

Editor's Note

THE International Journal of Interactive Multimedia and Artificial Intelligence – IJIMAI – provides an interdisciplinary forum in which scientists and professionals can share their research results and report new advances in Artificial Intelligence (AI) tools or tools that use AI with interactive multimedia techniques. The present regular issue includes 13 articles. The first block of articles deals with problems related to images as diverse as the artificial generation of images or the optimization of their storage and transmission through compression techniques. The applications are very diverse, including the identification of forgeries, tumors or even misplaced face masks. Another block contains only one paper on speech recognition targeted on specific users suffering from dysarthria. Other block of two articles focuses on the education field problems of automation of teachers' certification processes or prediction of students' academic failure. Last block of articles covers services and products, commerce, marketing and user experience issues, as well as the ethical implications of AI.

In the last years, outstanding results have been obtained by synthetic image generation algorithms applying deep learning based approaches. These can create original works of art or others astonishingly faithful to the artists' works. The first article by Fraile-Narváez et al. questions the possibility of using AI to detect forgeries created by AI algorithms, in order to protect works and their attribution. The authors propose a convolutional neural network (CNN) that is trained with a dataset of paintings by Rembrandt and other 17th century Dutch painters, with similar artistic styles. This is key to detect forgeries when paintings are remarkable similar. Their experiments showed that it was possible to create a deep learning algorithm capable of detecting false images generated by AI algorithms, specifically by Dall-e 2, with a high degree of accuracy.

The following article also proposes a CNN to solve a today's problem very different from the previous one. Since the coronavirus pandemic, face masks have been a common defense method worldwide to protect from respiratory diseases. Bhaik et al. propose to use the light-weighted neural network MobileNetV2 to detect people who are not wearing these masks properly. Their network is based on the concept of transfer learning and is trained on a self-made dataset of images, achieving an accuracy higher than 90%.

Next, Arif et al. propose an adaptive deep learning model for the detection of multi-fog types of images. Detection of objects in foggy weather condition is important for many applications such as autonomous driving or video surveillance. Foggy scenes are of different types based on fog density level and fog type, and detecting these types as a pre-processing step can enhance the detection results. Their experiment shows a 96% classification accuracy rate. Besides, the authors provide a dataset of multi-fog scenes due to the lack of publicly available datasets of inhomogeneous, homogenous, dark, and sky foggy scenes.

Unfortunately, another today's relevant problem is tumor identification. During the last years, many works have been undertaken on image segmentation for medical problems, as identification of brain tumors, using Magnetic Resonance (MR) images. Khemchandani et al. propose a classifier, based on CNN, to categorize the brain tumor from the MRI image segments. The CNN is optimized by using an algorithm that combines particle swarm optimization (PSO) and the imperialist colony algorithm. Also, they propose the scatter local neighborhood structure description to capture textural characteristics to support accurate tumor categorization. The proposed method obtained a maximum accuracy of 0.965 during the experimentation utilizing the

Multimodal Brain Tumor Image Segmentation Benchmark (BRATS) database.

As previous works show, the applications of images are many, and there is an increased demand for their storage and transmission. Image compression algorithms contribute to their efficient storage and transmission. In their article, Kaur et al. propose a new technique for optimizing image compression using Fast Fourier Transform (FFT) and Intelligent Water Drop (IWD) algorithm. The aim is to increase compression while keeping its best possible quality. The IWD is used to optimize de FFT threshold values. The Structural Similarity Index Measure (SSIM) is used to estimate the perceived image quality, obtaining further understanding of the compression problem and promising results.

Some diseases, as the previous mentioned brain tumor, cause dysarthria, which reduces the speech quality of a person by affecting the speech production system. Therefore, the automatic speech recognition systems degrade when the speaker suffers dysarthria. The following paper by Sahu et al., proposes a four-level discrete wavelet transform (DWT) decomposition to capture the sub-band information of the speech signal. Then, using the Inverse IDWT, the signals are reconstructed and the log filterbank energies are computed by analyzing the short-term discrete Fourier transform magnitude spectra of each reconstructed speech signal. For each analysis frame, the log filterbank energies obtained across all reconstructed speech signals are pooled together, and discrete cosine transform is performed to represent the cepstral feature, that is the discrete wavelet transform reconstructed (DWTR)- Mel frequency cepstral coefficient (MFCC) in this study. Given the results in the experiments, the authors propose a two-stage classification approach by using MFCC and DWTR-MFCC features, improving classification accuracy.

The following work is related to web information purchasers, whose consumption patterns are changing, being more focused on psychological satisfaction than price satisfaction. In multimedia content searches, psychological satisfaction can be improved through searching by mood or emotion rather than text content. Social Networks Services (SNS) use this type of searches based on a folksonomy, for example, but there are problems with synonyms. To solve the problem of synonyms in their previous study, Moon et al. represent the mood in multimedia content with arousal and valence (AV) in Thayer's two-dimensional model. Although some problems of synonyms were solved, the retrieval performance of the previous study was less than that of a keyword-based method. In their present study, the authors propose a new method where the mood of multimedia content is represented with a fuzzy set of 12 moods of the Thayer model. The experiments show that the proposed method is superior to other two methods, one based on AV value and the other based on keywords.

During the last years, the use of learning management systems (LMS) as a complement to face-to-face classes has spread a lot. Many universities study the usage of LMS by teachers to certificate and evaluate their competence in technology-based learning. To automate this process, in the next paper, Regueras et al. present an expert system that automatically classifies courses and certifies the teachers' competence in LMS from the data in their logs. Firstly, clustering helps define the classification scheme, which is used to define the rules used to classify courses. The scheme and rules have been obtained from data of 3303 courses and two million interactive events. The system has been tested with real data and the results have been successfully

validated against human experts. These experts valued very positively to have a tool that can automate the process as they find very difficult to manually classify many of the courses.

Also, in the field of education, the next study by Rincon-Flores et al. aims at improving the learning-process and reducing academic failure in two Physics courses. Specifically, they use K-nearest neighbor and random forest algorithms to predict academic performance. In their experiments they find differences between the first and second term evaluations, obtaining not very accurate predictions in the first term evaluation. However, the accuracy improves in the second term evaluation, as datasets grows. Based on the research results, the algorithm delivered a forecast of the group performance in general. Therefore, the algorithm can be used by the instructor to design and implement adaptative measures during the course.

In the recent years, the integration of work and family life is difficult since workers use technologies to work at home. This is stressful for workers who work anytime and anywhere. Therefore, a balanced work-life is important to improve mental and physical health condition of workers. Majumder et al. propose a monitoring web-based tool called the 'Wheel of Life.' Its interface helps tune various important factors, such as business life, creativity, social life, love, and life purpose, and provides multiple recommendations. Users can choose any of those recommendations and improve the living areas accordingly.

User experience is key for the success of a product or service. Today's users demand for high level of satisfaction, doing tasks efficiently and, moreover, they expect hedonic qualities not directly target-oriented. Agile methods are used frequently to develop products reducing development time. Requirements are typically written in user stories. In the next paper, Hinderks et al. propose a method called UX Poker to estimate the impact of a user story on user experience before the development of the product or service. Their results show that UX Poker can be implemented in real-life applications, providing essential insights for the agile team.

The use of AI is increasing rapidly, covering many different areas as health, marketing or education, as the present issue shows. Although the advantages of AI are recognized, there is a growing concern on the trust in systems. The European Union (EU) states that one of the four basic pillars on the development of AI is the development of ethical and trustworthy AI. In their paper, López Rivero et al. present an empirical study on the perception of the ethical challenges of artificial intelligence groups in the classification made by the EU. Authors seek to identify the ethical principles that cause the greatest concern among the population, believing that the study is a starting point for an informed debate on the ethical implications of AI based on the classification of ethical principles made by the EU.

The mentioned growth of use of AI and digital services have accelerated the opportunities of marketing intelligence. Supported by mobile and personalized marketing services, customer experiences have been optimized. However, on the other hand, there is also some deterioration caused by annoying marketing communication in real-time or programmatic advertisement, for example. Therefore, the question if marketing intelligence means service boom or bust of marketing arises. In the last paper of this issue, Lies elaborates the boom and bust aspects of marketing intelligence through a literature review, concluding that the question whether marketing 4.0 means the boom or bust of marketing remains open.

Dr. Rubén González Crespo
Editor-in-Chief
Universidad Internacional de La Rioja