterns of the elder monitored by the system

2.1. Scenario of use

“Mr. Juan Lopez lives in Mexicali, México; he is 65 years old and spends most of the time at home alone. He had a depressive episode a year ago, and now their children and Mr. Lopez use the SocialLife Calendar to be aware of the status of Mr. Lopez. Mr. Lopez has three children: Maria, who lives in Los Angeles, USA, and Antonio and Carlos who live in Mexicali. Every Saturday Maria calls her father. Antonio and Mr. Lopez enjoy going out to restaurants together. Carlos and his father go to the movie theater at least once a week. Today is November 19th as emphasized in Figure 1. The system has perceived some conditions that may negatively influence the elder’s behavior: Maria didn't make a phone call to her father last Saturday, and Mr. Lopez has cancelled some activities recommended by the system last week; and the system has detected disturbed sleep patterns. As all of these conditions contribute to the start of a depressive episode, the system suggests some

preventive actions that enable the elder to manage his stress. As illustrated in Figure 1, the SocialCalendar recommends Mr. Lopez to play billiards next Monday. At the same time, the system recommends to family members that they do some activities with their father. It suggests that Maria call Mr. Lopez next Saturday; it recommends Carlos invite him to watch a movie next Wednesday since they did not go the week before; and the system recommends Antonio invite Mr. Lopez to dinner on November 22nd. When Antonio accepts the system suggestion, Mr. Lopez receives Antonio’s invitation and confirms it”.

3. Conclusions and future work

The aim of the system is to help elders and their families to identify when elders have depression symptoms and to prevent relapse into. We mainly focus on presenting the users interfaces that were conceive with the aim of making the visualization of information and the use of the system simpler. The interfaces do not require explicit attention from the users to realize the elder’s status. We also propose that a physician may also analyze the information presented by the system in order to help him to evaluate the elder’s condition. To detect conditions like variations in weight and sleeping patterns, we are considering implementing a simple sensing mechanism that can be naturally integrated into the home environment, i.e. to use weight sensors on the elder’s bed. Our next step is to evaluate the design of the proposed system to get the perception of its ease of use and utility by potential users.

References

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