Editor's Note

Are We on the Way to Become Machines From Our Own Machines?

Artificial Intelligence (AI) is a scientific discipline that aims to drive disruptive scenarios for science-based technical developments that solve complex problems. The IJIMAI journal's scope is precisely to demonstrate how the combination of two factors — technical foundations and sought-after applications — must guide future AI developments to find solutions to complex real-world problems.

This IJIMAI publication opens with an article that considers the current framework for AI fundamentals: **how can we improve AI technology to find solutions to real-unsolved problems?** The initial answer seems to be related with a desired self-consistent procedure: let machines learn from our experience. In the article by Alotaibi et al., the analysis of neural networks in terms of the parameters used, how they work, and how do they respond to the problem itself led the authors to a rationale for decision-making regarding the performance of different neural models.

The immediate question that arises is whether there are any universal and fundamental criteria that can be used to define the models that guide AI methods. Apparently, there are not such universal methods, and we are faced with a challenging open problem. Subsequent manuscripts will provide readers with more in-depth insights into this issue.

The next articles place you at the forefront of current AI challenges, while using AI as a medium to assess objective results (understood as numerical evidence) to shed light on current problems arising from clearly defined, real-world areas of interest. The common factor is the complex nature of the issues at hand. This complexity is derived from the large amount of data and the development of a rationale to comprehend the interactions between them, i.e. data mining research (DM).

Real-world problems vary from highly demanding social science scenarios (where the huge number of variables involved is undeniable) to the most purely nature-inspired scenarios (where it is assumed that some well-defined laws should govern, reducing the freedom associated with the large number of natural variables). Both scenarios would probably find a route to further success by incorporating social rules and/or natural laws into the methodologies used to develop their associated AI algorithms. Such inclusions are essential for supporting the rationale behind what is known as machine learning (ML), a point also highlighted in this publication. From this point onwards, and in this IJIMAI edition, a variety of technical areas, including image processing, climate modelling, language processing and emotion analysis, are used to test current AI models.

The second contribution of this IJIMAI number is dedicated to numerical methods applied to image processing. Extracting information from image processing is one of the most challenging problems in information technology scenarios. Díaz-Pacheco et al. present methodological results that encourage the use of deep learning approaches for supervised (discriminative) learning and guide further unsupervised (generative) learning. The use of such results to inform decisions in the tourism sector is presented as a real-world application.

The next contribution deals with climate evolution predictions to create more robust forecasting systems. Such challenges rely on the need for more general and demanding fluid mechanics laws and complex systems analysis. Despite the progress made in these areas, the effective numerical integration of climate model projections with measured rainfall data remains challenging. The relevance of such analysis for vital sectors such as disaster prevention and agriculture-based industries is beyond doubt. Considering the results presented by Oswalt et al. would therefore be a meaningful way to combine advanced AI models with data fusion techniques, thereby enhancing the accuracy and reliability of rainfall predictions.

The articles by Paramasivam et al. and Zhang et al. are closely related. The manuscript presented by Paramasivam et al. deals with speech emotion recognition and the impact of data acquisition on the subsequent design of processing algorithms for machine learning-based solutions. The work presented by Zhang et al. deals with sentiment analysis in relation to AI use, which is probably a technological step further than the previously presented AI for 'language analysis'. The relevance of the topics addressed in both studies is widely recognised and encouraged by researchers who specialise in leveraging the strengths of AI to advance areas related to social behaviours. Examples include personalised healthcare, affective computing and human-machine interactions, as well as the omnipresent market insertion and interferences in our daily routines, which have been conditioned by commercial interests.

While the huge diversity of fields claiming methodological applications of AI is clear from the articles presented so far, the next three contributions focus on more specific technical concerns. Due to their relevance, such technical issues must be included as part of well-defined branches within AI research: the aforementioned 'data mining' and 'machine learning'.

The manuscript presented by Cartensen et al. could be considered a piece of research highlighting the importance of DM. The analysis presented therein once again raises the question regarding the need for fundamental rules to make data analysis more valuable in terms of setting guarantees for further algorithm designs. Successful contrast with selected experimental training data does not offer strong enough guarantees for AI design. However, presenting this AI problem-solving route is a valuable result, as it puts us at the forefront of state-of-the-art AI technologies.

The next two articles could be highlighted as contributions that are more closely related to the use of AI for ML designs. The first, by Suruliandi et al., uses what could be considered ML algorithms to perform tasks related to the well-known problem of healthcare assistance. In this case, the authors use clinical data collected for the evaluation of possible cases of coronavirus as training sets. The article then goes on to discuss the optimisation of effective diagnostic algorithms. The other manuscript, by Guo et al., proposes a mechanism that improves the state of the art in image analysis scenarios by optimising network architectures. The work presented goes into person-re-identification control mechanisms.

The last four manuscripts in this issue of IJIMAI review the issues that guide the scope of this journal and of AI research in general. They highlight the most challenging unsolved problems and the need to conscientiously improve AI technologies.

Martínez Núñez et al. analyse the impact of deep learning methods combined with visual computing techniques to address constraints and enhance operational capabilities around railway tracks. Tejero et al. address the universal problem of treating complex systems derived

DOI: 10.9781/ijimai.2025.08.001

from the analysis of social events. However, the most notable concept studied and evaluated here is misinformation. There is no doubt that this concept is closely related to the integration of AI methods into societal events. The relevance of this discussion in the current context must therefore be highlighted. **Is misinformation inherent to AI at this stage?** The question remains open.

The potential applications of AI methods in predicting, modulating and controlling human behaviours are far beyond current estimates. There is no doubt that AI technologies are already exerting control over interactions involving at least one human element. This is a hopeful and risky promise. With these factors in mind, trial cases are studied in next articles, one affecting the economic sector and the other concerning educational scenarios.

The economy sector is inevitably modulated by client and market interactions. The question of how these interactions can be controlled to generate profit from AI results is analysed by Kollmorgen et al. The second trial case involves students and their educational context. Based on similar technological foundations, the integration of AI into educational contexts is opening up new opportunities and presenting new challenges. Sánchez-Canella et al. intend to provide guidelines to improve interactions between AI and the educational final targets: students. **Is AI in education recommended? Is it useful? Is it challenging?** Time is needed.

Once again, this IJIMAI edition supports efforts to guide researchers in a collaborative endeavour to establish robust methodological frameworks that underpin the conscious application of AI techniques to real-world problems. The lack of systematic methodologies for designing self-guided algorithms -ML- and for defining proper learning databases -DM-, highlights the need to consciously prioritise basic research in order to formalise and control the rules governing the behaviour of complex systems under analysis.

Finally, I would like to thank all the authors who contributed to this edition of IJIMAI for their valuable contributions. I encourage them and all the other researchers involved to use their expertise to ensure the safe and successful advancement of AI.

To conclude this letter, I would like to invite you to consider the following questions: **should AI learn from our presumed natural intelligence? If so, is it a good idea?**

Dr. Yamila García-Martínez Eyre i Canals
Managing Editor
Universidad Internacional de La Rioja