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People`s Democratic Republic of Algeria
Ministry of Higher Education and Scientific Research
University of El Oued
Faculty of Exact Sciences
Under the supervision of
DGRSDT - The Directorate-General for Scientific Research and Technological Development
Organize
International Pluridisciplinary PhD Meeting (IPPM'23)

2nd Edition, December 11-13, 2023
Artificial Intelligence (AI) Revolution:
Challenges, Prospects and Ethical Aspects
Theme: Artificial Intelligence (AI) and its Applications in Physical, chemistry, mathematical and Computer Sciences

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Conference Axes:

Physics:
1-Artificial Intelligence for Materials Science
2-Mathematical Modelling in Fundamental Physics and Artificial Intelligence
3-Artificial Intelligence for Lasers Science
4-Improving the performance of thermal and photovoltaic systems using AI.

Chemistry:
1-Artificial Intelligence for Phytochemistry: Identifying Natural Products
2--Artificial Intelligence for materials synthesis and characterization.
3-Molecular Docking for Drug Discovery
4-Artificial Intelligence and Machine Learning in Analytical Chemistry.

Mathematics:
1-Applied Mathematics
2-Numerical Analysis
3-Dynamical Systems.

Computer science:
- Artificial Intelligence Algorithms -Intelligent System Architectures - Artificial Intelligence Tools & Applications.
- Computer Vision and Speech Recognition-Natural Language Processing (NLP).
- Web Intelligence Applications & Search-Resource management in an Edge computing environment.
- Internet of Things approach for smart cities - Critical systems, modelling and verification.
- Machine learning approaches for severe diseases diagnostics-Combination of IoT and Machine Learning for Smart Application.
- Formal specification and modelling of dependable critical systems-Blockchain models for systems security.
- Modelling of software architectures and evaluation of their functional and non-functional properties.
- Realistic case studies, applications and experimentation studies.

Conference Workshops:

Physics: Artificial Intelligence (AI) and its Applications in Physical Sciences

Workshop 1: Glass and Artificial Intelligence Challenges.

By Pr. BENTOUILA Omar, Ouargla University

Glass has been an integral part of human life for more than 2,000 years, and despite several years of research and analysis, some basic and practical questions remain unanswered. Recent studies suggest that data–driven technologies, such as artificial intelligence and machine learning (ML) can provide new perspectives to address some of these questions, which is a major challenge.

Workshop 2: Artificial intelligence for optimizing the laser applications:
By Dr. MEHALLOU Said, El-Oued University.

Artificial intelligence (AI) leads to reliably predicting how the laser application systems behave in order to better plan their maintenance and servicing. Such (AI) systems make the dream of 'predictive maintenance' come true in various laser applications – by reducing downtime and detecting errors early long before these issues leave the permissible tolerance range. This reliable prediction helps create laser systems that come closer and closer to the ideal of absolute error-free production.

Workshop 3: Computational Quantum physics and complex systems:
By Dr. AHMIM Rachid, El-Oued University.

Mathematical modeling is an essential tool in both fundamental physics. Mathematical models are used to describe and predict the behavior of physical systems based on artificial intelligence that has emerged as a promising alternative.

Workshop 4: Artificial intelligence: A powerful paradigm for scientific research:

By Dr. DJANI Faiçal, Biskra University.

Artificial Intelligence (AI) coupled with promising Machine Learning (ML) technologies is widely affecting many aspects of various fields including science, technology, industry and even our daily lives. ML technologies for data analysis are developed with the goal of gaining useful insights, classifying, predicting, and making evidence-based decisions in new ways, which will fuel the growth of new applications and fuel the sustainable boom of artificial intelligence.

Workshop 5: Improving the performance of thermal and photovoltaic systems using AI:

By Pr. ATTIA Mohammed Elhadi, El-Oued University.

This workshop aims to present the various techniques and programs used based on artificial intelligence to improve the performance of photovoltaic systems.

Chemistry: Artificial Intelligence (AI) and its Applications in Chemistry Sciences

Workshop 1: Molecular Docking for Drug Discovery.

By Pr. LANEZ Touhami, El-Oued University.

Molecular Docking In the field of molecular modeling, it is a method that predicts the preferred direction of one of the two molecules relative to the other when they bond with each other to form a compound. Knowing the preferred direction may be used to predict the strength

of coupling or the affinity of association between molecules using functions. Molecular docking is one of the most widely used methods in structure–based drug design (SBDD) due to its ability to predict the binding conformation of small molecule ligands with respect to the appropriate target binding site. The characterization of binding behavior plays an important role in rational drug design as well as in the illustration of basic biochemical processes.

Workshop 2: Artificial Intelligence for Phytochemistry: Identifying Natural Products.

By Pr. BEN CHIKHA Naima, El–Oued University.

The development of artificial intelligence is necessary for improving future research in natural product sciences. The laboratories have incorporated complementary systems that use artificial intelligence and machine learning to process analysis data and predict structure. The tandem use of HPLC and mass spectrometry analysis has been integrated. As well as the application of more advanced NMR spectroscopy, such as automated systems, and their increased use will provide centralized data storage allowing for more rapid and efficient data processing and human review.

Workshop 3: Artificial Intelligence for materials synthesis and characterization.

By Pr. BEN MAYA Ammar, El–Oued University.

The chemists integrate expertise in material composition, characterization, and theoretical simulation methods with machine learning to more explore the design space. Artificial intelligence enables us to extrapolate and predict unexplored compounds where current data are limited by combining these models with high–throughput synthesis and characterization tools, we can rapidly identify new compositions and materials of interest for applications.

Workshop 4: Artificial Intelligence and Machine Learning in Analytical Chemistry.

By Pr. ZENKHRI Louiza, Ouargla University.

Machine learning and artificial intelligence are increasingly gaining prominence through image analysis and machine processing. Machine learning is transforming chemistry profoundly, from revisiting decades–old analytical techniques for the purpose of creating better calibration curves to aiding and accelerating conventional simulations and using them as approaches to conclude the chemical properties.

Mathematics: Mathematical Analysis and its Applications in Computer Science

Workshop 1: Applied Mathematics (Partial Differential equations, Operators equations and application to computer science):

By Pr. FAREH Abdelfateh, El-Oued University.

The aim of this workshop is to encourage the researchers and PhD students to give some models of partial equations or operators equations which can be applied in artificial intelligence, the study contents also the functional part as the existence problem of the solution.

Workshop 2: Dynamical systems and mathematical modelling

By Dr. GUEDDA Lamine, El-Oued University.

The study of some systems needs its modelling, the idea based to create a model for each system, these systems divided into mathematical class or physical class. The mathematical modelling means that's the behavior of different systems can be explored by using their mathematical models. The aim of this workshop is to present some results related to computer sciences.

Workshop 3: Numerical Analysis (Algorithms and applications).

By Dr. DOUDI Nadjet, El-Oued University.

This workshop aims together leading researchers working on various numerical methods for Partial differential equations, by using some recent schemes, and encourage them to their applications in artificial intelligence.

Computer Science: Smart & Secure Systems

Workshop 1: Artificial Intelligence Systems, Tools & Applications

By Pr. BENHARZELLAH Saber, Batna 2 University

Artificial intelligence systems, tools, and applications encompass a diverse range of technologies and tools used in the design and development of computer software and intelligent systems. Artificial intelligence is used in various fields such as medicine, education, commerce, security, entertainment, and others, and enables users to benefit from smarter services and improve efficiency and productivity.

Workshop 2: Cyber-Physical Systems (CPS) and Cybersecurity Systems

By Dr. ABBAS Messaoud, El Oued University

Cyber-Physical Systems aim to provide a flexible and intelligent system that can effectively interact with its surrounding environment, while Cybersecurity Systems work to protect these systems from various electronic attacks and threats. Designing and developing these systems requires a high level of knowledge of cybersecurity techniques and encryption methods, as well as a deep understanding of the requirements of physical and technological systems used.

Workshop 3: Internet of Things and Smart Cities

By Dr. LAOUID Abdelkader, El Oued University

IoT" or the "Internet of Things" is a field that focuses on connecting various devices and objects over the internet, enabling them to interact and communicate with each other, and exchange information, data, and signals between them. Smart cities seek to apply IoT technologies in managing infrastructure and urban services, which helps improve efficiency and quality in providing services to citizens, improve resource and energy use, and reduce traffic congestion and harmful emissions. The application of IoT in smart cities relies on using a set of advanced technologies such as sensors, wireless networks, and data analysis, to collect and process information related to connected objects and convert it into valuable information used in improving urban services."

Workshop 4: Data science Machine learning & Deep learning

By Pr. MEFTAH Mohammed Charafeddine, El Oued University

Data science, machine learning, and deep learning are among the fastest growing fields in the technological world. Data science involves collecting and analyzing data and information from various sources to find patterns and future predictions. Meanwhile, machine learning aims to develop models and algorithms that rely on data to enable devices and software to learn patterns and make smarter and more accurate decisions. Deep learning relies on advanced machine learning techniques to enable smart systems to understand and interpret complex information and make more accurate decisions.

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   – **sn computer science**
   – **Applied Sciences**

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