Editorial

Research trends from computer and electronic sciences

Electronics as a technical and scientific discipline was born in 1904, based on the principles defined by John Ambrose Fleming (inventor of the diode) and André Marie Ampére (founder of electromagnetic theory), its evolution towards current electronics, has largely been possible thanks to the invention of the triode (device capable of converting alternating current into direct current) by Lee De Forest. On the other hand, computer science was born as a scientific discipline in the early 1940s, based on mathematical logic and algorithmic theory, the principles that sustain it go back to the works Gottlob Frege (father of modern mathematical logic) and Andréi Kolmogórov (founder of the theory of algorithm complexity). The complementarity between these two relevant disciplines has made possible the development of a wide diversity of technologies applied to studies in the care of health (e.g. biomechanics, computerized axial tomography and telemedicine) and to space exploration (e.g. communication mobile and GPS, robotics and nanotechnology), among others.

Current technological developments, in the field of computer and electronic sciences, have been possible thanks to an important and varied number of scientists and visionaries, performing in different roles: conceptualizers (Charles Babbage, Alan Turing, John von Neumann, Claude Shannon, Nikola Tesla and John Bardeen), inventors (Konrad Zuse, John Atanasoff, John Mauchly, Presper Eckert, Howard Aiken, Jay Forrester, John Bardeen, Walter Houser Brattain, William Bradford Shockley and Martin Cooper), entrepreneurs (Thomas Watson, William Norris and Ross Perot), the ones who made the smallest and most powerful computer (William Shockley, Robert Noyce, Jack Kilby and Marcian Hoff), hardware designers (Gene Amdahl, Seymour Cray and Gordon Bell), software specialists (Grace Murray Hopper, John Backus, John Kemeny, Thomas Kurtz, Gary Kildall, William Gates, Dennis Ritchie, Kenneth Thompson and Daniel Bricklin), those who brought the computer to the masses (Nolan Bushnell, Steven Jobs, Adam Osborne and William Millard) and computer science pioneer (Donald Knuth).

Although Computer and Electronic Sciences have a fairly broad spectrum of research, the interest of this journal is the dissemination of scientific advances in the field of: artificial intelligence, computer science (miscellaneous), computer networks and communications, information systems and signal processing. In the last year, the IEEE has defined in these areas, a series of standards that give indications about the interests of the industry in research. As for Artificial Intelligence, the most prominent standards are: transparency of autonomous systems [1], assessing the impact of autonomous and intelligent systems on human well-being [2], implementation and management methodology for Software Based Intelligent Process Automation-SBIPA [3], Big Data Business Security Risk Assessment-BD BSRA [4] and framework and application of Federated Machine Learning [5]. Regarding computer science, the most prominent standard is networked smart learning objects for online laboratories [6]. In terms of computer networks and communications, the most relevant standards are: Power over Ethernet over 2 pairs [7], Health informatics-Device interoperability-Personal health device communication-Device specialization-Body composition analyzer [8], Secure SCADA Communications Protocol-SSCP [9], utility industry end device communications module [10], measuring electroacoustic performance of communication devices [11], aerial communications and networking standards [12], data model for nanoscale communication systems [13], among others. Regarding information systems, the most prominent standard refers to Health informatics-Device interoperability (Point of care medical device communication-Domain information model) [14]. Finally, in terms of signal processing, the standards identified are: computation of energy efficiency upper bound for apparatus processing communication signal waveforms [15], spectrum characterization and occupancy sensing [16] and 2nd generation audio coding [17].

Complementarily, there is evidence of a trend in the most commonly addressed topics, in the fields of artificial intelligence, computer science (miscellaneous), computer networks and communications, information systems and signal processing. In all of them, the topic with the highest number of publications is artificial intelligence, these are most likely due to the interest that descriptive, predictive and prospective processes have aroused in researchers, using them from theoretical and applied approaches in the solution of different types of problems present in each of these areas. The identification of the topics that are trending worldwide, from the aforementioned areas, helps the researcher to detect the validity of his line of research work. In the field of Artificial Intelligence, the topics with the highest production in research are: neural nets, feature extraction, convolutional neural nets, image classification, pattern classification, optimization, object detection, image

segmentation, medical image processing, recurrent neural nets, support vector machines, diseases, regression analysis, computer vision, image representation, Internet of Things and telecommunication computing. As for computer science, the most trending topics are: feature extraction, neural nets, Internet of Things, convolutional neural nets, optimization, cloud computing, pattern classification and image classification. In computer networks and communications the most relevant topics currently are: telecommunication traffic, computer centres, resource allocation, virtualization, 5G mobile communication, optimization, Internet, telecommunication network topology, computer network security, telecommunication network routing, quality of service, Internet of Things and cloud computing. Regarding Information systems, the trend topics in research are: medical information systems, health care, driver information systems, geographic information systems, Internet, diseases, Internet of Things, mobile computing, cloud computing, road safety, neural nets, road vehicles and feature extraction. Finally, regarding signal processing, the most relevant topics are: medical signal processing, feature extraction, video signal processing, neural nets, convolutional neural nets, array signal processing, signal classification, electroencephalography, object detection, neurophysiology, optimization, image classification, medical image processing, diseases and image segmentation.

With the purpose of contributing to the research dissemination processes, developed from the computer and electronic sciences, CESTA (Journal of Computer and Electronic Sciences: Theory and Applications) is created. An open access journal, electronic, refereed, international and of continuous publication, which receives original contributions in English and Spanish, adopting the ethical parameters of COPE, within the framework of the theories and applications in sciences related to computing and electronic science, particularly in the aforementioned areas.

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