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Zerrin Yumak-Kasap

Swiss Federal Institute of Technology, Lausanne

Yu Chen

Swiss Federal Institute of Technology, Lausanne, yu.chen@sjsu.edu

Pearl Pu

Swiss Federal Institute of Technology, Lausanne

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Recommended Citation

Zerrin Yumak-Kasap, Yu Chen, and Pearl Pu. "EmoSoNet: An Emotion-aware Social Network for Emotional Wellbeing" *ACM SIGCHI CHI '12 Extended Abstracts on Human Factors in Computing Systems* (2012).

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EmoSoNet: An Emotion-aware Social Network for Emotional Wellbeing

Zerrin Yumak-Kasap

Human-Computer Interaction Lab
Ecole Polytechnique Fédérale de
Lausanne, Switzerland
zerrin.kasap@epfl.ch

Yu Chen

Human-Computer Interaction Lab
Ecole Polytechnique Fédérale de
Lausanne, Switzerland
yu.chen@epfl.ch

Pearl Pu

Human-Computer Interaction Lab
Ecole Polytechnique Fédérale de
Lausanne, Switzerland
pearl.pu@epfl.ch

Abstract

This paper presents our initial ideas towards developing an emotion-aware social network for the purpose of increasing emotional wellbeing. The framework will use sensors and behavior analysis methods in order to infer users' stress level automatically with minimal user effort and use audio, animation and vibro-tactile feedback for enhanced engagement. Additionally, we will explore the role of social support, social influence and gamification for sustained behavior change.

Author Keywords

Stress management, social networks, sensors, persuasive technology, gamification

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Introduction

Almost all of us experience stressful events in our daily lives related to work, relationships and financial issues. Some people are good at managing stress and finding coping strategies and turn stress into positive results which is usually something tied to their personality. However, for some others, it comes with the feelings of anger and anxiety and may lead to mental disorders such as depression under continuous pressure.

According to the Stress In America 2011 report published by the American Psychological Association, %39 of adults mentioned that their stress increased over the past year and even more said that their stress had increased over the past five years (%44) [1]. A common practice for relieving stress is sharing life problems with other people (family, friends, and colleagues) and getting advice from them. However, people usually hesitate to share bad experiences with others or sometimes they might not even realize that they need help. Usually, close friends and family members can feel our problems before we tell them. However, there could be cases when people are apart from their loved ones or they see expressing emotional problems as a weakness of their personality and hide them.

High adoption of smart phones, social networking applications and technological advancements in unobtrusive sensors bring novel opportunities for measuring and sharing stressful moments in life. Factors such as social support and social influence can encourage people to share their emotional states without much hesitation. Knowing that they can get support from other people and they are not alone is one aspect. Additionally, support givers may also benefit from such systems being more aware of the emotional state of their loved ones in a real-time manner. Even going out of the private circle, people can make comparisons of their stress level with less intimate friends (colleagues) or even strangers and learn from them. Research on human-computer interaction for behavior change often reports that, people lose interest in the system after a short period of interaction and require appropriate persuasion strategies to increase engagement [2]. Previously, we

used emotional memories in order to increase engagement during interaction with an animated robot head [3]. In this work, we would like explore other ways of engagement through the use of mobile phones.

Related Work

Mobile devices have been actively used to help users to manage mental wellbeing. Some mobile applications require users to manually indicate their emotions. Mappiness [4], asks users to specify their mood and context, including whom they are with and their location. Similarly, GottaFeeling [5] requires users to select their emotion from a range of options, visualize them in a timeline and share among friends. However, these apps require certain user effort and do not provide sufficient user incentives and motivation. Alternatively, mobile and pervasive sensors solve the above problem by evaluating user emotion automatically. Samsung has recently integrated emotion sensing technology in latest phones [6]. They detect mood by analyzing the speed of typing and shaking, and frequency of typing mistakes. MoodMeter [7] detects the smiley faces in a campus by deploying cameras. HappinessCounter [8] aims to improve user happiness by encouraging them to smile frequently, e.g. opening a fridge. Other researchers are actively helping people to enhance happiness by applying psychological theories. ThankfulFor [9] encourages users to share gratefulness frequently based on the discovery that the more people express thankfulness, the happier they will be. Calming technology [10] developed by Stanford University aims to improve quality of life by helping people to relax both mentally and physically. Track Happiness [11] is studying the factors that influence people's mood by asking users to answer a few questions and their feelings. Social science also

suggests the importance of improving mental wellbeing by using the social networks. The user study results from Aurora [12] and MobiMood [13] suggest that users are willing to share mood among their friends in social networks and log mood record together with social context. PatientsLikeMe [14] enable users to discuss disease related with mood conditions. Recently, games have become important tools that encourage users to participate in actively monitoring their health, e.g. Health Game Research [15].

EmoSoNet: An Emotion-aware social network

We propose an emotion-aware social network to serve as a test-bed for different emotional wellbeing related applications. Similar social networks started to appear recently as we mentioned in the related work section [12][13]. However, in order keep users engaged in the systems for long-term, other ways of persuasion and motivation is required, such as immersive feedback and gamification. EmoSoNet will be composed of three parts: Input devices (phone sensors or wristbands such as AffectivaQ [16]), output devices (audio and tactile feedback on mobile phones or other external devices such as Philips Rationalizer [17]), and a server application to manage the user profiles and input/output communication. Emotional state is usually represented with arousal and valence dimensions. Wristbands with physiological sensors (e.g. EDA) are good at detecting the arousal level. However, arousal level alone may not be enough to detect if the person is stressful since arousal can both be due to excitement or stress. In order to understand the positivity/negativity of the user state, analysis of voice, text messages and phone usage behavior is necessary. We propose two

applications based on this framework for enhanced user engagement as below.

“FourSeason”: Increasing immersion using audio and vibro-tactile feedback

Current ways of emotional communication in emotion related apps is based on the representation of emotional states using static colors, emotional words next to the profiles or emotion circles. However, with the current technological capabilities of mobile phones, it is possible to communicate emotions between people in a more immersive way using interactive art combining different modalities such as audio and vibro-tactile feedback (e.g. Immersion [18]). We will develop an application that could detect the arousal and valence dimensions of emotions and maps that to “season scene”s, temperature being related to valence and intensity of the temperature being related to arousal. Whenever someone checks the profile of the other and want to get more feedback about their emotional state, they will see an animated winter scene (with storms, wavy sea) or summer scene (shiny weather, calm sea) enhanced with audio and vibro-tactile feedback. In some cases, people can activate a track emotion button, if they want to track the mood of their child at school for example. In this case, the season scene representing the emotion of your child can be a screensaver on your smartphone. In other cases, you may only want to know someone’s stress level, if they really exceed a certain threshold and in this case you can be notified with the season scene on your phone.

“I win if you are happy” game: Using gamification to increase engagement

Gamification means using game-design principles in non-game environments and it has recently been used

in health-related applications such as Nike+Ipad to compare one's physical activity with other users. We think that similar idea can be applied for stress management, this time trying to keep the stress level down. We imagine that this game can especially be played within members of a company or classroom. The game works as follows: First people find partners and make pairs and compete with other pairs. In each pair, the ability of one person to control his/her stress level makes his/her partner gain points and vice versa. Then sum of the points of each pair is compared with other pairs leading to competition. While the former uses the teamwork aspect of games, the latter is based on the theory social proof, based on the fact that people try to be like other people. Competition can cause the users to be more eager to play leading to sustained behavior change. The case that people may want to become pairs with people who are better at controlling their stress is an effect of social pressure on the gameplay. One might think that such kind of game may induce more stress. However, we think that it is normal human practice to compare ourselves with other people and this should work in stress management too, unless people are already experiencing severe depression and require professional support.

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