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Editorial

Artificial Intelligence for Mobile Health Data Analysis and Processing

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This special issue is devoted to the application of artificial intelligence for mobile health data analysis and processing. All papers in this issue went through the standard reviewing process of *Mobile Information Systems*.

This special issue is motivated by recent advances in mobile health. Indeed, Internet-of-things (IoT) is changing eHealth and especially mobile Health (m-Health) systems. Currently, more and more fixed and mobile medical devices are installed in patients' personal body networks and medical devices, and the surrounding clinical/home environments collect and send a huge amount of heterogeneous health data to healthcare information systems for their analysis. In this context, machine learning and data mining techniques are becoming extremely important in many real-life problems. Many of these techniques have been developed for health data processing and analysis on mobile devices. Several mobile applications based on these techniques have emerged as an essential technology for improving the quality of medical diagnosis and treatments of many illnesses as well as many health disorders.

Existing techniques used for processing health data can be broadly classified into two categories: (a) non-Artificial Intelligence (AI) systems and (b) Artificial Intelligence systems. Even though non-AI techniques are less complex in nature, most of the systems suffer from the drawbacks of inaccuracy and lack of convergence. Hence, these systems are generally replaced by AI-based systems which are much superior to the conventional systems. AI techniques are mostly hybrid in nature and include artificial neural networks (ANNs), fuzzy theory, and evolutionary algorithms. Although most of the techniques are theoretically sound, their potential is not fully explored for practical applications. Many of the computational applications still depend on non-AI systems, which limit their practical usage.

The goal of this special issue is to present some applications of machine learning and data mining techniques on practical mobile health applications.

In N. Larburu et al.'s paper, the authors describe and analyze an approach to prevent mobile heart failure patients decompensation in real time via a monitoring-based predictive model. The proposed approach is based on mobile clinical data of 242 heart failure patients collected for a period of 44 months in the public health service of Basque Country (Osakidetza).The authors obtained the best predictive model as a combination of alerts based on monitoring data and a questionnaire with a Naïve Bayes classifier deploying Bernoulli distribution. This predictive model is shown to reduce significantly the false alerts.

In L. Yung-Hui et al.'s paper, the authors propose a computer-assisted diagnosis approach for diabetic retinopathy based on fundus images using a deep convolutional neural network (DCNN). Unlike the traditional DCNN approach, the authors replace the commonly used max-pooling layers with fractional max pooling. Using their approach, the authors achieved a recognition rate up to 86.17% which outperforms the state of the art. With the developed technique, the authors developed an app called "Deep Retina." Equipped with this app and a handheld ophthalmoscope, an average person can take fundus image and obtain immediate result, calculated by the developed algorithm.

In their manuscript, V. S. Kublanov et al. describe organizational principles of a mobile hardware-informational system based on a multifactorial neuroelectrostimulation device. The system is implemented with two blocks. The first one forms spatially distributed field of low-frequency monopolar pulses between two multielement electrodes in the neck region and the second one which constitutes the specialized control interface performed by a smartphone.

In G. Kostopoulos et al.'s paper, the authors describe a mentoring platform for older adults developed using machine learning techniques to support the "live and learn" concept. This platform called "ProMe" supports different opportunities for informal communication through a number of functionalities such as video, text-chat, e-mail, blogs, and forums. It provides also to end users the opportunity to take different kinds of mentoring roles.

B. F. Smaradottir et al. present in their manuscript a user evaluation of VoiceOver, a built-in screen reader in Apple Inc. products, with a detailed analysis of the gesture interaction, familiarity and training by visually disabled users, and system response. The evaluation was done by six participants with prescribed visual disability in a usability laboratory under controlled conditions. The data collected via this evaluation have been analyzed using a mixed methods approach based on quantitative and qualitative measures.

In A. R. Dargazany et al.'s paper, the authors introduce the concept of wearable deep learning (WearableDL) which is a unifying conceptual architecture inspired by the human nervous system, offering the convergence of deep learning, Internet-of-things, and wearable technologies. In the proposed architecture, the brain represents deep learning for cloud computing and big data processing, the spinal cord represents Internet-of-things for fog computing and big data transfer, and the peripheral sensory and motor nerves represent wearable technologies as edge devices for big data collection.

We would like to thank the authors for their contributions and the reviewers of the papers for their help in bringing this issue to its current form.

Conflicts of Interest

The editors declare that there are no conflicts of interest regarding the publication of this special issue.

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