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Editorial

Ambient Assisted Living and Ambient Intelligence for Health

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Ambient assisted living is an emerging trend in which artificial intelligence enables the use of new products, services, and processes that help to provide safe, high-quality, and independent lives for the frail and elderly. Due to underlying health issues, aspects of everyday living can become physically and mentally challenging for them. Technology can support daily interaction and be integrated in the health care of senior citizens, which are both vital to ensure their health and happiness.

Artificial intelligence has enabled significant advancements in ensuring such support, while preserving independence. Advancements include development of information and communication technologies used in versatile ways, including for prediction, prevention, rehabilitation, and support. However, technology that enables ambient assisted living comes with its own challenges. It needs to be easy to use, while suitably designed, and adaptable to changing needs and individual preferences.

The paper by X. Ferre et al. addresses the use of ultrasonic sensor-based gait speed measurement device controlled via a mobile interface, which permits patients to self-assess physical performance. This allows for timely detection of functional decline and frailty, which can, if undetected, ultimately progress to disability.

The paper by C. Ramírez-Fernández et al. presents the usability evaluation of a haptic-enhanced tele rehabilitation system for massage therapy of the back. The system includes features that allow for administering online therapy programs, providing self-adjustable and safety treatment of back massages using a virtual environment, and saving and replaying massage sessions according to a patient's therapy program.

The paper by D. Spoladore et al. presents a smart home simulator, using semantic and virtual reality-enhanced configuration of domestic environments, and taking into account both the preferences of the end-users, the configurations of smart appliances, and relevant technologies, including deployment and data-sharing issues.

The paper by I. Rodríguez et al. addresses issues surrounding using mobile and wearable devices for self-reporting of chronic pain and pain management in older adults.

The paper by M. Simón et al. introduces a system for gathering physiological data, which is valuable for the analysis of personal characteristics, such as behaviour, health conditions, and preferences.

The paper by M. A. Teruel et al. discusses physical and cognitive rehabilitation and shows that the development of collaborative rehabilitation systems is one of the best alternatives to mitigate isolation.

The article by M. Espinilla et al. introduces a fuzzy intelligent system for patients with preeclampsia in wearable devices. The system uses a decision analysis tool for the early detection of the condition in women at risk.

Gait analysis, using computer vision based on cloud platform and mobile device, is the topic of the paper by M. Nieto-Hidalgo et al. Since deterioration of cognitive and motor function is linked to gait patterns, gait analysis can be a powerful tool to assess frailty and senility syndromes.

The paper by B. Liu et al. discusses the relevance of monitoring breathing and establishing accurate breathing

rate using a deep learning-based fine-grained breathing rate monitoring algorithm, which works on smartphone and achieves professional-level accuracy.

A fuzzy logic-based personalized method to classify perceived exertion in workplaces using a wearable heart rate sensor is the topic of the paper by P. Pancardo et al. Wearable heart rate sensors represent an effective way to capture perceived exertion, ergonomic methods are generic, and they do not consider the diffuse nature of the ranges that classify the efforts. The proposed method is personalized, and it assesses perceived exertion and uses fuzzy logic as an option to manage imprecision and uncertainty in involved variables.

The paper by D. Martín et al. discusses approaches to improving learning tasks for mentally handicapped people using ambient intelligence techniques based on cyber-physical systems. The paper shows that that such solutions are feasible and allow for learning of complex tasks in some cases.

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