

# Promotion of Active Aging Using a Tailored Recommendation System

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## Abstract

Active Aging deals with the support and integration of the elderly population in a society focusing on improving physical and mental well-being. Persuasive technology provides solutions for tailored interventions aiming at maintaining an active lifestyle. The present paper introduces the initial ideas of a PhD trajectory that proposes to design and develop a tailored monitoring and coaching system for the promotion of Active Aging based on principles of physical and mental well-being. This is a multidisciplinary research that uses theories from Positive Psychology to determine input / output and informatics for the data processing and decision making system.

## 1 Introduction

The notion of Active Aging, also known as Successful Aging, defends that healthy aging goes beyond avoidance of disease and disability. The World Health Organization defines active aging as “*the process of optimizing opportunities for health, participation and security in order to enhance quality of life as people age*” (World Health Organization 2002).

Heterogeneity is one of the biggest issues when designing an intervention focused on the ageing population. Age-related functional decline is always expected due to biological factors. However, the steepness of this decline is highly variable. While some individuals reach old age with minor physical and/or cognitive limitations, others experience a steep decline after an event (e.g. accident) or even due to natural causes or progressive chronic diseases. ICT can provide a solution for personalized interventions enabling continuous monitoring and providing tailored advice based on current status, preferences, and goals of a specific user.

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The current research is incorporated in the European FP7 PERSSILAA<sup>1</sup> project. PERSSILAA addresses screening for and prevention of frailty based on physical, cognitive, and nutritional function. Among other services, participants in the project will be periodically assessed for these three domains.

## 2 Research Proposal

The present paper introduces the initial ideas of a PhD trajectory that proposes to design and develop a tailored monitoring and coaching system for the promotion of Active Aging. The intention is to recommend relevant activities that enhance physical as well as mental well-being of those who are willing to maintain or reach an active lifestyle.

The main research question of the work is: *Which tailoring strategies should be applied to a recommendation system aiming at enhancing Active Ageing based on principles of physical and mental well-being?* To answer such a question we need to know which information must be monitored to get insight in every day functioning (RQ1), how it will be processed (RQ2), and which rules should be implemented in the decision support system (RQ3).

*RQ1: Which parameters related to user's health condition and lifestyle should be included in such a system?* The periodical assessments of the PERSSILAA project will provide information to create stereotypes/clusters of users based on their health condition, forming the top layer of our user model. This data will also be used to set recommendations that enable the users to age actively in a safe manner. Regarding the lifestyle monitoring, our envisioned approach is to include the parameters that, for each particular user, relate the most to physical and emotional well-being in the daily life (e.g. play with grandchildren, join yoga lessons).

*RQ2: Which 'user model system' is best suited for promotion of Active Ageing based on user's health condition and lifestyle?* This question regards the data processing method that will be adopted in the application. A system targeting the elderly population should be able to continuously adapt to the user in order to follow possible decline. The model should be highly adaptive to the current status of the user and his context.

*RQ3: How can theories from Positive Psychology be used to increase the effectiveness of a recommendation system aiming at promoting Active Ageing?* Positive Psychology based behavior change interventions have recently shown promising results. We plan to analyze the field of Positive Psychology to provide a basis for developing the decision support recommendation system.

To sum up, the research intends to collect user and context information from different sources (e.g. accelerometers, location sensing, questionnaires), construct an appropriate user and context model, develop and test relevant algorithms, and finally evaluate effectiveness, compliance and adherence to the coaching system. Figure 1 presents a high level conceptual overview of the proposed system.

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<sup>1</sup> [www.perossilaa.eu](http://www.perossilaa.eu)

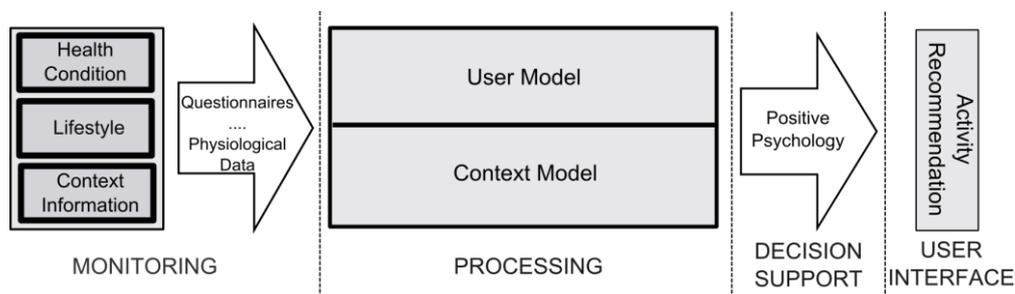


Figure 1 – High level conceptual overview of the proposed system.

## 2.1 Current stage

In the first phase of the research we aim to get insights into the routine of the elderly population, with the main focus on the parameters of daily life activities that influence the most the emotional well-being of each user (e.g. location, social companion). Given the increasing relevance of mental well-being in models of Active Ageing, we will analyze the relations between daily life activities, physical activity and emotional well-being. Ten older adults will be monitored over a period of one month using an accelerometer and a smartphone application using experience sampling. An experimental study is designed and will start in the Q4-2014, forming the basis for our initial models.

## 2.2 Expected contributions to the research world

This work intends to give insights into tailored interventions using a system for the promotion of Active Ageing taking a holistic approach by combining psychology, health, and technology aspects. We expect to contribute to the research world by (1) suggesting / developing new ways for monitoring elderly's lifestyle focusing on physical and emotional well-being; (2) extending the understanding on the influence on Positive Psychology in interventions aiming at behavior change; and (3) developing and evaluating an application that implements the model explained above.

## 3 References

World Health Organization, 2002. *Active Ageing: A Policy Framework*, Madrid, Spain. Available at: [http://whqlibdoc.who.int/hq/2002/who\\_nmh\\_nph\\_02.8.pdf](http://whqlibdoc.who.int/hq/2002/who_nmh_nph_02.8.pdf).