Editorial to the Special Section on Ambient Intelligence and Assistive Technologies for Cognitive Impaired People

NEURODEGENERATIVE diseases are progressive and difficult to diagnose in their early stages. Progressive impairment in the activities of daily living, as well as cognitive deterioration, leads to an increase in patient's dependence. Neuropsychiatric symptoms are common features and include psychosis (delusions and hallucinations), depressive mood, anxiety, irritability/lability, apathy, euphoria, disinhibition, agitation/aggression, aberrant motor activities, sleep disturbance, and eating disorders. Additionally, patients have a tendency to wander and misplace objects in their environment. Therefore, cognitive impaired patients need constant monitoring to ensure their wellbeing, and that they do not harm themselves.

Ambient intelligence (AmI) is the computing paradigm that can provide support both for cognitive impaired people within their domestic environments and for clinicians to collect data needed to assess the disease. A novel class of applications can potentially emerge from the specialization of AmI technologies to the special domain of cognitive impaired users. However, such applications must be able to deal with peculiarities due to irrational and abnormal behaviors of cognitive impaired people within their environments, and their general attitude to not accepting wearable technologies.

Several technical challenges remain to be solved before effective, intelligent, secure, and reliable AmI applications for the support of cognitive impaired people can be deployed trustfully into real environments.

In this special section, the paper "The role of Virtual Motor Rehabilitation. A quantitative analysis between Acute and Chronic Patients with acquired brain injury," concerning acquired brain injury, compares the evolution of chronic patients with acute patients in a virtual rehabilitation program. For this study authors have developed a "Vestibular Virtual Rehabilitation" system. Results have shown a similar recovery for chronic and acute patients during the period of intervention. It has also been shown that chronic patients stop their improvement when they finish the training encouraging the migration of such rehabilitation technologies to home.

In the contribution "An Adaptable and Flexible Framework for Assistive Living of Cognitively Impaired People" describes guidelines and an adaptable framework for the dynamic integration of assistive services with their related sensing technologies and interaction devices.

The paper on "Statistical Anomaly Detection for Individuals with Cognitive Impairments" focuses on the identification of anomalies for users' routes, which may be useful to assist the impaired in case of losing one's way or to alert caregivers in case of wandering. The proposed approach relies on the exploitation of contextual information derived from user's trajectories that are modeled as discrete-time series in the 2-D space.

The paper titled "An assistive navigation system based on augmented reality and context awareness for people with mild cognitive impairments" proposes a model based on contextual information and user's points of interest to support cognitive impaired with information on spatial orientation and routes in order to get their destination.

The contribution on "Intervention Tailoring in Augmented Cognition Systems for Elders with Dementia" presents an approach for personalizing nonpharmacologial interventions for people with dementia. The approach adopts an ontological model to personalize the planning and execution of interventions to address problematic behaviors.

The paper on "A predictive model for assistive technology adoption for people with dementia" concerns the user's acceptance and ability to use of new technologies. Prediction models based on selected data mining algorithms have been defined to forecast the degree of adoption by cognitive impaired in order to provide developers of new technologies with tools able to support them in planning, predesign, and decision making phases.

We sincerely thank the Editor-in-Chief Prof. Y.-T. Zhang of J-BHI and the Managing Editor Prof. C. C.Y. Poon for their strong support to realize this special section. We are also grateful to all reviewers and authors that contributed to the special section.

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Digital Object Identifier 10.1109/JBHI.2013.2292811

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