Research Project

Development and experimentation of an adaptive and collective intelligent cognitive training system

The swift project (Adaptive and collective intelligent web-based training to enhance problem-solving in older people https://dpg.unipd.it/progetto-swift) funded by Velux Stiftung aims to develop a new intelligent web-based training where healthy older adults will be engaged with real-life scenarios such as planning a trip to Rome. The goal is to enhance participants’ problem solving abilities and to guide participants in the acquisition of computer skills such as surfing online. The project also aims at promoting social connections between older adults and studying the impact of strategy sharing on strategy development.

In the context of the swift project this research activity concerns the development of the training tasks, including AI-based features to support adaptability and collective sessions, focusing on the training process and collaborating with the psychologists of the research group to identify traits and features that would be recommended involving older subjects.

For all the training tasks we will design and develop:
- A semi-automatic and personalized interface for setting training programs.
- Specific functionalities to administer, monitor and control (home-based) training activities. A set of tools for data gathering (performance indexes), a dashboard for their visualization, and facilities for exporting them in different formats.
- A personalized easy-to-use interface for older users. The interface will adapt automatically to monitor different sizes exploiting the Bootstrap framework. A personalized feedback for each participant.
- A set of tools based on social networking technologies integrated into the system for allowing effective communication with expert supervisors and participants.

The design of training tasks requires a coordinated multidisciplinary research effort. On the one hand, complex technical solutions are needed, for example, to adapt to the difficulty of performing exercises using artificial intelligence or exploiting automated planning techniques for the exercises. On the other hand, the supervision of cognitive psychologists is fundamental. Testing with subjects is essential for tuning tasks before delivering them. Personalization and adaptability are issues that require consideration for older subjects. Indeed, the reduced plasticity in ageing requires a higher level of customization and adaptability.

The main milestone of this research activity will be the delivering of the training system used in the validation study.
Plan of activities:

The candidate will be involved in the development and experimentation of the SWIFT web-based platform in the context of the international multidisciplinary research project SWIFT (Adaptive and collective intelligent web-based training to enhance problem-solving in older people). This will include the design and development of the training tasks and activities, including AI-based features to support adaptability and collective sessions. The task will also include supporting subjects and psychologists involved in the project during the validation experiments. Preferred requirements include a PHD in computer science and engineering, experience in the development of cognitive training systems and multidisciplinary projects, and the knowledge of the following technologies: Java programming techniques, Artificial Intelligence techniques to support adaptability and automated planning, development of web-based applications.

Piano delle attività:

Il candidato sarà coinvolto nello sviluppo e nella sperimentazione della piattaforma basata su web denominata SWIFT nel contesto del progetto di ricerca internazionale multidisciplinare SWIFT (Adaptive and collective intelligent web-based training to enhance problem-solving in older people). Requisiti preferenziali sono un dottorato di ricerca (PHD) in Informatica o Ingegneria Informatica, l’esperienza nello sviluppo di sistemi per il training cognitivo nel contesto di progetti multidisciplinari, congiuntamente ana buona conoscenza delle seguenti tecnologie: programmazione in Java, tecniche di intelligenza artificiale per lo sviluppo di sistemi adattivi e pianificazione automatica, sviluppo di applicazioni web.