Editor's Note

THE International Journal of Interactive Multimedia and Artificial Intelligence - IJIMAI (ISSN 1989 - 1660) is a quarterly journal which provides an interdisciplinary forum in which scientists and professionals can share their research results and report new advances on artificial intelligence tools, methodologies, systems, architectures integrating multiple technologies, problems including demonstrations of effectiveness, or tools that use AI with interactive multimedia techniques. Indexed now in the Journal Citation Reports by Clarivate Analytics, within the categories "Computer Science, Artificial Intelligence" and "Computer Science, Interdisciplinary Applications" [1], the IJIMAI Editorial Board reiterates its appreciation for their support to authors, reviewers and readers.

The last numbers where very exciting; we had a special issue where some of the hottest topics in soft computing were presented [2]. Then, a regular issue included, for the first time and almost necessarily, works related to the sadly famous COVID-19 [3]. Finally, the last special issue integrated together two very interesting fields like artificial intelligence and blockchain [4].

The present regular issue consists of 10 works with a great variety of topics. It begins with two interesting health-related works: the first one, reviews different approaches that can help fight COVID-19 [5] and the second one, tries to solve an optimal control problem of cancer treatment using an artificial neural network [6]. It continues with algorithms that can help in industrial processes such as reducing the temperature of electronic circuits [7] or carrying out chromium layer thickness forecast [8]. Radically changing the subject, the next paper proposes a method to identify the most influential nodes in social networks that can be the source of rumor spreading [9]. Another different work focuses on how to interact with virtual 3D environments in a cheap way by using multiple embedded markers in a specialized manner [10]. In this issue, a work has also been carried out to improve the identification of polysemy in natural language processing tasks [11]. The following two works are related to assess students satisfaction: on the perception of students when they are evaluated by an artificial intelligence and not by a human [12], and on the quality of the learning content and the methodology at unit level for any course and at any time [13]. Finally, the issue closes with a paper in which a tool can classify the emotions of users based only on non-invasive techniques like their keyboard typing and mouse usage pattern [14].

The first article, written by Lezcano et al. [5], reviews the most recent research efforts and approaches related to new data driven techniques, tools and datasets intended to manage the coronavirus disease. These approaches can assist medical staff in efficient decision making with complex and very heterogeneous data, even in stressful scenarios. The paper also describes how these new approaches can assist in the process of easing both the care of infected patients in Intensive Care Units and in the discovery of new treatments.

The next article, written by Heydarpour et al. [6], focuses on machine learning approaches for cancer treatment. The paper proposes a system of ordinary differential equations with state variables for immune cells, tumour cells, healthy cells, and drug concentration. The underlying idea is to anticipate the tumour growth showing the interactions of cells in the body. To achieve the goals, an artificial neural network is applied with results that show both a good performance and efficiency, showing the optimal dose of drugs needed for treatments.

Dash and Pradhan [7] propose a multi-objective heuristic approach to select an efficient input variable polarity for simultaneous optimization of area, power and temperature in chips. The idea of the work is to achieve temperature minimization at the logic level instead of at the physical level, reducing the cooling cost of circuits. The proposed algorithm saves around 76.20% silicon area, 29.09% power dissipation and reduces 17.06% peak temperature in comparison with the reported values in the literature.

Nieto et al. [8] build a novel nonparametric method for the hard chromium layer thickness forecast, which is very important for many different industrial applications (e.g., avoiding corrosion). The study is based on machine learning, employing a hybrid support vector machines model. The outcomes indicate that the model, together with radial basis function kernel, has permitted to satisfactorily foretell the thickness of the chromium layer created in the industrial process with a coefficient of determination of 0.9952.

Jain et al. [9] use a game-theoretic approach called Shapley Value to find the top 10 most influential nodes on three social network datasets. They have compared the results to the ones obtained by using primitive centrality measures showing that the new approach is better at understanding the marginal contribution, and therefore the actual influence of each node to the entire network. That is very important to identify nodes and edges that play a crucial role in a social network to find the most influential sources of rumour spreading.

Rehman et al. [10] propose an interaction technique that provides different ways of interaction on complex objects in a simple and computationally cheap way. The interaction is based on the use of multiple embedded markers in a specialized manner. The proposal can perform any type of interaction in a 3D virtual environment for working with Augmented Reality and Mixed Reality scenarios. A biological virtual learning application is developed for evaluation and experimentation, showing less task execution time than the alternatives.

Mudigonda and Sharma [11] present a novel idea for handling polysemy in natural language processing tasks by generating Multi-Sense Embeddings using synonym sets and hypernyms information of words. The work derives embeddings of a word by understanding the information of a word at different levels, starting from sense to context and definitions. The proposed sense embeddings of words obtain prominent results when tested on word similarity tasks, outperforming several state-of-the-art systems.

Sánchez-Prieto et al. [12] show a technology acceptance model for the artificial intelligence-based assessment on education. The different aspects are perceived: 1) usefulness; 2) ease of use; 3) attitude towards use; 4) behavioural intention; and 5) actual use. The outcomes can be relevant to the research community, since there is a lack of this kind of proposal in the literature to deal with the students perceptions of being assessed by a non-conscious software entity like a machine learning model or any other artificial intelligence application.

The penultimate article, written by Cantabella et al. [13], proposes a new tool to assess student satisfaction using emoticons. The idea is to evaluate the quality of the learning content and the methodology at unit level for any course and at any time. The results indicate that the assessment of student satisfaction is sensitive to the period when the survey is performed and to the level of study. Moreover, the results of this proposal are compared to the satisfaction results using traditional surveys, showing more accuracy data.

The last article, written by Magdin et al. [14], focuses on the

classification of emotions based on behavioral characteristics of users such as keyboard typing and mouse usage pattern, which is an effective and non-invasive way of gathering data. The work obtains the data using an application developed for the study (Emotnizer), that can classify emotional states with an average success rate of 82.31% among 4 emotional categories from Russel's complex circular model: happiness, anger, sadness and the state of relaxation.

As a novelty, we are pleased to announce that this is the first regular issue in IJIMAI that contains a special section with a collection of works on a specific topic. In this case, the section is presented under the title "Artificial Intelligence and Sensor Informatics: Exploring Smart City and Construction Business Implications" and is edited by Prof. Shaofei Wu from the Wuhan Institute of Technology (China). The section includes 7 exciting works which topics range from industrial robots to energy estimation based on machine learning algorithms. Enjoy!

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From the Guest Editor

With the continuous development of the world and the rapid growth of the urban population, the process of human urbanization has entered a new era. At the same time, with the rapid development of urbanization, more and more urban problems have been exposed, such as traffic congestion, population explosion, uneven distribution of resources, and threats to public security, which require an adaptive scheme to solve these urban governance problems. On the other hand, the development of internet technology and information and communication technology provides a technical basis for solving these problems. The concept of smart city is put forward under the action of practical demand and technical basis, which aims to manage the production and living conditions of human beings in a refined and dynamic way through information technology. By embedding or equipping sensors in the power supply system, water supply system, transportation system, buildings, and other aspects of production and life, the connection between the Internet of Things and the Internet is formed to integrate the human society and physical system, and then the rich data in the Internet of Things are processed through cloud computing to form a new way of urban governance.

Generally speaking, artificial intelligence refers to the technology of using ordinary computers to present human intelligence. The core of the technology is to construct the ability of reasoning, learning, perception, planning, etc., which are similar to or even exceed those of humans. Artificial intelligence has now surpassed human levels in chess games, image recognition, and other aspects. At present, there are a large number of tools using artificial intelligence, including mathematics, search optimization, logic deduction.

The extensive connection of digital entities is driving the construction of smart cities, which are all based on sensor networks in cities. The sensor network combines sensor technology, embedded computing technology, distributed information processing technology, and wireless communication technology. Real-time monitoring, data collection of various objects, and cloud computing data transmission processing are achieved through mutual coordination, finally the results are provided to users.

Ruhlandt proposed in a research that smart cities should connect advanced integrated materials, sensors, electronic devices, and networks to computer networks composed of databases, trackers, etc.,

and use these materials, sensors, electronic devices, and networks to design, build, and maintain physical or virtual structures [15]. Grimaldi and Fernandez mentioned in the research that through the application of information and communication technology, smart cities have improved the living standards of residents, achieved sustainable development, and made urban resource management more intelligent [16].

Traditional urban planning and architectural planning rely on experienced architects and planners to judge the problems between buildings and cities. Nowadays, urban and architectural planning not only relies on traditional statistical data, but also on various big data including satellites, sensors, maps, and remote sensing data. The changes in the breadth and speed of construction and planning projects brought about by artificial intelligence are obvious.

A smart city is a complex system, and the management of the city must have a systematic perspective. Especially under the various urban problems brought about by the rapid development of the current era, when the Internet of Things and artificial intelligence are applied to the construction of smart cities, the efficiency and quality of urban management can be better improved and the sustainable development of cities can be achieved. Besides, the construction of smart cities based on artificial intelligence can meet the high standard requirements of residents for modern public services. However, most of the construction of smart cities is practice-first, the theory lags behind, which lacks the development strategy of integration and adaptation to the history of the city. Therefore, it is necessary to strengthen research in this area and find a smart city construction plan that conforms to the historical development of the city.

We are grateful to the authors who submitted papers to this special section. We would also like to thank the reviewers for their hard work and their valuable feedback to the authors. Finally, we would like to express our sincere gratitude to Dr. Elena Verdú Pérez, the Managing Editor, for providing the opportunity and assistance to edit this special section in the International Journal of Interactive Multimedia and Artificial Intelligence.

Guess Editor:

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References

[1] R. González Crespo and E. Verdú, "IJIMAI Editor's Note-Vol. 5 Issue 7," *International Journal of Interactive Multimedia and Artificial Intelligence*, vol. 5, no. 7, pp. 4–5, 2019.

[2] J. A. Morente-Molinera, "IJIMAI Editor's Note-Vol. 6 Issue 1," *International Journal of Interactive Multimedia and Artificial Intelligence*, vol. 6, no. 1, pp. 4–5, 2020.

[3] E. Verdú, "IJIMAI Editor's Note-Vol. 6 Issue 2," *International Journal of Interactive Multimedia and Artificial Intelligence*, vol. 6, no. 2, pp. 4–5, 2020.

[4] A. Baldominos and F. Mochón, "IJIMAI Editor's Note-Vol. 6 Issue 3," *International Journal of Interactive Multimedia and Artificial Intelligence*, vol. 6, no. 3, pp. 4–5, 2020.

[5] S. M. Lezcano, F. C. L. Hernández, and A. C. Bellot, "Data Science Techniques for COVID-19 in Intensive Care Units," *International Journal of Interactive Multimedia and Artificial Intelligence*, vol. 6, no. 4, pp. 8–17, 2020.

[6] F. Heydarpour, E. Abbasi, M. J. Ebadi, and S. M. Karbassi, "Solving an Optimal Control Problem of Cancer Treatment by Artificial Neural Networks," *International Journal of Interactive Multimedia and Artificial Intelligence*, vol. 6, no. 4, pp. 18–25, 2020.

[7]   A. Das and S. N. Pradhan, "An Elitist Non-Dominated Multi-Objective Genetic Algorithm Based Temperature Aware Circuit Synthesis," *International Journal of Interactive Multimedia and Artificial Intelligence*, vol. 6, no. 4, pp. 26–38, 2020.

[8]   [P. J. G. Nieto, E. García-Gonzalo, F. S. Lasheras, and A. B. Sánchez, "Chrome Layer Thickness Modelling in a Hard Chromium Plating Process Using a Hybrid PSO/ RBF–SVM–Based Model," *International Journal of Interactive Multimedia and Artificial Intelligence*, vol. 6, no. 4, pp. 39–48, 2020.

[9]   M. Jain, A. Jaswani, A. Mehra, and L. Mudgal, "Rumour Source Detection Using Game Theory," *International Journal of Interactive Multimedia and Artificial Intelligence*, vol. 6, no. 4, pp. 49–56, 2020.

[10] I. Rehman, S. Ullah, and D. Khan, "Multi Layered Multi Task Marker Based Interaction in Information Rich Virtual Environments," *International Journal of Interactive Multimedia and Artificial Intelligence*, vol. 6, no. 4, pp. 57–67, 2020.

[11] K. S. P. Mudigonda and P. Sharma, "Multi-sense Embeddings Using Synonym Sets and Hypernym Information from Wordnet," *International Journal of Interactive Multimedia and Artificial Intelligence*, vol. 6, no. 4, pp. 68–79, 2020.

[12] J. C. Sánchez-Prieto, J. Cruz-Benito, R. Therón, and F. J. García-Peñalvo, "Assessed by machines: Development of a TAM-based tool to measure AI-based assessment acceptance among students," *International Journal of Interactive Multimedia and Artificial Intelligence*, vol. 6, no. 4, pp. 80–86, 2020.

[13] M. Cantabella, R. Martínez-España, B. López, and A. Muñoz, "A Fine-Grained Model to Assess Learner-Content and Methodology Satisfaction in Distance Education," *International Journal of Interactive Multimedia and Artificial Intelligence*, vol. 6, no. 4, pp. 87–96, 2020.

[14] M. Magdin, D. Držík, J. Reichel, and Š. Koprda, "The possibilities of classification of emotional states based on user behavioral characteristics," *International Journal of Interactive Multimedia and Artificial Intelligence*, vol. 6, no. 4, pp. 97–104, 2020.

[15] R. W. S. Ruhlandt, "The governance of smart cities: A systematic literature review," *Cities*, vol. 81, pp. 1–23, 2018.

[16] D. Grimaldi and V. Fernandez, "The alignment of University curricula with the building of a Smart City: A case study from Barcelona," *Technol. Forecast. Soc. Change*, vol. 123, pp. 298–306, 2017.