Journal of Ambient Intelligence and Smart Environments 15 (2023) 209–210
DOI 10.3233/AIS-235004
IOS Press

Guest Editorial

Applications in integrated intelligent infrastructures

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The convergence of several crucial trends, such as the Internet of Things, massive machine connectivity, edge computing, and artificial intelligence, is enabling smart or intelligent infrastructures. This thematic issue on applications in integrated intelligent infrastructures aims to illustrate and contribute to this exciting research area. The thematic issue attracted a good number of submissions from researchers in these domains. After critical peer-review and selection, four manuscripts were accepted for publication in this thematic issue, covering the topics of building energy management systems, patient monitoring, soil moisture prediction, and autonomous mobile robots.

The paper "**A Petri Net oriented approach for advanced building energy management systems**" by Marrone et al. presents a modeling methodology, based on Petri Nets, which is used to create building energy management systems. The paper discusses the generation of the user model, building model, device model, BEMS model, and how the different models interact with each other. The paper focuses on the application of the models to heating, ventilation, and air conditioning (HVAC) systems. Such systems are also evaluated by simulation, showing how the models used are able to determine the energy consumed in various scenarios.

The paper "**Energy-efficient Multisensor Adaptive Sampling and Aggregation for patient monitoring in Edge computing based IoHT networks**" by Kadhum Idrees et al. presents Energy-efficient Multisensor Adaptive Sampling and Aggregation (EMASA) for patient monitoring. EMASA operates on biosensors and at the edge gateway. EMASA reduces energy consumption by removing redundant sensed data (by means of local emergency detection and sample rate adaptation). The status of the monitored patient is decided by a machine learning algorithm.

The paper "**A new long short-term memory-based approach for soil moisture prediction**" by Koné et al. reviews the application of hybrid deep learning models to predict future soil moisture leveraging climate and soil information including past soil moisture content to improve irrigation practices. By determining how these well-suited deep learning models might ultimately be used to "close the loop" of machine actionable intelligence and human decision-making in promoting more effective irrigation, these systems may thereby enhance human use of this data for improved quality of life. The proposed system's benefits include assessing the suitability of new models that designate relevant features for soil moisture prediction, and reduce the size and complexity of the LSTM model while improving prediction accuracy. The predictive capabilities of the algorithm determined six crucial features: relative humidity, precipitation, net radiation, soil temperature, air pressure, and past soil moisture.

This work promotes the use of machine learning in intelligent irrigation infrastructure to move toward more optimal and efficient water management.

Finally, the paper "**A novel directional sampling-based path planning algorithm for ambient intelligence navigation scheme in autonomous mobile robots**" by Ganesan et al. proposes an optimized algorithm for path planning using a directional version of rapidly exploring random trees to overcome the problems of slow convergence and exploration of very large spaces. Several tests with different environments and situations achieve very good results (using a TurtleBot and ROS). Such work can easily find applications in intelligent environments with mobile robot fleets, for instance.

The guest editors of this thematic issue would like to thank the authors for submitting their high-quality work to the issue. The guest editors are also grateful to the reviewers for their careful assessment of the manuscripts and their constructive feedback. Finally, the guest editors would also like to thank the editors of JAISE for their continued support throughout the lifecycle of this thematic issue.