

The VESPA Virtual Research Environment: a final report about the project at the beginning of clinical operations

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The VESPA project aimed to provide a Virtual Research Environment (VRE) for qualitative and quantitative evaluation and rehabilitation of motor and cognitive diseases. It addressed more than thirty operational objectives to enable an extremely innovative platform for early evaluation and rehabilitation of cognitive diseases, such as Alzheimer's Dementia, Mental Retardation and Linguistic Deficit, etc. VESPA is a pioneer project mixing brand new ICT technologies and Computer Science concepts in the fulfilling of patients and caregivers needs in the cognitive diseases field. In fact, on top of a fully immersive Virtual Reality system, it combines innovative and specialized 3D software applications, dedicated hand-free devices, a flexible and scalable Cloud Computing infrastructure, a powerful Science Gateway and a tele-supervision system. The project provided a completely new response to increasing demand for treatment of mental retardation, AD, Parkinson Disease, etc.

Our open and flexible framework, the VESPA Library, extended a common gaming platform enabling integration of any cognitive application into a highly productive environment. By deriving from it, one can build a brand new evaluation test or rehabilitation task in the form of a 3D videogame by writing close-to-zero lines of code. The framework is highly customizable and include safe data management and transfer features.

The development team created more than 80 applications designed by psychologists and neuropsychiatrists for three different kind of patients, in the range of simple to very hard, by just inheriting basic features from the framework. This is crucial for the growth of the community and the success of the VESPA system, aimed to feed a theoretically unlimited number of installations sites. The system also includes a Science Gateway that allows doctors, administrative staff members, and VESPA technicians to configure and manage system planning, operation, and results. Patients/caregivers take advantage from it by visualizing schedule and results of daily rehabilitation protocols, as well.

Telemetries produced during operation are safely sent to the Cloud and the DataBase located at Health Center, so they can be available in near real-time to the community.

Innovative and self-built devices can be plugged and used in the VESPA system with very few effort. This was the case of the home made instrumented glove built by VESPA, and devices like MyO Armband, Leap Motion sensor, etc.

The validation process ran on three different group of patients. In the final part of the presentation, the results of VESPA system validation through Clinical Trials will be shown.

By entering the market, the VESPA system will allow numbers of children and elders to live their daily rehabilitation sessions at schools and rest-homes so that no effort to be spent in transportation by caregivers.

Since months, a community all around Europe is growing around the VESPA VRE. The VESPA system is now an open gate looking towards the next telemedicine offering fully immersive Virtual Reality applications inside a highly interactive platform to Health System actors by promising impressive results in terms of impact and speed for effective cognitive training activities.

Summary

The VESPA project (Virtual Environment for a Superior neuroPsychiAtry) was funded by the Sicilian Regional Funding Programme PO FESR, in the aim of an ICT call dedicated to R&D activities into SMEs. It involved Software Engineering Italia Srl (aka Swing-It, a SME) as coordinator, the University of Catania (UniCT), a Health Service Research Institute (IRCCS Oasi) and two SMEs (Korec srl and Xenia srl). It started in Dec 2013 and ran until Nov 2015. The total budget was 2.46 MEuro of which 1.75 MEuro contributed by the Regional Government of Sicily..

Despite the huge results obtained, the project management is working hard to a follow-up to consolidate results and design and plan improvements to the system. Dr Marco Pappalardo (Swing-It) is the project coordinator and Prof Roberto Barbera (UniCT) is the Scientific Coordinator for technological activities.

The presentation will depict several issues faced by the project related to both usability and technical implementation, the criteria to select hardware and software solutions to be applied to cognitive disease, criteria to

build a low cost Virtual Room for medical applications as well as open issues to be faced in the next future.

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