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*Editorial*

# Advances in Explainable Artificial Intelligence and Edge Computing Applications

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## 1. Introduction

Artificial Intelligence (AI) and its applications have undergone remarkable experimental development in the last decade and are now the basis for a large number of decision support systems. There are countless models and algorithms with different typologies, and their applications are highly varied in terms of both configuration and use cases. In addition, there has been an increase in the number of tools that simplify the application of all the existing algorithms, and there are powerful data visualization systems.

The success of AI has been demonstrated in many use cases. New graphical tools promote its usage as they enable people who do not have previous experience in AI, Machine Learning, Deep Learning, etc., to create algorithms. Thus, these tools are targeted at end-users who are experts in an application domain, enabling them to design AI algorithms and directly apply them, despite their lack of knowledge of AI. The problem is that many algorithms continue to be black boxes that receive data and deliver unintelligible results, even for AI or domain experts.

The growing complexity of AI means that research is required on new approaches to designing algorithms following the principles of transparency, interpretability, and explainability. By transforming black-box models into interpretable white-box algorithms, humans will be able to understand the generated predictions.

## 2. The Present Issue

This Special Issue consists of nine papers covering important topics in the field of AI and Explainable Artificial Intelligence (XAI).

The Internet of Things (IoT) and Edge Computing are also commonly used within XAI algorithms. Palanca et al. [1] provide a framework for the development of Multi-Agent Systems on IoT devices and a Multiagent System developed on its basis. It is a consistent theoretical framework based on the concept of an IoT artifact for modeling an abstraction from which a Multiagent System can be developed. The MAS proposed by the authors allows for the interconnection of IoT devices. Within the area of IoT, Poza-Lujan et al. [2] introduce a distributed modular architecture that allows embedding some intelligence in IoT devices, making it possible to shift from a hierarchical pyramid to an inverted pyramid. In the architecture, IoT devices can join together to form abstract nodes called control nodes. These control nodes have advanced capabilities; they can share information about the measurements being taken, which increases accuracy and reduces the processing load. The research community focuses on algorithms applied to transportation, especially to emergencies in transportation [3,4]. Santos et al. [4] propose a system for the detection of violence inside vehicles (Uber, Lyns, etc.). The system operates within a limited timeframe as it analyzes both the video and audio recordings from real-time surveillance. The article presents three models for in-car violence recognition (X3D, C2C, and I3D) that are compared with traditional methods. González et al. [3] focus on traffic-control strategies and the autonomous management of emergency vehicles at intersections. The article proposes a distributed junction management protocol for emergency vehicles. The traffic control system uses basic traffic lights (red and green); however, the levels of priority change in certain situations. Thus, the authors propose rules based on distributed intersection management, so that the traffic flow of non-priority vehicles is minimally affected.

Prediction and decision-making models are also commonly used within AI and XAI models [5–8]. These models can be applied to different areas, such as tourist preferences, as proposed by Meira et al. [6], that explore Machine Learning to predict users' ratings. Concretely, the authors used Natural Language Processing strategies and Machine Learning methods to identify the tourists who truly like or dislike a particular point of interest. Flores et al. have focused on Higher Education [5] to reduce university student dropouts. To do so, the authors apply data mining methods to forecast the dropout and, based on the conducted study, analyze the factors that influence student dropout. Another interesting approach is the application of Deep Learning in videos and audio to detect human activities and emotions, as proposed by Reinolds et al. [7]. In this study, the CRISP-DM methodology is followed to analyze Machine Learning models that detect violence in video streams to compare their performance. Sung et al. [8] also research the factors a multimodal service system has to achieve to satisfy a specific set of requirements. The study identifies key decision-making problems in the design process and analyzes the role played by Artificial Intelligence.

Finally, as part of this Special Issue, Lage et al. [9] explored the uses of blockchains to identify the objectives of the companies that are currently investing in blockchain technologies as a means of improving their processes and services. This article identifies properties attributed to blockchains in each sector and company size and the relations among them, revealing the reality of blockchain technology adoption for process and service improvement.

## 3. Conclusions

This Special Issue showcases a variety of research approaches to the use of XAI and AI models to complement systems, facilitating the parallel use of data treatment and knowledge processing algorithms. This makes it possible to simultaneously process both relational and non-relational data from databases and sources, generating advanced results, following a white box approach where domain experts are able to design AI algorithms and where the results may be justified based on the input data.

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