
FitCity: Motivate Physical Activity to Sedentary People

Lorenzo Sanna

OKKAM Srl
Salita dei molini 2
38123 Villazzano Trento
sanna@okkam.it

Paolo Bouquet

OKKAM Srl
Salita dei molini 2
38123 Villazzano Trento
bouquet@okkam.it

Andrea Cattani

INTERPLAY SOFTWARE Srl
Via 4 novembre 1918, 95
38121 Trento (TN)
acattani17@gmail.com

Giovanni Cortese

INTERPLAY SOFTWARE Srl
Via 4 novembre 1918, 95
38121 Trento (TN)
g.cortese@ipsoft.it

Abstract

Fitcity is a project that aims to use ICT as a stimulating factors for the adoption of an active lifestyle and provide to policy makers of sport and health in local area.

Author Keywords

Transtheoretical Model of Behavior Change; Self-Determination Theory; Exercise; Active Lifestyle; Design Strategies; Mobile Technologies; Gamification; Augmented Reality;

ACM Classification Keywords

H.1.2. Human Factors; H.5.2. Theory and methods; J.3. Health.

Introduction

Sedentary living style is the 4th most important factor responsible for mortality in the world [1]. Among the causes of sedentary habits are urbanization, mobility systems mainly based on private transportation, and the increasing working rhythm. Governments are currently committed to find a solution to this problem. Medical agencies and health insurance companies seek to curb costs through more effective disease prevention programs. Many companies are trying's leverage technology to improve individual's behavior. Information and Communications technology (ICT) can

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee.

CHI'13, sept. 16 – sept. 19, 2013, Trento, Italy.

Copyright 2012 ACM 978-1-XXXX-XXXX-X/XX/XX...\$10.00.

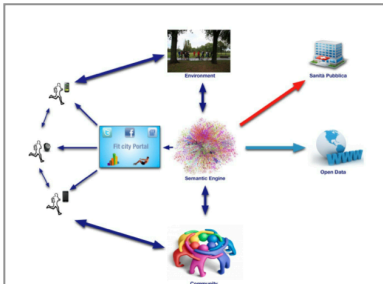


Figure1. Fitcity systems

be used to convey stimulus fostering a healthy and active lifestyle. The aim of FitCity project is to use Human computer Interaction (HCI) and ICT to create a system that can stimulates sedentary people to change their lifestyle through small daily sport activities designed taking into account the local territory [figure 1].

Problem and Motivation

FitCity addresses the growing problem of sedentary behavior, which is known to contribute to heart diseases, diabetes, and other life-threatening conditions. Moreover, FitCity project aims at addressing the current lack of connections between sport, territory, technology and data control to stimulate sedentary people to engage in fitness activities during their daily life.

The objective of this project is to develop a system that opens the possibility to develop new information-sharing systems, allowing citizens to share the information about their health and fitness status with medical organizations.

A review of the state-of-the-art fitness commercial projects show how that they do not have a clear scientific support regarding the methodology used to suggest physical activity programs and encourage users to engage in these activities. We studied application like (Runtastic, Runkeeper, Endomondo, Strava, GarminFit, Fitbit, Nke+, Adidas microcoach, Withings, Eerymove and others). The FitCity mobile application will be based on research in this field with the aim to create a system that uses advanced HCI, Gamification and social feedback designed on a fitness model to foster an active lifestyle behavioral change. At the same time, using semantic technologies deal with information coming from public stakeholders (such as

government, public health organizations) FitCity aims at developing public services for the public healthcare system.

Methodology

During the initial design phase, we involved the participants to the project UNI.Fit (www.unisport.tn.it/unifit), promoted by the University of Trento to enhance the physical shape of its students and employees to better understand our user's needs and motivation. In this phase, we started to interview participants to learn about their exercise activities, motivations and feelings and their efforts to track fitness [5]. At the same time we took into consideration a large number of mobile and web applications in the field of fitness and technological devices used to track the activities. This study has allowed us to better understand what functionalities are used by the existing apps, what types of users are involved and how the interfaces are designed [2]. Through the feedback obtained and the collaboration with the Fondazione Bruno Kessler's (FBK) research units Intelligent Interfaces & Interaction (i3) and Group of Vision Technologies (TeV), we obtained important information and design requirements for the development of the application interface and features, using a user-centered approach. At this point, we created an initial set of paper mock-ups and we are currently starting to design an alpha version of the smartphone application and web server.

We are planning two different experiments in September 2013 and in March 2014. The first will start together with the new program UNI.Fit. We will ask UNI.Fit participants to use the FitCity app to manage and maintain their fitness diary and, at the same time, we will provide to UNI.FIT coaches a system that helps

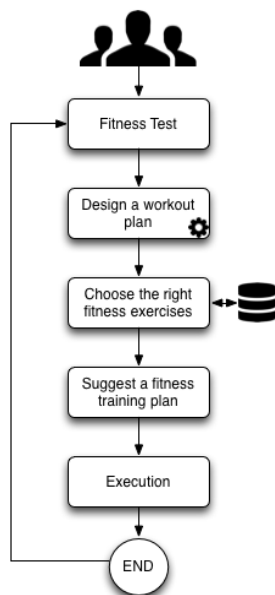


Figure2. Personal training program

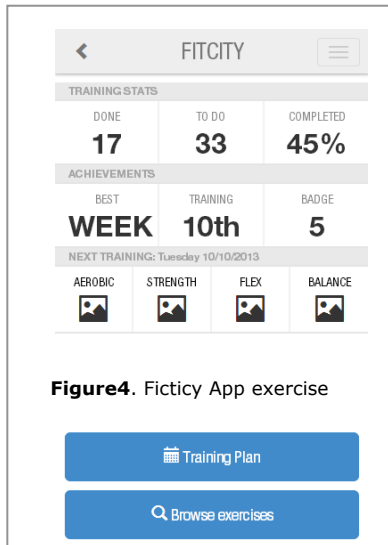
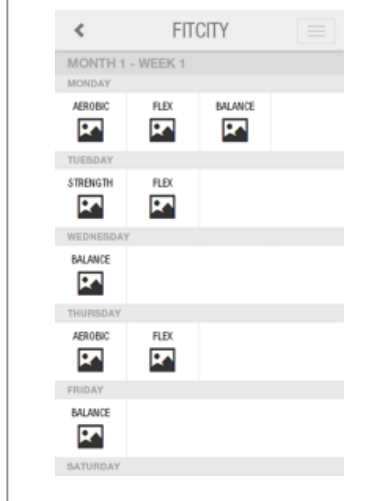


Figure4. Ficticy App exercise

Figure3. Ficticy App. homepage



them to create personal and dynamic training programs based on the results of specific fitness tests done by participants [figure 3,4]. The second experiment will employ a selected subset of UNI.Fit participants, mainly made of employees and professors of the University of Trento. During this experimentation (March 2013) we will provide a complete FitCity mobile application. In order to maintain consistency within the system we are working to develop a set of surveys to be administered to local public government and health agencies to understand their needs in terms of data.

Research Findings and Implications

Our three-stages research study supported the development of user-centered application. The main research areas involved in the design process are: **Study of a fitness model based on sedentary people.** This research was directed by the Research Center of Sport Mountain and Health (CERISM) and allowed us to create:

- A set of auto-evaluated fitness tests;
- A fitness model designed on sedentary people;
- A group of fitness exercises based on the main physiological areas: aerobics, strength, balance, and flexibility;
- Automatic solution to create a personal training program starting from the fitness test [fig. 2].

Study and development ICT services. We are working to implement a set of persuasive mechanisms based on the use of gamification techniques [3], social feedback and advanced technologies, to maintain users' motivation over time.

The actors involved in the development of these areas are: **The i3 research unit of FBK**, involved in the research activities aimed at identifying effective

persuasive strategies, such as gamification and peer-pressure, for triggering a behavioral change toward an active lifestyle and for sustaining motivation to engage in physical activity over time [4]. **The TeV research unit of FBK**, responsible for the design and prototype “concepts” of advanced services based on gadgets, smartphones, vision and augmented reality techniques; These actors are coordinated by INTERPLAY SOFTWARE Srl, experienced in the field of augmented reality application and vision techniques, and OKKAM Srl, specialist in semantic technologies.

Research based on Semantic technologies. It is directed by OKKAM Srl provides to the Ficticy project the knowledge to:

- To be integrated with public and private datasets related to all the data from the local territory. Exercises and workout plans are generated through reasoning providing the most suitable places to carry out the training.
- The reuse of “satellite” ontologies (such as geographic ontologies, medical schema of particular types of entities, public transport) merged in a new semantic model with fitness data.

Fitcity Design

Based on this research agenda, we are designing the FitCity application to feature four main concepts: Fitness activity, User and Friends, Territory, and Public Administration involved in health control. We are designing a mobile platform, and a web platform that will allow people to manage their data, simultaneously providing the public administration with new ways to manage statistical information about public healthcare.

The mobile and the web-user platform: will suggest and recommend physical activities specifically designed on the basis of the current users' fitness level, preferences and contextual information, such as their current location; will monitor and analyze the users' actual physical activity data, providing a real-time feedback; will keep users motivated and involved employing gamification mechanisms (such as points, levels, rewards, achievements, quests) and peer-pressure; will adapt the mobile interface of the application employing these different persuasive mechanisms on the basis of the users' motivation and stage of change [5]; will provide access to additional content and functionalities by means of augmented reality techniques and vision. The aim of the platform is to provide users the opportunity to manage all their data and interact with friends and other people who want to change their lifestyle through the Fitcity technology. The Fitcity application is designed to give the opportunity to create fitness programs based on the local territory. All information is managed by the semantic technology with the goal of building a system capable of assessing the health status of the citizens. All the data-schema will be designed to integrate different databases coming from the public administration. This way the FitCity portal will provide enriched information and statistics on the health status of the citizens.

Conclusion

Fitcity is the first system that uses semantic technologies to combine social networks, fitness tracking based on the local territory and interactive visualizations. Using smartphone applications Fitcity offers playful visualization to promote offline fitness activities. Thereby, represents a new development in

both fitness and community visualization, while combining a medical physiological model for fitness and social network visualization with gamification and social feedback in novel ways.

Acknowledgements

We thank all the volunteers, and all publications support and staff, who wrote and provided helpful comments on previous versions of this document. It is a project partly funded by the European Community with the "European Fund for Regional Development" (FESR).

References

- [1] Global Advocay For Physical Acticity. <http://www.globalpa.org.uk/>.
- [2] Consolvo, S., Everitt, K., Smith, I., and Landay, J.A. Design requirements for technologies hat encourage physical activity, ACM (2006), 457-466.
- [3] "Gartner Predicts Over 70 Percent of Global 2000 Organisations Will Have at Least One Gamified Application by 2014" in Gartner, 2011
- [4] Zichermann, G. and Cunningham, C. *Gamification by Design: Implementing game mechanics in Web and Mobile Apps*. O'Reilly Media, Sebastopol, CA, 2011.
- [5] Transtheoretical Model for Designing Technologies Supporting an Active Lifestyle. Michela Ferron, Paolo Massa.