Editorial Note for the Special Issue: Perspectives and Challenges in Doctoral Research—Selected Papers from the 10th Edition of the Scientific Conference of the Doctoral Schools from the "Dunărea de Jos"

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This editorial note is dedicated to the 10th Scientific Conference which was held on June 2022 in Galati, Romania, and was organized by the Council of Doctoral Schools of the "Dunărea de Jos" University of Galati (SCDS-UDJG). The papers in this Special Issue, which reflect the sectional talks exhibited at the SCDS-UDJG, originate from a relatively variety of research fields. The goal of this conference and Special Issue was to present the most recent innovations in doctoral research while bringing together new perspectives and challenges.

This Special Issue contains a total of 13 scientific works that were presented at the SCDS-UDJG conference and includes topics including artificial intelligence technologies, mechanical and industrial engineering, mechatronics, materials system engineering, food science and bio-resources engineering.

Four articles present studies related to artificial intelligence technologies, representing the majority of papers published in this Special Issue. In article [1], the authors attempted to identify the most effective multivariate model for screening for main drugs of abuse, including opioids, cannabinoids, and hallucinogenic amphetamines (2C-x, DOx, and NBOMe) based on their ATR-FTIR spectra. Several machine learning methods, including Support Vector Machines (SVMs), eXtreme Gradient Boosting (XGB), Gradient Boosting, Random Forest, and K-Nearest Neighbors (KNN), were used to assess the drug class membership.

In article [2], the authors presented alternative training methods that were evaluated for an Artificial Neural Network (ANN) intended to identify JWH synthetic cannabinoids. The authors employed the Python programming language along with the Neural Designer data science and machine learning platform to improve the model's performance in terms of output sensitivity.

In the study reported in article [3], a technique based on deep learning and machine learning was used to help doctors to more accurately categorize breast cancers as benign or malignant utilizing BUS photographs. The authors suggested a technique that incorporates Hu's moments as handcrafted and significant aspects in the analysis of breast tumors. This technique may be applied to aid in the clinical diagnosis of breast cancers after detection by offering a good combination of segmentation and Hu's moments.

Last but not least, A CNN (convolutional neural network) version along with full photographs from four digital databases were considered in article [4] to describe a method for fingerprint categorization. The suggested model has three stages: a preprocessing stage that handles edge enhancement operations, data resizing and data augmentation, and a post-processing stage that concentrates on classification tasks.

Three articles in this Special Issue present findings in the field of mechanical and industrial engineering. Thus, articles [5,6] take wind energy as their main objects of

research. The objective of article [5] was to provide a parallel assessment of the wind resources from the Black Sea's onshore and offshore regions, taking into account some significant local sites such as the harbors.

Article [6] uses weather information from the Maritime Hydrographic Directorate collected over a 13-year period (2009–2021) to present a general survey of the wind energy potential of the Black Sea coast of Romania. Furthermore, in article [7], information and design options appropriate to the entire shipping industry are presented along with an overview of the development of the modern low-speed marine two-stroke diesel engine from the perspective of the technical water-cooling plant, taking into consideration and starting from the market requirements for power and speed.

In the domain of mechatronics, two articles, [8,9], were also published. The flexible assembly, disassembly, and repair of a mechatronic line (A/D/RML) supported by an autonomous robotic system (ARS), two robotic manipulators (RM), and a visual servoing system (VSS) are the subject of the article [8], which describes modeling and control techniques used in this field of study.

The A/D/RML comprises a flexible cell (FC) with a 6-DOF ABB industrial robotic manipulator (IRM) and an ARS for manipulation and transport, along with six workstations (WS) on a mechatronics line (ML) attached to the flexible cell (WS). The work in question also covers the question of how to synchronize data between different types of industry-standard field equipment and control systems. With the aim of obtaining precise positioning in a processing technology applied to a laboratory mechatronics line (ML), the essential contribution of article [9] is the modeling and control of a complex autonomous system (CAS) outfitted with a robotic manipulator (RM) and a mobile vision sensor (MVS).

The next two research articles cover topics related to materials system engineering. Thus, article [10] describes an event-based PID controller equipped in a conveyor transportation system. PID control is one of the most widely researched methods of control used for controlling the event trigger transportation system. Article [11] also studies the corrosion rate indicated in the material loss per unit of time and the surface characteristics of the carbon steel type S235JR blasted with different types of materials (quartz, alumina, and red garnet with a particle size between 60 and 80 mesh (0.25–0.60 mm)). The corrosion rate was estimated using electrochemical techniques such as the open circuit potential, corrosion rate, polarization resistance, and gravimetric process.

Finally, the other two articles included in this Special Issue focus on various bioactive compounds from plant matrices used to enhance the extraction process and acquisition of by-products and value-added extracts for the design of functional food products. The extraction optimization of biologically active compounds, especially anthocyanin compounds and polyphenol compounds, and the antioxidant activity from red grape (*Băbească Neagră*) peels is discussed in article [12], while article [13] investigates the optimization of the parameters impacting on the concentration of anthocyanins in red onion skins and their antioxidant activity. These two studies are based on the idea that natural food additives should take the place of synthetic ones in the food system while also controlling the food industry's economic value chain by exploiting various valuable byproducts.

At this final point, it has to be highlighted that the works discussed above reflect the most recent advancements in the fields of artificial intelligence technologies, mechanical and industrial engineering (wave and wind energy), mechatronics, materials system engineering, food science, and bio-resources engineering. In the opinion of this Special Issue's Guest Editors, these papers represent a starting point for further studies and open new research directions.

Conflicts of Interest: The authors declare no conflict of interest.

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