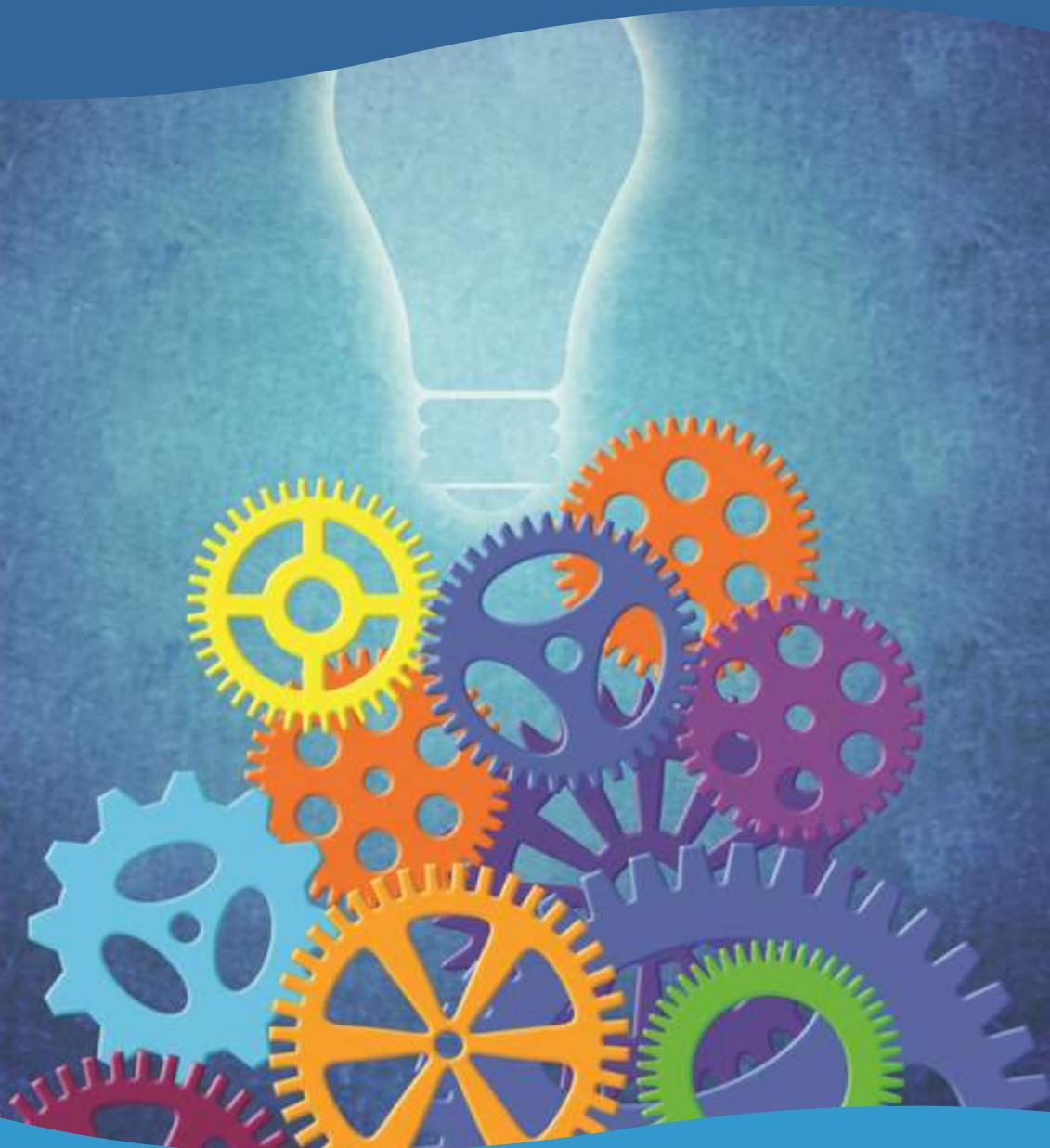


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Congress ICADA 2024**

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INTRODUCTION

We had the great honor of organizing the 4th International Artificial Intelligence and Data Science Congress ICADA 2024. It was truly a great pleasure for us to greet a lot of participants from many different countries attending ICADA 2024! We firmly believe that the conference will become an important international event in the field of cross-industry discussion about innovations in Academic Studies.

Three cooperating organizations supported the four-day conference. There were 130 papers accepted for presentation at ICADA 2024, contributed from different countries. We had plenary speeches and several well-known scientists and experts, to give invited talks at different sessions.

The purpose of ICADA 2024 was to provide a forum for the participants to report and review innovative ideas, with up-to-date progress and developments, and discuss novel approaches to the application in the field of their own research areas and discuss challenges of doing science.

We sincerely hope that the exchange of ideas on doing research, science and improving education will help the participants, and international cooperation sharing the common interest will be enhanced.

On behalf the Organization Committee of ICADA 2024, we would like to heartily thank our cooperating organizations for all they have done for the conference. We would also like to thank the authors for their contribution to the proceedings; the participants and friends of ICADA 2024, for their interest and efforts in helping us to make the conference possible; and the Editorial boards for their effective work and valuable advice, especially the ICADA 2024 secretariat and the ICADA 2024 staff, for their tireless efforts and outstanding services in preparing the conference and publishing the Proceedings.

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4TH INTERNATIONAL ARTIFICIAL INTELLIGENCE AND DATA SCIENCE CONGRESS ICADA 2024

MARCH 14-15, 2024

20.03.2024

14-15 Mart 2024 tarihlerinde MEET üzerinden çevrimiçi olarak gerçekleştirilen 4th International Artificial Intelligence and Data Science Congress ICADA 2024 konferansı akademik teşvik yönetmeliğinin 9. Maddesine istinaden “Tebliğlerin sunulduğu yurt içinde veya yurt dışındaki etkinliğin uluslararası olarak nitelendirilebilmesi için Türkiye dışında en az beş farklı ülkeden sözlü tebliğ sunan konuşmacının katılım sağlanması ve tebliğlerin yarıdan fazlasının Türkiye dışından katılımcılar tarafından sunulması esastır.” kriterlerini sağlamaktadır. Toplam 130 adet bildirinin yer aldığı kongre iki gün boyunca çevrimiçi olarak gerçekleştirilmiştir.

Türkiye dışından toplam 13 farklı ülkeden (**Fas, Cezayir, Slovakya, Kuzey Makedonya, Bulgaristan, Kosova, Pakistan, Arnavutluk, Romanya, İtalya, Macaristan, Irak**) katılım sağlanmış olup, 130 adet bildirinin 73 (%56,15) tanesi yabancı katılımcı tarafından sunulmuştur.

Kongremize ilginiz için teşekkür ederiz.

Saygılarımla,



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4TH INTERNATIONAL ARTIFICIAL INTELLIGENCE AND DATA SCIENCE CONGRESS ICADA 2024

MARCH 14-15, 2024

20.03.2024

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4TH ICADA 2024 konferansı bilimsel komitesinin çoğunuğu yabancı bilim insanlarından oluşturmaktadır. Aşağıdaki link ile bilimsel komite incelenebilir:

<https://as-proceeding.com/index.php/icada/committe>

Ayrıca konferansımızda hakem değerlendirmesi olup hakem değerlendirmesi olumlu sonuçlanmadan ücret talebinde bulunulmamaktadır.

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https://drive.google.com/file/d/1zDbV2I_ubMH6_bMzBDIV1vqZdtJS-bSb/view?usp=drive_link

Ayrıca görevlendirme yazıları ilgili konferansında özet ve tam metin kitapçıklarında yer almaktadır.

Kongremize ilginiz için teşekkür ederiz.

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14.09.2023

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The main roles of artificial intelligence in civil engineering

Chaima Mahkour¹, Djenette Mendjel² and Souhila Rehab Bekkouche³

¹ Civil Engineering Department / LMGHU, University University 20 August 1955 of Skikda, Algeria

² Civil Engineering Department / LMGHU, University University 20 August 1955 of Skikda, Algeria

³ Civil Engineering Department / LMGHU, University University 20 August 1955 of Skikda, Algeria

¹(mahkourchaima23@gmail.com)

Abstract – Artificial intelligence has been used for a long time and with enormous success in many sectors: from the manufacturing industry to medical diagnostics, from e-commerce to video games, and so on.

Now more than ever, we are witnessing the development and deployment of intelligent systems also in the field of civil engineering. Thanks to these systems, it is possible to solve most of the problems related to the construction of buildings and infrastructure. In this article, we have discussed the potential of artificial intelligence in civil engineering and the techniques used by designers and contractors to deliver more reliable, cost-effective and efficient construction projects.

Keywords – Construction, Technique, Artificial Intelligence, Civil Engineering, Design.



Data-Driven Approaches to Optimize Branch and Team-Based Targeting in Banking

Mert Güneş¹, Metin Samet Korkmaz²

¹ *Türkiye Vakıflar Bankası T.A.O, Vakıfbank R&D Center İstanbul, Turkey*

² *Türkiye Vakıflar Bankası T.A.O, Vakıfbank R&D Center İstanbul, Turkey*

Abstract – The utilization of machine learning techniques to enhance strategic and operational decision-making within the banking sector is explored in this research. The second-largest state bank in Turkey conducted the studies, focusing on performance target prediction for two fundamental SME banking products: non-cash loans and demand deposits. Given the complex influencing factors such as volatile market conditions, customer creditworthiness, macro and microeconomic indicators, and team-specific variables, accurate performance prediction remains a significant challenge. The aim was to develop robust machine learning models capable of accurately predicting performance targets, thereby enabling efficient resource allocation and performance management. Techniques ranging from data mining and data preprocessing to feature selection and predictive modeling were applied in the studies. The effectiveness of the Orthogonal Matching Pursuit CV algorithm for branch targeting of non-cash loans and Stacked Regression algorithm for a dynamic team-based targeting process of demand deposits was revealed in the findings. The transformative potential of data analytics in banking and the importance of refining these models to cater to evolving industry needs are underlined by these insights.

Keywords: *Target Prediction, Machine Learning, Banking, Data Science*



Ensuring Fairness in VAT: Leveraging Artificial Intelligence to Address Challenges in Harmonizing Tax Rates Across EU Member States

Simeana Beshi¹, Driola Susuri¹

Faculty of Law, University "Ukshin Hoti" Prizren, Republic of Kosovo

Email: simeana.beshi@uni-prizren.com

Abstract – This paper explores the intersection of value-added tax (VAT) harmonization and artificial intelligence (AI) within the European Union (EU). The primary aim is to assess the feasibility and effectiveness of leveraging AI technologies to address challenges in harmonizing VAT rates across diverse EU Member States, with a focus on promoting fairness in the taxation system. The study employs a mixed-methods approach, combining legal analysis, comparative case studies, and quantitative data analysis. The research reveals that AI holds substantial potential in mitigating challenges associated with VAT harmonization. AI-driven algorithms can identify factors contributing to tax rate variations, such as economic indicators, consumer behavior, and market dynamics. By identifying these factors, policymakers can make informed decisions to streamline and harmonize VAT rates, fostering a fair and consistent tax environment across EU Member States. The study also highlights the need for collaborative efforts among Member States to share data and insights, facilitating the development of more accurate and adaptable AI models. Furthermore, it underscores the importance of transparent communication and public engagement to ensure the acceptance and legitimacy of AI-driven VAT harmonization efforts. This research contributes to the ongoing discourse on tax policy and technological innovation by demonstrating the potential of AI in addressing the complex challenges associated with harmonizing VAT rates across EU Member States. The findings provide practical insights for policymakers, tax authorities, and technologists interested in leveraging AI to enhance tax harmonization efforts, ultimately contributing to a fair and efficient European taxation system.

Keywords – Fairness, Taxation System, Economic Indicators, Market Dynamics, Technological Innovation.



Maximum Power Point Tracking in Photovoltaic Systems Using P&O and GWO Techniques: A Comparative Study

Mohammedi Imad Eddine*, Korich Belkacem¹, Kouzou Abdellah¹ and Elottri Ahmed¹

¹*Applied Automation and Industrial Diagnostics Laboratory Faculty of Science and Technology University of Djelfa, Algeria*

E-mail: imad.mohammedi@univ-djelfa.dz

Abstract – Photovoltaic (PV) systems frequently experience shading, which has a substantial impact on the systems' power output and efficiency. In order to maximize the power output of PV systems under varying operating conditions, such as shading, maximum power point tracking (MPPT) algorithms are used. Two popular MPPT algorithms that have been utilized on PV systems with shading include the Perturb and Observe (P&O) method and the Grey Wolf Optimizer (GWO) algorithm. In this study, we analyze how well the P&O and GWO algorithms work in a PV system under various shading scenarios. The outcomes demonstrate that the GWO method outperforms the P&O algorithm in tracking the maximum power point (MPP) under shading conditions with more accuracy and a faster convergence speed. Additionally, it is demonstrated that the GWO algorithm performs better under rapidly varying solar energy. These findings imply that the GWO algorithm is a promising method for MPPT in shading prone PV systems.

Keywords – Maximum Power Point Tracking (MPPT), Photovoltaic Systems (PV), Shading, Perturb and Observe (P&O), Grey Wolf Optimizer (GWO)



Maximizing English Language Proficiency with ChatGPT: A Comprehensive Exploration for Non-Native Speakers

DALI YOUSSEF Lynda

Department of English, Higher School of Education Amour Ahmed (ENSO), Algeria

(daliyoussef.linda29@gmail.com)

Abstract – This study embarks on a comprehensive examination of the transformative potential inherent in ChatGPT, an advanced artificial intelligence system developed by OpenAI, with a particular focus on its utility in enhancing English language proficiency among non-native speakers. This research seeks to delineate its multifaceted applications within the realm of English Language Teaching (ELT). Beyond serving as a mere conversational partner, ChatGPT emerges as a versatile tool for facilitating diverse language learning activities, including conversation practice, translation tasks, vocabulary enrichment, grammar refinement, and pedagogical guidance for educators and learners alike. This investigation unfolds with an elucidation of the diverse benefits and potential applications afforded by ChatGPT in the context of English language learning. However, notwithstanding its myriad advantages, this study also delves into the nuanced limitations and challenges associated with ChatGPT's integration into language learning settings. These encompass considerations such as the system's reliance on the quality of input data, potential errors in responses, and the ethical implications surrounding the use of AI-driven language learning tools in educational contexts. Furthermore, the research underscores the imperative for adopting a holistic approach that combines the innovative capabilities of ChatGPT with progressive language learning methodologies. By leveraging ChatGPT as a supplementary resource rather than a standalone solution, educators and learners can optimize its efficacy in facilitating language acquisition while mitigating potential pitfalls.

Keywords – *ChatGPT, English Language Teaching, Non-Native Speakers, Artificial Intelligence, Language Learning, Pedagogy, Ethical Implications.*



AI Applications in Environmental Engineering for Sustainable Solutions

BOUSLAH Mahmoud^{*}, MAZA Mekki², RAHMOUNI Zine EL Abidine³

¹*Civil engineering Department / Geomaterials Development Laboratory, University of M'sila, Algeria*

²*Civil engineering Department / Geomaterials Development Laboratory, University of M'sila, Algeria*

³*Civil engineering Department / Geomaterials Development Laboratory, University of M'sila, Algeria*

Mahmoud.bouslah@univ-msila.dz

Abstract – Environmental engineering plays a crucial role in addressing sustainability challenges such as pollution control, waste management, and climate change mitigation. In recent years, artificial intelligence (AI) has emerged as a powerful tool for enhancing environmental engineering practices and developing sustainable solutions. This paper presents an overview of AI applications in environmental engineering, focusing on its role in addressing key sustainability issues. The study examines how machine learning algorithms are applied to analyze environmental data, model complex environmental systems, and optimize resource management strategies. The paper discusses specific AI-driven applications in areas such as pollution monitoring, waste treatment, renewable energy integration, and natural resource management. Additionally, the research explores the challenges and opportunities associated with the adoption of AI technologies in environmental engineering, including data availability, model interpretability, and regulatory compliance. By leveraging AI tools and techniques, environmental engineers can gain valuable insights, improve decision-making processes, and develop innovative solutions to advance sustainability goals. Overall, this paper highlights the potential of AI to drive transformative changes in environmental engineering, contributing to the development of sustainable and resilient infrastructure for future generations.

Keywords – *Artificial Intelligence, Environmental Engineering, Pollution Control, Waste Management, Natural Resource Management.*



Makine Öğrenmesi Kullanarak Öğrencilerin Özelliklerine Göre Matematik Dersindeki Başarı Durumunun Tahmin Edilmesi

Muhammet Semih KELEŞ^{1*} ve Ayşegül ALAYBEYOĞLU²

¹*Yazılım Mühendisliği / Fen Bilimleri Enstitüsü, İzmir Kâtip Çelebi Üniversitesi, Türkiye*

²*Yazılım Mühendisliği / Fen Bilimleri Enstitüsü, İzmir Kâtip Çelebi Üniversitesi, Türkiye*

*semihkeles1997@hotmail.com

Özet – Bu çalışmanın amacı öğrencilerin özelliklerine, tercihlerine ve ebeveyn eğitim durumlarına bakarak matematik dersindeki başarı durumunu tahmin etmektir. İlgili çalışmada 1000 öğrencinin cinsiyet, etnik grup, ebeveyn eğitim durumu, öğle yemeği tercihi, sınava hazırlık durumu, okuma skoru, yazma skoru ve matematik skoru öznitelikleri kullanılmıştır. Verilerin %70'i eğitim, %30'u ise test için ayrılmıştır. Matematik skoru için 60 ve üstü ‘Başarılı’, altı ise ‘Başarsız’ olarak kabul edilmiştir. Tahmin sürecinde KNN, Logistic Regression, Naive Bayes ve Decision Tree algoritmaları kullanılmıştır. Her bir algoritma için ayrı ayrı Confusion Matrix’ler oluşturulmuş ve Accuracy, Precision ve F1 skorları hesaplanmıştır. Eğitilen verilerden alınan sonuçlara göre (300 veri) KNN algoritması için True Positive (TP) değeri 61, True Negative değeri (TN) 187, False Positive (FP) değeri 15 ve False Negative değeri (FN) 37 olarak; Naive Bayes algoritması için TP değeri 76, TN değeri 175, FP değeri 15 ve FN değeri 22 olarak; Logistic Regression algoritması için TP değeri 78, TN değeri 187, FP değeri 15 ve FN değeri 20 olarak; Decision Tree algoritması için ise TP değeri 86, TN değeri 182, FP değeri 20 ve FN değeri 12 olarak bulunmuştur. Ayrıca elde edilen F1 skorlarına bakıldığından KNN için 0.8201, Naive Bayes için 0.8376, Logistic Regression için 0.8825 ve Decision Tree için ise 0.8943 değerleri bulunmuştur. Bu sonuçlar ışığında eğitilen algoritmalar arasında en iyi sonuçları veren algoritmalar sıralaması Decision Tree > Logistic Regression > Naive Bayes > KNN şeklindedir.

Anahtar Kelimeler – Makine Öğrenmesi, Yapay Zekâ, Matematik, Öğrenci Başarı Durumu, Başarı Durumu Tahmini



Predicting Shear Wall Failure Modes: Advancements in Machine Learning for Enhanced Structural Safety

Nesreddine Djafar henni ^{*}¹, Rachid Chebili ²

¹*Department of Civil Engineering and Hydraulics, University of Biskra, Algeria*

²*Department of Civil Engineering and Hydraulics, University of Biskra, Algeria*

^{*}(nasiroddine@gmail.com) Email of the corresponding author

Abstract – A critical structural element in buildings for carrying lateral loads is the reinforced concrete shear wall. Despite its significance, investigations following earthquakes and recent experimental studies have revealed inadequate safety margins associated with shear walls. The absence of empirical and mechanics-based models hinders the swift identification of failure modes in existing shear walls. This research capitalizes on advancements in machine learning to predict shear wall failure modes based on geometric configurations, material properties, and reinforcement details. Drawing from a comprehensive database comprising almost 400 experimental results of shear walls with varied geometric setups, eight machine learning models were assessed, including K-Nearest Neighbors, Naïve Bayes, and Decision Tree, to identify the most effective prediction model. Through rigorous evaluation, a machine learning model utilizing the Random Forest method emerged as the most accurate, achieving an 80% success rate in identifying shear wall failure modes. Furthermore, this study underscores those parameters such as aspect ratio, boundary element reinforcement indices, and wall length-to-wall thickness ratio significantly influence shear wall failure modes. Additionally, the work presents an open-source data-driven classification model, adaptable for use in design offices worldwide. This model is designed to incorporate additional experimental data, enabling continuous refinement and the generation of new insights.

Keywords – *Machine Learning, Failure Mode Classification, Reinforced Concrete Shear Wall, Seismic Performance, Critical Input Parameters*



Machine Learning Advances in Predicting Shear Wall Failure Modes for Enhanced Structural Safety

Nesreddine Djafar henni ^{*}¹, Rachid Chebili ²

¹*Department of Civil Engineering and Hydraulics, University of Biskra, Algeria*

²*Department of Civil Engineering and Hydraulics, University of Biskra, Algeria*

^{*}(nasiroddine@gmail.com) Email of the corresponding author

Abstract – The reinforced concrete shear wall is a pivotal structural component in buildings, tasked with supporting lateral loads. Despite its importance, post-earthquake assessments and recent experimental investigations have brought to light insufficient safety margins associated with these shear walls. The absence of empirical and mechanics-based models poses a challenge in promptly identifying failure modes in existing shear walls. This study leverages advancements in machine learning to forecast shear wall failure modes, considering geometric configurations, material properties, and reinforcement specifics. Drawing from an extensive database encompassing nearly 400 experimental outcomes of shear walls with diverse geometric arrangements, eight machine learning models were scrutinized, including K-Nearest Neighbors, Naïve Bayes, and Decision Tree, to ascertain the most effective prediction model. Following meticulous evaluation, a machine learning model employing the Random Forest method emerged as the most accurate, achieving an 80% success rate in discerning shear wall failure modes. Moreover, this research underscores the significant influence of parameters such as aspect ratio, boundary element reinforcement indices, and wall length-to-wall thickness ratio on shear wall failure modes. Additionally, the study introduces an open-source data-driven classification model, adaptable for deployment in design offices worldwide. This model is designed to assimilate additional experimental data, facilitating ongoing refinement and the acquisition of fresh insights.

Keywords – Machine Learning, Failure Mode Classification, Reinforced Concrete Shear Wall, Seismic Performance, Critical Input Parameters



Artificial Intelligence In Camel Racing : Health maintenance and prevention

DJEDDOU BENABID Amira ^{*1}, HOUSSOU Hind ¹, DJEDDI Khaled ¹ and OUACHTATI Dounia ¹

¹ *Institut of Agronomic and Veterinary Sciences, Souk Ahras University, Algeria;
Laboratory of Sciences and Techniques of the living, Souk Ahras University, Algeria.*

** corresponding author: a.djeddoubenabid@univ-soukahras.dz*

Abstract – Traditional camel racing is a popular sport in many countries and it is infused with cultural significance. The integration of artificial intelligence (AI) has brought promising innovations that continue to revolutionize this traditional sport, AI can provide real-time data analysis that can lead to precision training, optimized nutrition, and the prevention of injuries as well as illnesses. Here are some ways in which AI is implemented in camel racing: Performance Forecasting and AI-Assisted Training; capable of providing personalized feedback that helps optimize training programs for each camel, Nutrition Optimization; using biometric tracking sensors, monitoring devices, smart scales, and nutritional management software, specific nutrition plans are recommended for each camel based on its age, weight, energy requirements, and physical condition. Advanced Medical Management By combining a Camel Behavior Monitoring System; using sensors that identify various physiological indicators such as heart rate, respiratory rate, body temperature, blood pressure, and oxygen saturation to detect signs of fatigue or stress, with Advanced Veterinary Technologies such as Magnetic Resonance Imaging (MRI) and CT scanners, the aim is to swiftly diagnose injuries and illnesses and provide appropriate treatment. Not forgetting Dr. DOUMIR's innovation: the "Camel Racing Diagnostic Boots," a device that diagnoses lameness in racing camels using specialized sensors. These applications of AI contribute to modernizing camel racing, bringing significant benefits in terms of performance, animal well-being, and the overall competition experience.

Keywords – AI, Camel racing, Diagnostic, Prevention, Veterinary Technologie.



Vector-norm Regularized Multiple Kernel Fisher Null Learning for Novelty Detection

Shervin Rahimzadeh Arashloo^{1*}

¹*Department of Computer Engineering, Bilkent University, Ankara, Turkey*

**s.rahimzadeh@cs.bilkent.edu.tr*

Abstract – Novelty detection where only positive instances are available and utilized for training is addressed in this study. To this end, the Fisher null transform in a one-class setting represented in a reproducing kernel Hilbert space is generalized to benefit from combining multiple kernels whose combination weights are regularized via a vector l_p -norm constraint. We pose the corresponding optimization task as a convex learning problem and present an effective dual optimization technique for the maximization of the corresponding Lagrangian. Next, the proposed multiple-kernel novelty detection approach in a one-class setting is extended to the case where multiple conceptually linked one-class classification tasks are constrained to have similar kernel fusion weights. The advantages of this latter concurrent learning of multiple problems is discussed and studied both in terms of classification performance as well as computational complexity.

We extensively evaluate the proposed method in different domains of application including one-class novelty detection, abnormal image detection, and face presentation attack (spoofing) detection on different standard data sets and illustrate its merits compared to other methods from the literature encompassing both deep learning-based approaches and SVM-based techniques. Furthermore, a comparison of the proposed approach in terms of computational complexity of the learning stage to other commonly employed multiple kernel learning algorithms as well as to the existing standard convex optimization packages is presented which demonstrates the efficacy of the presented optimization approach.

Keywords – Novelty Detection, One-Class Classification, Fisher Null Approach, Multiple Kernel Learning, Vector-Norm Regularization.



Using Localized Information in Learning Multiple Kernels for Zero-Shot Detection of Face Presentation Attacks

Shervin Rahimzadeh Arashloo^{1*}

¹*Department of Computer Engineering, Bilkent University, Ankara, Turkey*

**s.rahimzadeh@cs.bilkent.edu.tr*

Abstract – We study the face spoofing/presentation attack detection task in the demanding situations where the test attack types have not been observed during the training stage of the system. In this context, earlier work has demonstrated the advantages offered by ensemble techniques, and especially, algorithms based on learning multiple kernels for the problem. Nevertheless, one drawback of these methods lies in the fact that the entire space of genuine samples is treated uniformly, neglecting any local information inherent to the observations. In this study, we address this facet of face spoofing detection with regards to learning multiple kernels for one-class classification and present a method to utilize the inherent local information and structure in genuine observations to assign a weight to each representation locally and more flexibly. More specifically, building on the Fisher null classification principle, a convex localized multiple kernel learning approach subject to a matrix-norm regularization term on the collection of local weights associated with different kernels is formulated to derive locally adjustable weights for fusion of multiple kernels for zero-shot face spoofing detection.

The experimental analysis of the presented approach on generic object databases shows its effectiveness for the detection of novelty and anomaly while the experimental outcomes of evaluating the proposed approach on multiple standard face presentation attack datasets confirm its capacity for the detection of face presentation attacks in a zero-shot unseen scenario.

Keywords –*Face Spoofing Detection, Zero-Shot Learning, Localized Multiple Kernel Learning, One-Class Classification, Novelty Detection.*



Perceptions of Teachers About AI In Teacher Education And Academic Practices

Dr Irfan Bashir^{1*}, Aiza Nisar¹, Afshan Naseem¹, Fariha Gul¹

Dept of Education, University of Management and Technology, Lahore, Pakistan

irfanbashir@umt.edu.pk

Abstract – The experiences, opinions, and difficulties surrounding the incorporation of artificial intelligence (AI) into teacher education are examined in this qualitative study. This research examines teachers' experiences, perceptions, and obstacles related to the adoption of artificial intelligence (AI) through semi-structured interviews with a varied group of educators. Through the use of the narrative inquiry technique, the research attempts to investigate the possible impact of AI on teaching practices, student learning, and the general efficacy of teaching practices. The results show that teachers have a generally positive opinion of AI, and many of them are excited about how it can improve teaching methods and help pupils receive individualized learning. The ways in which AI-powered tools are implemented by teachers differ. While some educators have effectively incorporated AI technologies into their curricula. Others, meanwhile, encounter obstacles like trouble using the tools or provide sufficient assistance to diversified education. Concerns over AI's ability to worsen preexisting biases and dehumanize education are voiced by some educators. The research points to both the difficulties in using AI and its potential benefits for teacher preparation, student learning, and engagement. In order to ensure successful AI integration into the field of teacher education, it is imperative that these problems be addressed.

Keywords – Artificial Intelligence, Academia, Teacher Education, Practices,



An overview of using artificial neural networks to determine the behavior of steel beam-column connections

BOUBEKRI Amel¹, RAS Abdelouahab² BOUMECHRA Nadir³

¹*Civil engineering, Abou Bekr Belkaid University, Tlemcen, Algeria*

²*Civil engineering, Abou Bekr Belkaid University, Tlemcen, Algeria*

³*Civil engineering, Abou Bekr Belkaid University, Tlemcen, Algeria*

¹ *boubekriamel40@gmail.com*

Abstract – The column-beam connections are important elements in the design and construction of steel structures. Their behavior is characterized by strength, stiffness, and stability, which must be reliably produced to represent the real behavior of a structure, especially when considering dynamic or seismic loading. Therefore, this article presents the results of a scientific review on the use of artificial neural networks to predict the strength and initial stiffness of steel column-beam connections. Different types of assemblies have been studied under monotonic and cyclic loading. The neural network results proved to be consistent with experimental and design code reference values.

Keywords – *Steel Structures, Beam-To-Column Connections, Artificial Neural Networks, Joint Stiffness, Hysteretic Behavior*



University students' attitudes towards using artificial intelligence as a translation tool in academic writings

Neliada Memushaj*

¹Department of English Language, Faculty of Foreign Languages, University of Tirana, Albania

(memushajneliada@gmail.com)

Abstract – This research investigates university students' attitudes toward using AI as a translation tool in academic writings. With the increasing availability and accessibility of online translation tools, understanding students' perceptions and behaviors regarding their use in academic contexts is crucial. The study employs a quantitative methods approach, consisting of surveys to gather comprehensive insights. The findings reveal the extent to which students rely on artificial intelligence, their perceptions of its accuracy and reliability, and the factors influencing their decision to use it for academic purposes. Additionally, the study explores students' awareness of the ethical considerations associated with machine translation and their preferences for alternative translation resources. The results contribute to the ongoing discourse on the integration of technology in education and provide valuable implications for language learning pedagogy and academic policies.

Keywords – Artificial Intelligence, University Students, Translation, Attitudes, Academic Writings.



Innovative implemented MPC-MPPT for FPGA-Based boost converter

Habib BEY*, Abdelouahad MAY¹, Fateh KRIM¹, Moncef KHITAS¹, Hamza FEROURA¹, Anis KRIM¹

¹*Department of Electronics/ Power electronics and industrial control laboratory (LEPCI), Sétif-1 University, 19000 Sétif, Algeria*

**(bey_habib@univ-setif.dz)*

Abstract – This paper proposes a model predictive control based maximum power point tracking (MPC-MPPT) algorithm with optimum number of sensors for driving high step-up DC/DC converter, in photovoltaic (PV) systems. For utilizing PV module in power generation, the developed controller is designed under MATLAB/Simulink environment; then, field programmable gate array FPGA in the loop (FIL) technique is used to implement the MPC-MPPT model. this digital implementation satisfies the hardware and recommended performance. Which led to a significant increase in processing speed. A computing capability 300 times faster than conventional sequential implementations has been achieved (Parallel computation: $T_s = 1 \mu s$ with a processing clock of 100 MHz, Sequential computation: $T_s = 30 \mu s$ with a processing clock of 1 GHz). the experimental validation is carried out on Atlys spartan-6 FPGA Xilinx board using ISE 14.2 processing. MPC is a prevalent control technique with superior transient and steady-state performances in PV systems. The algorithm is designed to operate with both fixed and adaptive step-size. the results obtained confirm proper operation of the developed approach.

Keywords – DC/DC converter, Model Predictive Control based Maximum Power Point Tracking (MPC-MPPT), Field Programmable Gate Array (FPGA).



An IC-MPPT Technique for Controlling the Boost Converter in Photovoltaic Systems Using Model Predictive Control

Abdelouahad MAY*, Habib BEY¹, Fateh KRIM¹, Hamza FEROURA¹ and Moncef KHITAS¹

¹*Department of Electronics/ Power electronics and industrial control laboratory (LEPCI), Sétif-1 University, 19000 Sétif, Algeria*

(abdelouahad.may@univ-setif.dz)

Abstract – This article presents a novel approach to enhance the performance of a high-gain DC-DC converter in a photovoltaic (PV) system through the utilization of Model Predictive Control (MPC) combined with Maximum Power Point Tracking (MPPT). The primary objective is to ensure the continuous operation of the PV system at its MPP. To achieve this, a straightforward current-based Incremental Conductance (IC) MPPT algorithm is employed to generate a reference current for the Model Predictive controller. The system exhibited remarkable tracking dynamics and demonstrated autonomous grid current injection capabilities. Extensive simulations confirmed the feasibility and effectiveness of the proposed control techniques, showcasing their strong performance in tracking maximum power from the PV system.

Keywords – DC/DC Converter, MPPT, MPC. PV System.



"Smart villages" - a new concept in modern agribusiness

Katerina Kareska

*University St. Kliment Ohridski – Bitola, Scientific tobacco Institute – Prilep, Republic of North Macedonia, e-mail:
katerina.kareska@uklo.edu.mk ; katekareska@gmail.com*

Abstract – The concept of "Smart Villages" represents a novel paradigm shift in modern agribusiness, aiming to revolutionize rural development and agricultural practices through the integration of cutting-edge technologies and innovative approaches. In the face of evolving challenges such as climate change, rural depopulation, and the need for sustainable agricultural practices, the emergence of Smart Villages offers a promising solution to address these pressing issues.

Smart Villages leverage advanced technologies such as Internet of Things (IoT), artificial intelligence (AI), big data analytics, and precision farming techniques to optimize agricultural processes, enhance productivity, and improve overall efficiency. Through the deployment of sensor networks, remote monitoring systems, and data-driven decision-making tools, farmers and rural communities can access real-time information about weather patterns, soil conditions, crop health, and market trends, enabling them to make informed decisions and maximize yields while minimizing resource wastage.

Moreover, Smart Villages foster collaboration and knowledge exchange among stakeholders, including farmers, researchers, policymakers, and technology providers, to co-create innovative solutions tailored to the specific needs and challenges of rural areas. By promoting entrepreneurship, skill development, and access to markets, Smart Villages empower local communities, stimulate economic growth, and create new opportunities for livelihood enhancement.

Successful implementation of Smart Villages requires addressing various challenges, including infrastructural limitations, digital divide, data privacy concerns, and the need for supportive policy frameworks and investment incentives. Collaborative efforts from governments, private sector entities, and civil society organizations are crucial to overcoming these obstacles and scaling up Smart Village initiatives.

Smart Villages represent a transformative approach to modernizing agribusiness and revitalizing rural economies. By harnessing the power of technology and innovation, Smart Villages have the potential to drive sustainable development, and create inclusive growth opportunities for rural communities in the 21st century.

Keywords – Smart Villages, Modern Agribusiness, Rural Development, Technology, Innovation, Sustainability, Entrepreneurship.



E-Ticaret Sektöründe Yapay Zeka Destekli Dinamik Ürün Fiyatlandırma Sistemi

Miraç ÖZTÜRK ¹, Fehmi Ziya AKYÜZ ¹, Resul ÖZEN ¹, Mustafa KAMAŞAK ^{*2}

¹*Oksid Bilişim ve Teknoloji, İstanbul, TÜRKİYE* m.ozturk@oksid.com.tr, fakyuz@oksid.com.tr, r.ozen@oksid.com.tr

^{*}²*İstanbul Teknik Üniversitesi, Bilgisayar ve Bilişim Fakültesi, Bilgisayar Mühendisliği Bölümü, İstanbul, TÜRKİYE,* kamasak@itu.edu.tr

Özet – E-ticaret sektöründe belirli bir ürünün çok sayıda satıcısına kolay şekilde erişim sağlanabilmesi sebebiyle büyük bir rekabet yaşanmaktadır. Her ne kadar müşteri hizmetleri, teslimat vb. konularda çeşitli rekabet avantajları sağlanabilese de, rekabetin ana unsuru ürün fiyatı olarak ortaya çıkmaktadır. Bu sebeple, e-ticaret sektöründe ürün fiyatlarının doğru ve hızlı şekilde belirlenmesi satış ve ciro miktarlarını belirleyen en önemli etken haline gelmektedir. Ürün fiyatlarının insan gücü ile belirlenmesi çok sayıda ürünün oldukça hızlı şekilde fiyat değişimi göstermesi sebebiyle sürdürülebilir nitelikte olmadığı görülmektedir. Bu sebeple, e-ticaret sektöründe ürün fiyatlarının anlık ve otomatik olarak belirlenmesi gerekmektedir. Çalışmamızda, e-ticaret sektöründe çok sayıda ürünün stok durumu, teslimat lokasyonu, ürün ham maliyeti, rakiplerin ürün fiyatları gibi çok sayıda unsuru göz önüne alarak dinamik olarak belirleyen bir yapay zeka modeli geliştirilmiştir.

Ürün fiyatlarının otomatik olarak belirleyebilen modelin geliştirilmesi için güdümlü regresyon yöntemleri tercih edilmiştir. E-ticaret sitemiz için insan gücü ile belirlenen fiyatlar modelin eğitilmesi ve doğrulanması için kullanılmıştır. Çalışmamız kapsamında çok değişkenli doğrusal regresyon, destek vektör regresyonu, düzenlileştirilmiş (Lasso/Ridge) regresyon, rastsal orman regresyonu, torbalama regresyon ağacı ve en yakın komşu regresyonu denenmiştir. Sonuçların doğrulanması için çok katlı çapraz doğrulama ve istatistiksel analiz yöntemleri kullanılmıştır.

Anahtar Kelimeler – E-Ticaret, Dinamik Fiyatlandırma, Regresyon, Makine Öğrenmesi, Yapay Zeka



Optimal Res-UNET Architecture with Deep Supervision for Tumor Segmentation

Rehman Masood¹, Fazeel Abid^{1*}, Salwa M. Akhtar¹, Fatima Nawaz¹ and Abdul Ghafar¹

¹*Department of Information Systems, University of Management and Technology, Lahore*

^{*}(fazeelabid@hotmail.com) *Email of the corresponding author*

Abstract – For radiologists, categorizing brain tumor cells is complex because of the tumor's heterogeneity. Competency in radiologists or clinical specialists is required for the detection, segmentation, and extraction of contaminated tumor regions from MRI images, which is a repeated and thorough job. As a result of deep learning, the Medicinal Image Examination is experiencing an archetype shift. With the current surge in interest in this technique from the medical imaging community, a professional session on "Medical Imaging with Deep Learning" was held in 2018. Examine the latest advancements in this approach and critically assess its fundamental difficulties. Computer vision and machine learning breakthroughs in identifying and categorizing brain tumors are the focus of this research, giving a unique perspective on these developments. This allows us to identify this research's main problem (among other obstacles): the absence of correctly labeled large-scale data sets. However, to overcome this problem, with the BraTS21 contest, we propose an enhanced U-Net structure for brain tumor segmentation with Deep supervision residual interconnections, all tested in an extended implication research to discover the ideal model structure. Our research has also examined the number of convolutional layer paradigm and the image processing approach. The test phase validated our method's viability from 0.9% to 0. 96% compared to the state-of-the-art method.

Keywords – *Brain Tumor, Magnetic Resonance Imaging, Deep Learning, Medical Imaging, U-NET, Implication Studies, Challenges.*



Perceptions of Communication and Public Relations Students in Romania on (AI) in University Education: An Online Survey Study

Sebastian Fitzek¹, Alina Bârgăoanu¹

¹*National University of Political Studies and Public Administration (SNSPA) Bucharest, Romania.*

(sebastian.fitzek@comunicare.ro)

Abstract – The integration of (AI) across sectors has significant implications for communication and public relations (PR) education. This study investigates the knowledge, attitudes, and perceptions of Romanian students of AI and its potential professional impact. An online questionnaire was distributed to communication and PR students at Romanian universities using targeted Facebook ads. The 28-item survey comprising a Likert scale and open-ended questions captured demographics, AI familiarity, exposure, emotional responses, and field implications. 216 responses were collected, with 212 being valid. The analysis showed a gender-diverse cohort with a mean age of 25.2 years, spanning various programme years. The survey revealed moderate AI familiarity, with an average rating showing the need for more comprehensive AI education. Attitudes were moderately positive, with a strong correlation ($r=0.67$) between tech proficiency and AI application awareness. Qualitative feedback highlighted the desired integration of core AI instruction and ethics. The findings emphasize integrating tailored AI education into communication and PR curricula to address specific student needs and prepare them for an AI-augmented industry future. Although attitudes are moderately positive, there is a clear gap in formal exposure and training to bridge.

Keywords – (AI), Communication Education, Public Relations, Student Perceptions, Online Survey, Romanian Universities, Educational Curriculum.



A Comparative Study of CNN for R-T Based Faulty Line Insulator Using Deep Learning

Murk Shaikh^{1*}, Qasim Ali Arain¹, Syed Akbar Ali Shah¹, Mehwish Shaikh¹, Mehak Fatima¹

¹*Dept. of Software Engineering MUET Jamshoro Hyderabad, Pakistan*

Murksheikh3@gmail.com

Abstract – Ensuring power distribution reliability is paramount in modern electricity transmission. This study delves into the realm of deep learning to address R-T (Real-Time) Based Faulty Line Insulator Detection, comparing the effectiveness of three MobileNet variants—V1, V2, and V3 Small—for real-time and portable applications. Our diverse dataset, sourced from field surveys and online platforms, undergoes augmentation to train and test the models. Notably, MobileNet V1, after fine-tuning to tackle challenges like detecting the elusive ‘Healthy Rusted’ class, emerges as the most effective in detecting faulty line insulators, surpassing V2. The research culminates in a real-time, portable mobile application, showcasing the practical viability of the chosen model. However, we acknowledge limitations, including class imbalance and specific challenges, paving the way for future work in optimizing model performance and addressing these constraints. This research not only contributes to the advancement of deep learning but also holds the potential to enhance the reliability of electricity transmission infrastructure.

Keywords – *Power Distribution, Faulty Line Insulator Detection, Deep Learning, MobileNet, Resistance-Time, Real-time Detection, Portable Application, Dataset Augmentation, Fine-tuning.*



Exploring the Dominant AI Approaches of 2024

Grela Ajvazi*

¹*Department of Informatics, University of Tetova, North Macedonia*

**Grela.ajvazi@unite.edu.mk*

Abstract – The tools, algorithms, and data science approaches that enable computers to carry out tasks that have historically required human intervention are referred to as artificial intelligence techniques. These methods are what enable AI systems to learn, compute, recognize patterns, and make future predictions. The most common methods that artificial intelligence (AI) provides in the modern world are machine learning, supervised learning, unsupervised learning, and reinforcement learning. Given how quickly this field is developing and changing, each of these methods has a special way of collecting, analyzing, and presenting data to the user; nevertheless, none of them would be able to work as intended without the others. AI and data together provide enormous potential for solving real-world issues in a variety of fields. Organizations may have a big beneficial impact by recognizing problems, gathering and evaluating data, utilizing AI approaches, and creating workable solutions.

The personalization facilitated by Artificial Intelligence Techniques is revolutionizing how customers engage with various platforms. In domains like e-commerce, streaming services, and marketing, AI-powered recommendation systems analyze user behavior to deliver highly individualized content and products. We are navigating a journey that urges us to embrace the possibilities while also acknowledging the responsibilities that accompany this extraordinary transformative influence.

Keywords – AI, AI techniques, AI in 2024, learning with AI, AI methods



Makine Öğrenimi Yöntemleri İle Sağkalım Analizi

Akın Çağatay Çalışkan^{1*}, Ayşe Övgü Kınay²

¹*Veri Bilimi / Fen Bilimler Enstitüsü, Dokuz Eylül Üniversitesi, Türkiye*

²*Bilgisayar Bilimleri / Fen Bilimleri Enstitüsü, Dokuz Eylül Üniversitesi, Türkiye*

* (akincagataycaliskan@gmail.com)

Özet – Sağkalım analizi veya olay-zaman analizi, bir dizi gözlemi ele alan ve bu gözlemlerle ilgi duyulan olayın meydana gelmesi için geçen süreyi tahmin etmeye çalışan istatistiksel yöntemlerdir. Sağkalım analiz yöntemleri genel olarak istatistiksel yöntemler ve makine öğrenimine dayalı yöntemler olmak üzere iki kategoriye ayrılmaktadır. Her iki yöntemin de hedefi hayatta kalma süresini tahmin etmek ve hayatta kalma süresi boyunca sağkalım olasılığını tahmin etmektir. Son yıllarda makine öğrenimi yöntemlerinin geleneksel yöntemler ile birleştirilmesi ve optimizasyondaki gelişmeler, makine öğrenimi yöntemlerinin popülerliğini artırmaktadır. Mekanik sistemlerdeki başarısızlıklar ve özellikle tip alanında biyolojik organizmalarda sağkalım analizlerinde yaygın olarak kullanılmaktadır.

Bu çalışmada göğüs kanseri veri seti makine öğrenimi yöntemlerinden biri olan Rastgele Sağkalım Ormanı (RSO) (Random Survival Forest-RSF) yöntemi, geleneksel istatistiksel yöntemlerden biri olan Cox regresyonu ve derin öğrenme yöntemlerinden biri olan DeepHit ile karşılaştırılmıştır. Kullanılan veri setinde 335 adet veri bulunmaktadır. Veri setinde Yaş, Cinsiyet ve dört proteinin (Protein1, Protein2, Protein3, Protein4) ekspresyon seviyeleri ve Meme kanseri evresi (Tumor_Stage), Histoloji (kanser türü), ER, PR ve HER2 durumu, Ameliyat Türü, Ameliyat Tarihi, Son Ziyaret Tarihi ve Hastanın Durumu (Yaşayan/Ölü) olmak üzere toplam 15 değişken yer almaktadır. Bu veri seti ile üç farklı senaryo oluşturulmuş, örneklem büyüklüklerindeki değişimlerin her bir algoritma üzerindeki etkileri incelenirken, tahminleme başarıları da ortaya koyulmuştur. Python programlama dili kullanılarak gerçekleştirilen analizler sonucunda bu veri seti için DeepHit algoritması RSO ve Cox regresyon yöntemlerinden daha iyi bir performans göstermiştir.

Anahtar Kelimeler – Sağkalım Analizi, Rastgele Sağkalım Ormanı, DeepHit, Cox Regresyon, Makine Öğrenimi



EŞİTLİ ARAMA ALGORİTMALARININ BÜYÜK BOYUTLU LABİRENTLER İÇİN PERFORMANS İNCELEMESİ

Merve Menevşe^{1*}, Ayşe Övgü Kınay²

¹Bilgisayar Bilimleri/ Fen Bilimleri Enstitüsü, Dokuz Eylül Üniversitesi, Türkiye

²Bilgisayar Bilimleri/ Fen Bilimleri Enstitüsü, Dokuz Eylül Üniversitesi, Türkiye

^{*}(merve.menevse@ogr.deu.edu.tr)

Özet – Arama algoritmaları birçok alanda sıkılıkla kullanılmaktadır. Akıllı süpürgeler, oyunlarda yol bulma, arama kurtarma robotları üzerine yapılan çalışmalar örnek olarak verilebilir. Bunlardan labirent çözümü için kullanılan Derinlik Öncelikli Arama (Depth-First Search, DFS), Genişlik Öncelikli Arama (Breadth First Search, BFS) ve A* (A Star) algoritmaları ise farklı yaklaşımalarla en kısa yolu bulunmasını amaçlar. Labirentler için DFS algoritması, yolları gezerek bir çözüm bulduğu için daha kısa bir yol varsa bile bu yola ulaşmayabilir. BFS, başlangıç düğümünden hedef düğüme olan en kısa yolu daha etkili bir şekilde bulur ancak daha fazla bellek tüketir. A* algoritması ise diğer iki algoritmaya göre en kısa yolu daha etkin şekilde bulunmasını sağlar.

Bu çalışmada büyük labirent boyutları için bahsedilen algoritmalarının performansları incelenmiştir. Farklı boyutlarda ve zorluk seviyelerinde rastgele oluşturulan labirentlerde yol, yol uzunluğu ve ziyaret edilen hücre sayıları incelenmiştir. Hesaplamlar Pycharm kod analiz aracı üzerinden Python program dili kullanılarak yapılmıştır. Yöntemler arası farklılıklar istatistiksel olarak anlamlı farklılık olup olmadığı SPSS ile incelenmiştir.

Anahtar Kelimeler – Labirent, Derinlik Öncelikli Arama, Genişlik Öncelikli Arama, A Algoritması, Karşılaştırma Testleri*



The Effect of Feature on Movie Recommendation Methods

Büşra Yağcı ^{1*}, Kadriye Filiz Balbal ² and Emel Kuruoğlu Kandemir ²

¹ Computer Science/The Graduate School of Natural and Applied Sciences, Dokuz Eylül University, Turkey

² Department of Computer Science / Faculty of Science, Dokuz Eylül University, Turkey

* (busra.yagci23@ogr.deu.edu.tr) Email of the corresponding author

Abstract – One of the most common activities that people do in their spare time is watching movies which is a cheap, easily accessible, and enjoyable activity. For this reason, it is often preferred by people.

In previous years, the choice of movies available to watch was limited. Nowadays, there are many digital movie platforms available which have a wide range of movie options. However, this variety also brings with the problem of deciding on the movie to watch. There are lots of criteria that are efficient for choosing movie like genres, running time, rating, release date, language, locations, cast, director, etc. Thus, developing a movie recommendation system is very important in terms of making human life easier.

In the literature, different methods have been used to develop a movie recommendation system like simple system, content-based filtering, collaborative filtering, and hybrid system. Besides, there are lots of datasets which include different features of movies. It is important choosing features to develop a recommendation system that gives optimum results. The aim of this paper is observing the effect of feature on movie recommendation methods. For this purpose, content-based and simple recommendation systems were proposed using different combinations of features in dataset which are overview, genres, keywords, cast, crew, tagline, vote count, and vote average.

As a result, the recommendation systems that are developed using different features recommend different movies. However, the lists are not completely independent each other. They contain almost the same movies, but their orders are different.

Keywords – *Movie Recommendation, Content-Based Recommendation, Simple Recommendation System, Movie, Recommendation Algorithm*



Akıllı Evler için Yeni Nesil Yapay Zeka destekli Enerji Verimli IoT Uygulaması

Muhammet Ali Eroltu¹, Müge Erel-Özçevik¹

¹*Manisa Celal Bayar Üniversitesi, Hasan Ferdi Turgutlu Teknoloji Fakültesi, Yazılım Mühendisliği Bölümü, Manisa, Türkiye, 45400*

Özet – Nesnelerin İnterneti, (Internet of Things, IoT) dünya üzerindeki nesne veya cihazların internete bağlanması ile oluşan ve bu bağlantılı kullanıcılar birbirleriyle haberleşebilen sistemlerdir. Literatürde, bu konu üzerinde yapılan çalışmalar incelendiğinde kullanılan yapay zeka yöntemleri arasında derin öğrenme, makine öğrenmesi yöntemleri ile görüntü işleme ve doğal dil işleme yer almaktadır. Bu çalışmada yer alan eksik taraflar da bulunmaktadır, örneğin bazı yapay zeka yöntemlerinde büyük veri, derin öğrenme, son kullanıcı deneyimleri kullanılmamakta veya göz arı edilmektedir. Bundan dolayı, bu çalışmada derin öğrenme kullanılarak yeni nesil akıllı IoT uygulaması önerilmektedir.

Önerilen uygulama cihazların enerji tüketimlerini ölçüp 1,3,5,9 saatlik tahminler yapmıştır. Tahmin sonuçlarına göre anormal artış gözlenen cihazlar için kullanıcıya bildirim gönderilmiştir. Bu uygulama için toplamda 55.773 adet veri kullanılmıştır. Bu veriler, buzdolabı, çamaşır makinesi, televizyon, klima, fırın ve bulaşık makinesinin enerji tüketimi içermektedir. Bu uygulamada kullanılan algoritmalar Prophet ve Xgboosttur. Xgboost ile elde edilen yüzde hata değeri 7.2, Prophet ile elde edilen yüzde hata değeri ise 4.1 olarak bulunmuştur. Sonuçlara göre, Prophet algoritması daha iyi bir tahminleme performans sergilemiştir. Buradaki performans farklarının birkaç nedeni bulunmaktadır. Birincisi, Prophet algoritmasının zaman serisi verilerinin doğası gereği ortaya çıkan dönenmeliklikleri çoğunlukla doğru tahmin etmesidir. İkincisi ise, prophet algoritmasının Xgboost algoritmasına göre daha az parametreyle çalışması ve bundan dolayı az ayar gerektirmesidir.

Anahtar Kelimeler – Nesnelerin İnterneti, Akıllı Ev, Enerji Verimliliği, Derin Öğrenme, Yapay Zeka

Teşekkür- Müge Erel-Özçevik, Türkiye Bilimsel ve Teknolojik Araştırma Kurumu (TÜBİTAK) 1515 Sınır Ar-Ge Laboratuvarları Destek Programı tarafından BTS Gelişmiş Yapay Zeka Merkezi: BTS Otonom Ağları ve Veri İnovasyon Laboratuvarı tarafından desteklenmektedir (Proje: 5239903).



Next Generation AI-powered Energy Efficient IoT App for Smart Homes

Muhammet Ali Eroltu¹, Müge-Erel Özçevik¹

¹*Celal Bayar University, Hasan Ferdi Turgutlu Faculty of Technology, Department of Software Engineering*

Abstract – The Internet of Things (IoT) is a system formed by connecting objects or devices around the world to the internet and communicating with each other using this connection. In the literature, the artificial intelligence methods used in the studies on this topic include deep learning, machine learning methods, image processing and natural language processing. There are also shortcomings in these studies, for example, in some artificial intelligence methods, big data, deep learning, end-user experiences are not used or ignored. Therefore, this study proposes a next generation smart IoT application using deep learning.

The proposed application measured the energy consumption of the devices and made 1,3,5,9-hour predictions. According to the prediction results, notifications were sent to the user for devices with abnormal increases. A total of 55,773 data was used for this application. This data includes the energy consumption of refrigerators, washing machines, televisions, air conditioners, ovens and dishwashers. The algorithms used in this application are Prophet and Xgboost. The percentage error value obtained with Xgboost was 7.2 and the percentage error value obtained with Prophet was 4.1. According to the results, the Prophet algorithm has a better prediction performance. There are several reasons for the performance differences here. The first one is that the Prophet algorithm mostly correctly predicts the periodic changes that occur due to the nature of time series data. The second is that the prophet algorithm works with fewer parameters than the Xgboost algorithm and therefore requires less tuning.

Keywords - *Internet of Things, Smart Home, Energy Efficiency, Deep Learning, Artificial Intelligence*

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The Use of Artificial Intelligence in Instagram and Facebook: Opportunities and Perspectives

Ghulam Safdar ^{1*}, Farhat Fatima ²

¹Assistant Professor, Department of Media and Communication Studies, Rawalpindi Women University, Pakistan.

²MPhil Scholar, Department of Media and Communication Studies, Rawalpindi Women University, Pakistan.

^{*}(safdarsting@gmail.com)

Abstract – This study investigates users' perceptions, experiences, concerns, and future outlooks on the incorporation of artificial intelligence (AI) on Facebook and Instagram. While content recommendations are generally acknowledged, the precision and user satisfaction of other functionalities are still questioned, highlighting the necessity for ongoing enhancement. The need of transparent data procedures is underscored by concerns around privacy. The future vision reveals that the expansive potential of artificial intelligence is accessible. This study offers significant understanding of the dynamic environment where artificial intelligence intersects with social media, emphasizing the necessity for ethical deliberations, transparency, and ongoing enhancement. Using quantitative research design, the study employed a questionnaire consisted on close-ended questions that was administered to students in Rawalpindi and Islamabad. Researchers adopted purposive sampling and data was collected from (N=252) students of various universities of Rawalpindi and Islamabad, Pakistan. The collected data was then analyzed using statistical software. The findings indicate divergent viewpoints regarding the integration of AI, with a substantial portion expressing confidence in the present level of integration. Individual user experiences differ, with certain individuals expressing satisfaction with content recommendations while others express dissatisfaction with AI-based chatbots. The prominence of privacy concerns highlights the necessity for explicit data regulations. Anticipating the future underscores a positive outlook on the influence of AI in changing social media. These findings enhance current debates surrounding AI in social media and emphasize the significance of user-centric methodologies and ethical deliberations.

Keywords – Facebook, Instagram, Social Media, AI tools, Chatbot, User experience, AI Perception



Addressing Missing Data in Surveys and Implementing Imputation Methods with SPSS

Robert Kosova^{*}, Adrian Naço², Shkelqim Hajrulla³, Anna Maria Kosova⁴

^{1*}*Department of Mathematics, University "Aleksandër Moisiu" Durrës. Albania*

²*Department of Mathematics. Politechnic University of Tirana. Albania*

³*Computer Engineering Department. Epoka University. Tirana. Albania.*

⁴*Department of Computer Science. University "Aleksandër Moisiu" Durrës. Albania*

robertkosova@uam.edu.al

Abstract – The presence of missing data in surveys or in other types of scientific research poses significant challenges for academic research, impacting the reliability, validity, and generalizability of study findings. Missing data can introduce bias into the analysis, leading to erroneous results and conclusions. Furthermore, missing data can compromise the statistical power of analyses, reducing the precision and accuracy of estimates. As a consequence, researchers may encounter difficulties in drawing robust conclusions or identifying significant patterns within the data. Missing data can stem from various sources, including participant non-response, data entry errors, survey design flaws, and respondent unwillingness to disclose sensitive information. Many researchers struggle with how to handle missing data in their studies. They often use simple methods like deleting all the cases with missing data, partial deletion, or filling in missing values with a single number, such as the values of the variables mean, median, or mode. However, these methods can be misleading because they don't take into account the reasons why data might be missing and produce estimation errors, so other approaches are implemented to impute the missing values. However, each approach has its limitations and assumptions, which can influence the validity of results and introduce additional uncertainty into the analysis. This article analyzes the problem of missing data in social surveys, the reasons for missing data, the types of missing data, and also suggests several ways, deterministic and probabilistic, for data imputation.

Keywords – *Missing Data, Imputation, Survey, SPSS, Deterministic, Probabilistic*



Pros and Cons of Artificial Intelligence in Education

Blerta Abazi Chaushi^{*}, Florije Ismaili² and Agron Chaushi³

¹*Faculty of Business and Economics, SEE-University, North Macedonia*

²*Faculty of Contemporary Sciences and Technologies, SEE-University, North Macedonia*

³*Faculty of Business and Economics, SEE-University, North Macedonia*

^{*}b.abazi@seeu.edu.mk

Abstract – This study explores the use of artificial intelligence (AI) in education, examining the possible advantages, challenges, and investments in this field as well as the upcoming trends. The analysis highlights how AI personalizes education, streamlines processes, and enhances accessibility with the use of the diverse AI applications, encompassing intelligent tutoring systems, adaptive learning platforms, and automated grading tools. While acknowledging ethical concerns related to data privacy and potential biases, the paper underscores the necessity of responsible development and ethical considerations for the effective integration of AI in education. The conclusion depicts the future trends, including AI-enhanced personalization, integration of VR/AR, ethical AI education, and AI-driven learning analytics, along with their potential impact on educational transformation.

Keywords – Artificial Intelligence, Education, Personalized Learning, Educational Technology, AI Ethics



Earliest method of using surfactant-based cationic medium on a boron-doped diamond electrode with voltammetric Rifampin detection

Hemn A.H. Barzani^{1*}

¹ Department of Medical Laboratory Science, College of Health Science, Lebanese French University, Erbil, Iraq

(hemn.abdulazeez@lfp.edu.krd)

Abstract – Using a non-modified boron-doped diamond electrode resulted in the creation of a good electrical method for determining Rifampin (RFA) using square-wave voltammograms. RFA can be determined using cyclic voltammetry in combination with both the Britton-Robinson buffer(BR, 0.04 M, pH 4.0) an irreversible type of behaviour, a diffusion-controlled, as well as easily outlined couple of oxidation peaks have been noted in the remedy at roughly +0.55 (PA1) and + 1.13 (PA2) V vs Ag/AgCl. This same pH as well as the electrolytes that endorse the RFA oxidation process are critical. The adding of cetyltrimethylammonium bromide substantially increased this same anodic peak current flow of the RFA in the chosen counter electrode. The response through to the RFA is correspondingly linear when avionics parameters and optimisation procedures are used 0.5 to 20.0 µg mL⁻¹ via a limit of detection of 0.040 µg mL⁻¹ for PA1 and 0.036 µg mL⁻¹ for PA2 in BR buffer (PH 4.0) solution. It was eventually possible to accurately evaluate RFB in pharmaceutical formulations.

Keywords – Rifampin, Voltammetry, Boron-Doped Diamond Electrode, Cationic Surfactant, Pharmaceutical Formulation.



Application of Artificial Intelligence and Response Surface Methodology (RSM) for predicting AC flashover voltages of contaminated composite insulators

Khaled Belhouchet^{1*}, Abderrahim Zemmit¹, Lyamine Ouchen², Nadjim Alti², Assam Zorrig¹

¹ Department of Electrical Engineering, Faculty of Technology, and Laboratory of Electrical Engineering (LGE), University of M'sila, Algeria.

² Department of Electrical Engineering, Faculty of Technology, Ferhat Abbas University, Setif – 1, Algeria.

* Corresponding author, e-mail: khaled.belhouchet@univ-msila.dz

Abstract – This work aims to use artificial intelligence to predict the flashover voltage of a high-voltage insulator that has been artificially polluted. The optimum parameters of the mathematical model that explains this phenomenon can be identified using the Bat Algorithm (BA). Next, two different bat algorithms are created to create a nonlinear model that connects the essential flashover voltage to the previously listed features. The COMSOL Multiphysics software program has been utilized in the development of the tools and algorithms. The efficiency of using the Bat Algorithm technique for optimization and modeling of crucial flashover voltage and leakage current against contamination is fully demonstrated by further comparing the estimated results with the measured data gathered from the site measurement. In order to carry out the analysis, a statistical model is presented to address the relationship between the parameters of the insulator layer (the position and conductivity of the pollution layer) and the pollution. In this research, these factors are changed on a regular basis. An analysis of variance (ANOVA) is a statistical method used to evaluate the effect of every parameter. The response surface methodology (RSM) models the link between surface firing, maximum electric field, breakdown intensity, and the selected parameters. The results demonstrate the applicability of artificial intelligence in high-voltage transmission line simulation. The technique presented in the research can be applied to offer an efficient remedy against pollution flashover of high voltage insulators, as well as to eradicate the flashover fault and establish maintenance strategy.

Keywords – Composite Insulators, Electric Field, Artificial Intelligence, Flashover.



Optimizing corona Ring Design of Polymeric Insulators for improved Electric Field by using FEM and a Grey Wolf Optimization Method

Khaled Belhouchet^{1*}, Assam Zorrig¹, Abderrahim Zemmit, Lyamine Ouchen², Nadjim Alti².

¹ Department of Electrical Engineering, Faculty of Technology, and Laboratory of Electrical Engineering (LGE), University of M'sila, Algeria.

² Department of Electrical Engineering, Faculty of Technology, Ferhat Abbas University, Setif – 1, Algeria.

* Corresponding author, e-mail: khaled.belhouchet@univ-msila.dz

Abstract – The performance of Corona rings on insulator strings is greatly influenced by their design parameters. Since no standard design approach for high-voltage polymer insulators has been devised, we investigate in this work the best way to design the grading rings of these types of insulators. With the use of COMSOL Multi-Physics and finite element method (FEM) software, the electric field on an outdoor composite insulator is investigated. High-voltage composite insulators' efficacy is largely determined by the size and placement of the corona rings. Thus, under both dry and humid conditions, the effects of the corona ring's radius, that of its tube, and the vertical location of the tube are carefully examined. Artificial intelligence algorithms have been used recently to optimize the corona ring design in high voltage transmission systems. In this study, we use the grey wolf optimization algorithm to optimize and modify the corona ring's positions and dimensions. Simulations demonstrate that the outcomes of the grey wolf optimization algorithm's sizing are optimal. This study's optimization strategy is centered on finding the highest electric field that can pass through the insulator surface while still staying below the corona initiation level.

Keywords – Optimization, Corona Ring, Electric Field, Grey Wolf.



Recent Advances in Controller Area Network (CAN) Bus Technology of Autonomous Vehicle (AV)

Zeina Ali¹, Qutaiba I. Ali¹

¹ *Electronics Engineering College, Ninevah University, University of Mosul, Mosul, Iraq*

* *Corresponding author, e-mail: zinah.mohammed@uoninevah.edu.iq*

Abstract – The development of autonomous vehicles (AVs) has gained significant attention in recent years due to their increased safety, reduced traffic congestion, and improved energy efficiency. Controller Area Network (CAN) bus protocols in AVs are the most common type of internal vehicle networks (INVs) necessary for proper vehicle operation. This paper summarizes previous works, including state of the art regarding wired and wireless CAN bus types. In addition to, this work exploring future trends regarding this bus and its implementation.

Keywords – *CAN, Autonomous Vehicle (AV), Wireless CAN*



Fuzzy controller for simulating a photovoltaic emulator

Samira Boumous^{1*}, Zouhir Boumous², Sabrine Morakeb³, Rayane Yasmine Mahfoudi⁴

Electrical engineering Department, LEER Laboratory, Univ Souk Ahras, Algeria

Email: samira.boumous@univ-soukahras.dz

Abstract – Designing a non-linear power supply that emulates the output of a photovoltaic (PV) module using fuzzy logic involves creating a control system that adjusts the output voltage or current of the power supply based on inputs such as irradiance, temperature, and load conditions .By employing fuzzy logic control, you can develop a non-linear power supply that dynamically adjusts its output to mimic the behavior of a PV module under changing environmental and load conditions. This approach provides flexibility and robustness in emulating the complex characteristics of renewable energy sources like solar panels, using fuzzy logic , we can define input and output variables, by choosing a good membership functions and fuzzy rules. In the simulation used, we adjusted the membership functions, fuzzy rules and control parameters to optimize controller performance and ensure that the output of the non-linear power supply closely matched that of the photovoltaic module. the results were very satisfying.

Keywords – Fuzzy Controller, PV Module, Controller, Renewable Energy.

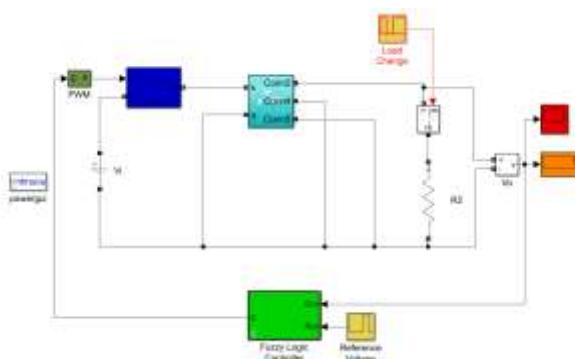


Fig 1. Simulation Bloc in Matlab.

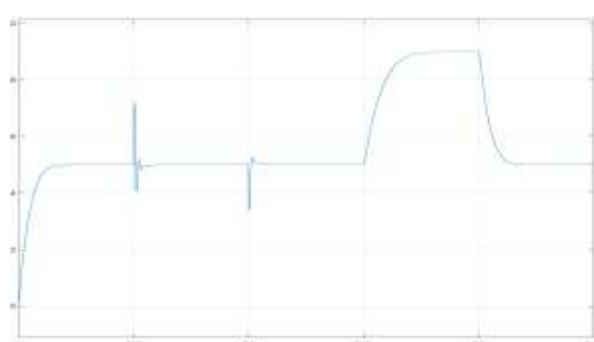


Fig 2. Output voltage

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PSO optimization for MPPT control of photovoltaic panels

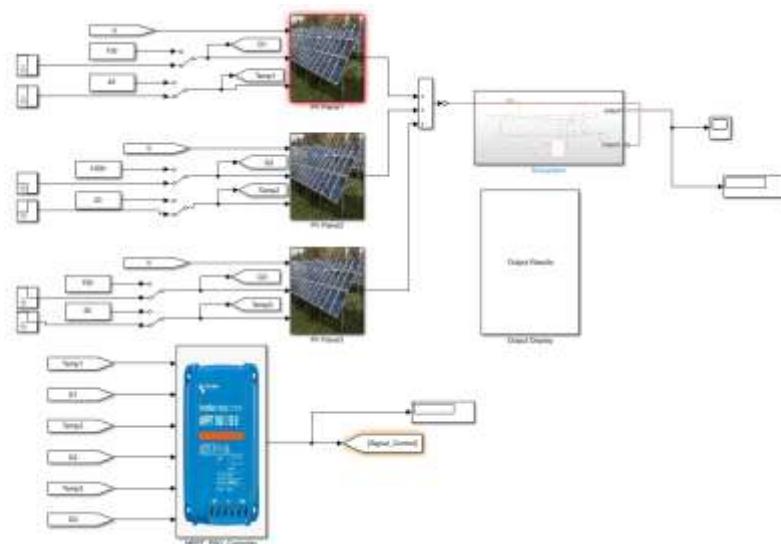
Zouhir Boumous^{1*}, Samira Boumous², Med Mounir Abbes,³ Med Abderrezak Ghellouci⁴

Electrical engineering Department, LEER Laboratory, Univ Souk Ahras, Algeria

Email: zohir.boumous@univ-soukahras.dz

Abstract – Particle Swarm Optimization (PSO) can be effectively applied to maximum power point tracking (MPPT) in photovoltaic (PV) systems, especially under partial shading conditions. Implement PSO optimization for MPPT control of photovoltaic panels under partial shading conditions, effectively navigating the search space to find the global maximum power point despite the presence of local optima caused by shading. The advantages of PSO, including simplicity, robustness, global search ability, convergence properties, parallelization capabilities, and broad applicability, make it a valuable optimization tool for addressing complex optimization problems in different fields. Implementing MPPT (Maximum Power Point Tracking) using PSO (Particle Swarm Optimization) involves adapting the PSO algorithm to find the optimal operating point of a photovoltaic (PV) system in real-time.

Keywords – PSO Algorithm, PV Module, Controller, Renewable Energy, Shading Conditions.





A Hybrid Quadratic Programming and Evolutionary Single-objective Optimization Algorithm: Empirical Study on CEC 2022 Benchmark Problems

Gülce Turhan^{*1,2}, Ökkeş Tolga Altınöz²

¹*Department of Electrical and Electronics, Tedu University, Turkey*

²*Department of Electrician and Electronics Engineering, Ankara University, Country*

^{*}(gulce.turhan@tedu.edu.tr) *Email of the corresponding author*

Abstract – Optimization methods are used in many fields of study to find solutions that maximize or minimize some operating parameters. Optimization can be considered constrained or unconstrained, as well as computational and traditional optimization algorithms. Both has advantages and disadvantages among them. Therefore, to improve the performance of the algorithm it is possible to use both in a hybrid manner. In this research, hybrid computational and traditional optimization method is proposed. For this purpose, two algorithms are selected as the examples of both categories, which are as a mathematical algorithm Sequential Quadratic Programming (SQP) and as a metaheuristic algorithm Genetic Algorithm (GA). As hybrid algorithm whose are named as SQP-GA and GA-SQP, are used. In addition to GA-SQP hybrid algorithm which is composed of two different forms named as V1 and V2 with respect to the collaboration of these algorithms. In this paper, this proposed hybrid algorithms were applied to the CEC 2022 benchmark problems are used to solve with boundary constrained optimization.

Keywords – Optimization, SQP, GA, Objective Function, Single-Objective Constrained Optimization



Optimizing PV-Powered Charging Infrastructure for Electric Vehicles: A Comparative Analysis of MPPT Techniques

TRAIBIZ Omar ^{1*}, OULAD BEN ZAROUALA Rachad ²

^{1,2} STIC Department / National School of Applied Sciences of Tetouan, Abdelmalek Essaadi University, Morocco

* E-mail Address: omar.traibiz222@gmail.com

Abstract – Climate change concerns prompt a shift towards sustainable transportation, with electric vehicles (EVs) increasing. However, this growth strains grid infrastructure. A pioneering approach is proposed: an electric vehicle charging station that integrates solar and battery storage technology. This design addresses sustainable energy needs and mitigates grid strain, offering a practical solution to the challenges posed by the increasing number of EVs.

Employing MATLAB Simulink, the study meticulously models the PV charging infrastructure and delves into the optimization realm by investigating six distinct Maximum Power Point Tracking (MPPT) techniques. These methods include Perturb and Observe (P&O), Incremental Conductance (INC), Variable Step Size P&O, Variable Step Size INC, as well as Modified Variable Step Size P&O and Modified Variable Step Size INC.

Conducting a comprehensive comparative analysis, the research evaluates the efficacy of each MPPT technique in maximizing power output and augmenting system efficiency. Through a detailed analysis of output power simulations, the research reveals subtle variances in the performance and effectiveness of each MPPT technique.

The main objective of this project is to provide insightful data on which MPPT technique performs most effectively for PV-powered charging stations. Factors such as stability, accuracy, and adaptability to diverse environmental conditions are thoroughly examined to provide practical guidance for designers, engineers, and stakeholders invested in the sustainable evolution of transportation infrastructure.

Keywords – Electric Vehicles, Solar Power, P&O MPPT, INC MPPT, Charging station, Battery Energy Storage System.



Fault Diagnosis Approach Based on Improved Variational Mode Decomposition (IVMD) and Convolutional Neural Network (CNN)

Yahia Bousseloub*

¹ Faculty of Sciences Engineering, Badji Mokhtar Annaba University, electromechanical systems laboratory, Annaba, Algeria.

**(yahia.bousseloub11@gmail.com) Email of the corresponding author*

Abstract – In scenarios involving the diagnosis of compound faults in rotating machinery, where disparate failures of varying severity manifest in distinct components of the system, detecting minor faults presents a complex challenge. The presence of a minor fault is often obscured by the more pronounced fault, thereby leading to the predominance of the characteristics associated with the severe fault. Existing literature typically treats compound failures as a distinct fault category, independent of corresponding single faults occurring either within disparate locations of a sensitive component or across separate components, such as bearings and gears, albeit exhibiting comparable fault severities. This study proposes an innovative fault diagnosis approach leveraging improved Variational Mode Decomposition (IVMD) coupled with Convolutional Neural Network (CNN). The fundamental concept involves training the CNN solely on datasets comprising healthy and single fault conditions, excluding compound fault data during training. The efficacy of the IVMD and the proposed hybrid methodology is assessed through the decomposition of simulated vibration signals and the analysis of a gearbox system under a compound fault scenario, characterized by one minor and one severe fault. Results demonstrate the superior accuracy of the proposed approach in diagnosing compound faults and effectively extracting features and classifying minor faults amidst the presence of more severe ones.

Keywords – *Fault Diagnosis, Convolutional Neural Network, Bearing, Vibration Signal, Signal Processing*



Optimization of Continuous Soft Polyurethane Foam Production Considering Sustainability Parameters

Vivien Konyhas*, Annamaria Polyákné Kovács ^{1*},

¹ *Energy, Ceramics, and Polymer technology Institute, University of Miskolc, Hungary*

*vivien.konyhas@gmail.com

Abstract – Nowadays the use and production of more specified polyurethanes show an increasing trend. Essentially, these materials can be processed by any plastic processing method and are mainly used as foams in a wide range of applications. Regarding environmental issues, sustainability is an important factor to consider during the production. In this work we investigated how processing parameters affect the rising time and quality of soft polyurethane foams manufactured by continuous industrial production. The most important parameters exerting effect on the rise time have been selected with the help of the DoE (Design of Experiments) statistical experimental design system. Investigation of the reaction time of artificially produced prepolymers that do not occur in nature - which contain toluene diisocyanate (TDI) - for process optimization. The technology of foaming has two stages: the foam rising stage and the foam solidification stage. Among these two stages, I examined the data obtained from the measurements of the foam rise part, since the formation of closed type cells takes place in this stage. One of the foaming machines already in production (name: PU1) can produce the foam product of the given thickness with a machine speed of 1.7 m/min, in contrast, the recently relocated machine (name: PU3) can produce the same type of foam at 1.4 m/min can produce at a speed of. Apart from the speed, another difference between the two machines can be observed in the length of the tape used for the reaction. Because in the case of the PU3 machine, it is smaller by 1.6 meters. The goal would be to ensure that the PU3 machine can run at the same speed as the PU1 machine. In order to do this, I started to investigate the rise time of the foam under normal production conditions, and what factors or parameters could affect this time. The parameters I examined are the following: the temperature of the catalyst, the speed of the mixing shaft, the temperature of the raw material, the modification of the mixing ratio and the change of the batch number of the raw material.

Keywords – *Polyurethane, Soft Foam, Rise Time, Continuous PUR Production, DoE*



Advancing Waste Management: A Comprehensive Bibliographic Exploration of Artificial Intelligence Applications for Sustainability

Hamza Bellouk^{*1}, Imane EL Mrabet², Mostafa Nawdali¹, Hicham Zaitan¹

¹ *Laboratory of Process's, Materiel's and Environment, Faculty of Sciences and Techniques Sidi Mohamed Ben Abdellah University Fez, Morocco*

² *Team of Applied Chemistry, Geo-Mining, and Modeling (CAG2M), Polydisciplinary Faculty of Ouarzazate, Ibnou Zohr University, 45000, Ouarzazate, Morocco*

hamza.bellouk2@usmba.ac.ma

Abstract – This bibliographic study extensively examines the influence of artificial intelligence (AI) on sustainable waste management in urban environments. Faced with a projected 70% growth in global waste production by 2025, the paper explores how AI, particularly in waste sorting, can revolutionize current waste management practices. Drawing from diverse scholarly sources, the study highlights the utilization of AI to optimize waste collection routes, reduce operational costs, and enhance the overall efficiency of waste management. The AI-powered waste sorting, exemplified by systems like "Recycleye Vision" and "Recycleye Robotics," is scrutinized, emphasizing how these technologies can automate and expedite the process while ensuring precise material separation. The study underscores the positive environmental impact of AI, including a reduction in landfill waste and greenhouse gas emissions. In conclusion, it accentuates the pivotal role of AI in the transition toward sustainable waste management, consolidating its advantages within the scientific literature.

Keywords – *Waste Management, Artificial Intelligence, Sustainability, Waste Sorting.*



Revolutionizing Wastewater Management: A Bibliographic Exploration of Artificial Intelligence's Role in Water Treatment

Hamza Bellouk^{*1}, Imane EL Mrabet², Mostafa Nawdali¹, Hicham Zaitan¹

¹ *Laboratory of Process's, Materiel's and Environment, Faculty of Sciences and Techniques Sidi Mohamed Ben Abdellah University Fez, Morocco*

² *Team of Applied Chemistry, Geo-Mining, and Modeling (CAG2M), Polydisciplinary Faculty of Ouarzazate, Ibnou Zohr University, 45000, Ouarzazate, Morocco*

hamza.bellouk2@usmba.ac.ma

Abstract – This bibliographic study delves into the transformative impact of artificial intelligence (AI) in wastewater management, highlighting its pivotal role in addressing the global water scarcity crisis. AI-powered water treatment systems significantly enhance the accuracy of water quality predictions, enabling swift detection of fluctuations. They optimize water distribution by precisely adjusting chemical dosages, balancing pressure, and swiftly identifying leaks. The paper specifically emphasizes the application of AI in leachate treatment, providing precise predictions for chemical and oxygen requirements in wastewater treatment. These advancements are particularly noteworthy given current manual practices and associated costs related to pond aeration in wastewater treatment plants. Grounded in a compilation of bibliographic sources, this study illuminates the path toward a sustainable and intelligent future in water resource management, ensuring their availability for future generations.

Keywords – *Wastewater Management, Artificial Intelligence, Water Treatment, Leachate Processing, Sustainable Resource Management*



Fast Decryption Methods for The Somsuk-RSA Cryptosystem

Muhammad Asyraf Asbullah^{1*}, Nur Adira Mohamad Azlan²

¹*Centre for Foundation Studies in Science of Universiti Putra Malaysia, Malaysia*

²*Department of Mathematics and Statistics, Faculty of Science, Universiti Putra Malaysia, Malaysia*

^{}(ma_asyraf@upm.edu.my) Email of the corresponding author*

Abstract – In today's digital landscape, safeguarding data transmission and storage is paramount, with the RSA cryptosystem standing as a crucial guardian through its asymmetric encryption mechanism. Despite its effectiveness, the Somsuk-RSA variant has emerged to enhance security measures, albeit with computational challenges, particularly during decryption. This research addresses these challenges by proposing innovative approaches to expedite decryption time. The key proposition involves replacing the Euler function with the Carmichael function, a strategic move to enhance efficiency compared to the original RSA and Somsuk-RSA. A comprehensive analysis of the decryption process reveals a notable slowdown in the Somsuk-RSA method, prompting refinement. The study, conducted across prime sizes of 512, 1024, and 2048 bits, underscores the efficacy of the New Somsuk-RSA Cryptosystem, demonstrating a noteworthy improvement in data decryption speed compared to the conventional Somsuk-RSA method. Thus, this research contributes valuable insights into optimizing the Somsuk-RSA variant, paving the way for enhanced data security and more efficient cryptographic processes in the evolving digital era.

Keywords – Asymmetric, Encryption, RSA, Carmichael Function, Cryptography



Mid-Term Power Load Forecasting of a Statistically Modified Long-term Data by using the LSTM

Khalid Alhashemi^{*1}, Okkes Tolga Altinoz¹

¹*Department of Electrical and Electronics, Ankara University, Turkey*

^{*}(kwhalhashemi@ankara.edu.tr) *Email of the corresponding author*

Abstract – The surplus power produced by power plants, which is considered as generation losses, can be avoided by estimating the expected load consumption, which will lead to financial gains for companies producing electrical energy. An accurate estimation of the power load can yield a reliable determination for power system management and the accompanying reduction of gas emitted from power plants. This work aims to create an integrated deep learning model based on a time series index to estimate future values of electric power consumption by applying Long Short-Term Memory (LSTM) networks. The dataset used has taken directly from PJM Interconnection Organization, which is a regional transmission organization in the United States, the data is an hourly power consumption in megawatt for Chicago and much area of Northern Illinois state. A statistical test was used to evaluate the dataset. Three different statistics functions have used for resampling the dataset, mean, minimum, and maximum function. After fitting the proposed model, it will predict the power load for one year ahead on daily basis. When the minimum function has used in the resampling processing the model was able to attain a Mean Absolute Percentage Error (MAPE) of 3.84%, and the coefficient of determination (R-squared) of 0.8.

Keywords – *Load Forecasting, Long Short-Term Memory, Machine Learning, Short-Term Load Forecasting, Time-Series Analysis*



Modeling and optimization of pectin extraction from citrus peels using artificial neural networks (ANN) and response surface methodology (RSM)

Djerri Rofia^{1*}, Himed Louiza¹, Berkani Mohamed², Trad khoja Esma Anissa², Barkat Malika¹

¹The Biotechnology and Food Quality Research Laboratory (BIOQUAL), INATAA, University of the brothersMentouri – Constantine 1.

²Higher School of Biotechnology, New University center Ali Mendjeli B.P. E66 25100- Constantine.

Email*:rofia.djerri1@doc.umc.edu.dz

Abstract – Citrus fruits are a significant source of bioactive compounds, such as pectin, it's one of the most valuable products, which is primarily produced from the pomace of apples, citrus peels, guava extract, sugar beets, and sunflower heads. Due to its capacity to create aqueous gels and act as a dispersion stabilizer, pectins are frequently employed as functional ingredients in the food industry, pharmacy and cosmetic manufacture thanks.

There are several studies have been carried out on the extraction of pectin from citrus peels by various methods. The intention of this present study is to optimize the recovery of pectin from citrus peel examining four independent process variables (pH, extraction time (min), amplitude (Hz)) and compare the pectin recovery (PR) using statistical (response surface methodology (RSM)) and non-statistical (artificial neural network (ANN) with genetic algorithm (GA)) methods.

Input parameters were extraction time (30-60 min), amplitude (25-50 Hz), PH (1.2-4.2) while pectin yield (PY %) was the output. Using ANN as the fitness function, a maximum pectin yield of $38.67 \pm 0.09\%$ was searched by genetic algorithm at the time of 30 min, amplitude of 50 Hz, and PH 1.2 while the predicted value by RSM was $39.77 \pm 0.08\%$ at the time of 60 min, amplitude of 25 Hz and PH 4.2.

Finally, the prediction by response surface methodology was better than artificial neural network. Therefore, response surface methodology model is much more accurate in estimating the values of pectin yield and mean square error when compared with the artificial neural network.

Keywords – Citrus Peels, Optimization, Pectin, RSM And ANN, Ultrasound AssistedExtraction



Görüntü İşleme Teknikleri ve Yapay Zekâ Algoritmaları Kullanılarak Hurma Meyvesinin Sınıflandırılması

Abdullah Ammar KARCIOĞLU^{1*}, Esra EFİTLİ¹

¹*Yazılım Mühendisliği / Mühendislik Fakültesi, Atatürk Üniversitesi, Erzurum, Türkiye*

^{*}(amar.karciooglu@atauni.edu.tr)

Özet- Arap yarımadasında üretilen meyvelerin yaklaşık %80'ini oluşturan hurma meyvesi, birçok hurma yetiştircisi ülkelerin onde gelen tarım ürünüdür. Manuel hurma sınıflandırma zaman alıcı bir işlemidir ve sisteminin doğruluğu ve tutarlılığı konusunda belirsizliklere yol açar. Ayrıca, her yere dağılmış olan çeşitli hurma meyvesi türleri, renk, tat, şekil ve doku dahil olmak üzere çeşitli karmaşık ve benzersiz özellikler sergiler. Bu ayırt edici özellikler ve görünüm, bazen hurma meyvelerinde değişkenlik göstermeyebilir. Çünkü çeşitli hurma meyveleri renk, şekil ve doku açısından ince farklılıklara sahip olabilir. Hurma meyvelerinin birden fazla türünü ayırma ve sınıflandırma zorluğunun üstesinden gelmek zamanla problem haline gelmiştir. Bu çalışmada, meyve sınıflandırma örneği olarak hormalar ele alınmıştır. 1658 görüntü ve 9 hurma türü (Medjool, Ajwa, Galaxy, Shaishe, Meneifi, Sugaey, Nabat Ali, Rutab, Sokari) içeren bir veri seti kullanılmıştır. Görüntü işleme teknikleriyle renk, doku, şekil öznitelikleri çıkarmak için morfolojik işlemler ve metodlar uygulanmıştır. Geleneksel yöntemlerle toplamda 33 öznitelik çıkarılmıştır. Oluşturulan veri seti ile 7 makine öğrenmesi algoritması ve yapay sinir ağı modeli (YSA) ile sınıflandırma yapılmıştır. YSA ile %96,80 doğruluk oranı elde edilmiştir. Böylelikle, endüstrilerde hurma ticareti sırasında hurma türlerinin yapay zekâ teknikleri kullanılarak yüksek doğrulukta sınıflandırma yapılabileceği gösterilmiştir.

Anahtar Kelimeler – Görüntü İşleme, Makine Öğrenmesi, Yapay Sinir Ağları, Morfolojik İşlemler, Meyve Sınıflandırma,



Güneş Enerjisi Santralleri İçin İyileştirilmiş Önleyici Bakım Planlaması

Halil Karayel^{1*}, Ahmet Aktaş²

¹Enerji Sistemleri Mühendisliği / Fen Bilimleri Enstitüsü, Gazi Üniversitesi, Türkiye

²Enerji Sistemleri Mühendisliği / Fen Bilimleri Enstitüsü, Gazi Üniversitesi, Türkiye

^{*}(halil.karayel@gazi.edu.tr)

Özet – Son yıllarda artan çevresel felaketler, iklim değişiklikleri, doğal afetlerin üzerine bir de savaşların eklenmesi enerji krizlerini beraberinde getirdi. Bu gelişmeler ve olumsuz durumlar üzerine ülkeler birleşip yeni senaryolar ile yeni enerji planlarını yayınladı. Bu yeni enerji senaryolarında ve gelecek planlamalarında güneş enerji santrallerinin en büyük payı oluşturacağı görülmektedir. Güneş enerjisi santrallerinin kullanımının artan büyümeye oranı, amacı maliyet etkin bir şekilde enerji üretmeyi sağlamak olan yatırımcıların, devlet kurumlarının ve diğer paydaşların bu konuda yeni sistemsel değişikliklere gitmesine sebep oldu. Öngörülen bu enerji geçisi ise beraberinde getirdiği enerji arzı güvenliğini sağlamadaki eksik yönleri nedeniyle mevcut kaygıları artırdığı söylenebilir. Bu öngörülen olumsuz durumlar, güvenilirlik, tesis ve makine bileşen arızalarının tespiti yoluyla sürekli çalışmayı sağlayan ve endüstriyel sistemlerde sürdürülebilir üretim için önemli bir parametre olan bakım işlemini çok daha önemli hale getirmektedir. Sistemin güvenilirliğini artırmak için en iyi kombinasyon önleyici bakım aralıkları ile değiştirilen bileşenlerin optimize edilmesi ile belirlenen seçici ve önleyici bakım eylemlerinin optimizasyonu- sağlanarak uygun bakım planlarını oluşturulmalıdır. Bu çalışmanın amacı bir güneş enerjisi santrali sisteminin kullanılabilirliğini en üst düzeye çıkararak önleyici bakım planlaması için yeni bir model önermektir. Bu yeni modeli oluşturmak için ise tahmin metodlarının optimum seviyede uygulanıldığı makine öğrenmesinde kullanılan yeni teknolojileri tesislerin bakım sistemlerine entegrasyonu temel alınmıştır. Uzun zaman sürecinde alınmış olan anlamlı veriler kullanılarak arızalara sebep olan ve verimliliği düşüren faktörler uygun analizlerle tespit edilerek doğru bir metod geliştirme yapılabileceği amaçlanmıştır. Kurulan iyileştirilmiş bakım sistemleriyle enerji arz güvenliğini sağlayan, verimli, bakım ve işletme maliyetini düşüren bir yapı oluşturulmasına zemin hazırlaması beklenilmektedir.

Anahtar Kelimeler – Önleyici Bakım, Güneş Enerjisi Santrali, Öngörücü Bakım, Makine Öğrenimi, Arıza Tespiti



OPTIMAL PLACEMENT AND SIZING OF DISTRIBUTED GENERATION IN RADIAL DISTRIBUTED NETWORK USING REPTILE SEARCH ALGORITHM

Qirat Nizamani^{1*}, Ashfaque Ahmed Hashmani¹, Zohaib Hussain Leghari¹, and Zeeshan Anjum Memon²

¹*Department of Electrical Engineering, Mehran University of Engineering and Technology (MUET), Jamshoro, 76062, Sindh, Pakistan*

²*Department of Electrical Engineering, Mehran University of Engineering and Technology (MUET), SZAB Campus, Khairpur Mirs, 66020, Sindh, Pakistan*

**(qiratkhalid97@gmail.com)*

Abstract – The power distribution systems are more vulnerable to technical losses due to high currents and lower voltages. The distributed generation (DG) units can significantly improve a distribution network's overall performance if allocated optimally. This study demonstrates the potential of a nature-inspired metaheuristic optimization technique, Reptile Search Algorithm (RSA), to optimize the allocation of DG units in the power distribution networks to reduce power losses. RSA is employed to optimize the size and placement of type-I and type-II DG units, facilitating the injection of real and reactive powers. The IEEE 33-bus test system and backward-forward load flow analysis method are utilized to analyze the effectiveness of RSA. The results demonstrate the RSA's dominating and comparative performance over existing techniques in the literature. Moreover, allocating multiple DG units instead of a single unit has been identified as a more effective approach to minimize power losses.

Keywords – *Distributed Generation - Distribution System - Nature-Inspired Meta-Heuristic Optimization - Power Loss Reduction - Reptile Search Algorithm.*



Tf-Idf Vektör Modeli ve Yapay Zekâ Teknikleriyle Sahte Haber Tespiti

Abdullah Ammar KARCIOĞLU^{1*}, Şuheda KARA¹ ve Melisa YALÇINKAYA¹

¹*Yazılım Mühendisliği / Mühendislik Fakültesi, Atatürk Üniversitesi, Erzurum, Türkiye*

**(ammar.karciooglu@atauni.edu.tr)*

Özet – Sahte haber, yanlıltıcı ve sansasyonel bilgilerin ilgili haber bağlamında yayıldığı bir olguyu ifade etmektedir. Dijital çağın hızlı bilgi erişimine olanak sağlama, sahte haberlerin kolayca yayılmasına ve toplumları olumsuz yönde etkileme potansiyelini artırmasına sebep olmuştur. Bu durum, toplumlar arasında güvensizlik, ekonomik problemler ve toplumsal gerilim gibi sorunlara neden olabilmektedir. Bu çalışmada, bu tür problemlerin önüne geçebilmek ve sahte haberlerin yayılmasına engel olabilmek hedeflenmiştir. Çalışma kapsamında sahte haberlerle mücadele edebilmek amacıyla haber doğruluğunu teyit eden yapay zekâ tabanlı doğal dil işleme teknikleri kullanılarak bir model önerilmiştir. Bu modelde, açık kaynak veri seti olan ISOT veri seti kullanılmıştır. Modelin ilk aşamasında, veriler belirli bir yapıya getirilmek üzere çeşitli ön işleme aşamalarından geçirilmiştir. Daha sonra, veri seti 70/30 oranında eğitim ve test verisi olarak ayrılarak ve k=5 çapraz doğrulama kullanılarak iki farklı çalışma gerçekleştirilmiştir. Kelimelerin temsili için vektör model yöntemlerinden Tf-Idf yöntemi kullanılmıştır. Lojistik Regresyon, Naive Bayes, Karar Ağaçları ve Destek Vektör Makineleri sahte haber tespitini tahmini için seçilen makine öğrenmesi algoritmalarıdır. Çalışmada 70/30 oranında eğitim-test bölümlemesi ile elde edilen sonuçlara göre en yüksek doğruluk değeri %99,24 ve k=5 çapraz doğrulama ile elde edilen sonuçlara göre, en yüksek doğruluk değeri Karar Ağaçları ile %99,17 olarak elde edilmiştir. Bu çalışmada yapay zekâ tekniklerini kullanarak yüksek doğrulukta sahte haber tespitini gerçekleştirebileceği gösterilmiştir.

Anahtar Kelimeler – Yapay Zekâ, Doğal Dil İşleme, Makine Öğrenmesi, Sahte Haber Tespiti, Tf-Idf



Optimizing Crop Selection: Machine Learning Recommendations Based on Soil and Environmental Factors

AbdElKader Seif El Islam RAHMANI¹, Abdenour AIT AHMED², Mohamed Elhadi RAHMANI³ and Hadj Ahmed BOUARARA⁴

¹Computer Science Department, Université Dr. Tahar Moulay de Saïda,, Algeria

²Computer Science Department, Université Dr. Tahar Moulay de Saïda,, Algeria

³Computer Science Department, Université Dr. Tahar Moulay de Saïda,, Algeria

⁴Computer Science Department, Université Dr. Tahar Moulay de Saïda,, Algeria

1a.e.k426rahmani@gmail.com

Abstract – This research aims to develop a machine learning model for crop yield recommendations based on seven key soil and environmental factors which are: nitrogen (N) ratio, phosphorus (P) ratio, potassium (K) ratio, temperature, humidity, pH and precipitation. The material contains 22 different categories labeled according to harvest level.

The performance of seven different models was evaluated: Linear Regression, Decision Tree, Random Forest, Gradient Boost, XGBoost, Bagging Regressor and KNN. The models were evaluated based on accuracy, mean square error (MSE) and R2 score. The results show that the decision tree, random forest and bagging regressor achieved high accuracy indicators with scores exceeding for 98% as they got 98.4%, 98.9% and 98.9%, respectively. These models also showed low MSE values, indicating their ability to make accurate predictions.

Additionally, a comparison using k-fold cross-validation was conducted, revealing consistent performance across models. Notably, Bagging Regressor, Decision Tree and Random Forest maintained their superior performance across all metrics.

This indicates that it allows for accurate performance prediction based on specified characteristics. However, it is recommended to improve and validate the model for larger data sets and different environmental conditions to improve its robustness and applicability in real agricultural environments.

Keywords – *Machine Learning, Crop Yield Recommendation, Soil Analysis, Environmental Factors, Model Evaluation.*



Club Speed: Calculation of Golf Club Speed at the Time of Hit in the Golf Game Using Radar Signal and Images

Onur Koyuncu ^{1*}, Ali Erol ² ve Ahmet Anil Dursun ³

¹Rapsodo Yazılım A.Ş., Turkey

²Rapsodo Yazılım A.Ş., Turkey

³Rapsodo Yazılım A.Ş., Turkey

^{*}(onur.koyuncu@rapsodo.com)

Abstract – This research endeavors to measure golf club speed with the objective of enhancing the performance of golf players, employing data science techniques and cutting-edge technologies. The assessment of golf club speed during ball impact will be accomplished through a fusion of experiential algorithms and deep learning-based methods with radar signals. The primary stages encompass radar signal preprocessing, curve tracking, estimation via spectral centroid, and the integration of deep learning-based predictions.

The overarching aim is to achieve results comparable to high-cost products utilizing Doppler radar signals and GS camera technology. In tandem with this, the study seeks to develop a user-friendly mobile application compatible with Android and IOS devices. This application is designed to facilitate golf players in tracking their performance and gaining insights into their game. By applying data science methodologies within the realm of sports technology, this research proffers a comprehensive and innovative approach. The utilization of Doppler radar signals and GS camera technology not only aims to provide accurate measurements but also intends to offer a cost-effective alternative to existing high-priced solutions.

Furthermore, the study's impact extends beyond the immediate scope of golf, holding potential applications in sports analytics and performance measurement across diverse disciplines. The combination of a meticulous methodology, robust data collection practices, and inventive algorithms contributes significantly to the potential influence of the study in advancing the field of sports technology.

Keywords – *Golf Technology, Club Speed Measurement, Data Science in Sports, Sports Performance Enhancement, Innovative Sports Technology*



Deep Learning for Automated Grapevine Leaf Shape Classification: A Review of Methods and Applications for Cultivar Identification

Wahiba YAHIAOUI*, Roumaissa BEKIRI² and Ziane LAIADI³

¹*Department of natural and life sciences/ LGBVB laboratory, Mohamed Khider University of Biskra, Algeria*

²*Department of computer science/ LESIA laboratory, Mohamed Khider University of Biskra, Algeria*

³*Department of agronomic sciences/ LGBVB laboratory, Mohamed Khider University of Biskra, Algeria*

*(wahiba.yahiaoui@univ-biskra.dz)

Abstract – Grapevine cultivars exhibit diverse leaf shapes, which are crucial for cultivar identification and discrimination. Traditional ampelography methods rely on visual assessment, but they are time-consuming and prone to human error. In this review, we provide an overview of recent applications of deep learning methods to automate image-based grapevine leaf shape classification. We explore various deep learning architectures, including convolutional neural networks (CNNs) and recurrent neural networks (RNNs), and their variants to extract discriminative features from grapevine leaf images. These models classify leaves into different shape categories such as orbiculate, cuneiform, and pentagonal. Transfer learning approaches, leveraging models pre-trained on natural image datasets, serve as effective starting points for grapevine leaf classification. We discuss how data augmentation techniques such as cropping, flipping, and warping enhance model training with limited grape leaf datasets. Additionally, we delve into the evaluation metrics used, including precision, recall, F1-score, and ROC curves, alongside classification accuracy and time speed, to assess model performance. Despite challenges such as high intra-cultivar variability and limited labeled cultivar leaf images, deep learning presents promise for automating ampelography and cultivar identification. The advantages of these approaches, including enhanced accuracy and efficient processing times, demonstrate their potential for assisting in cultivar discrimination and pedigree analysis.

Keywords – *Grapevine, Leaf Shape, Deep Learning, Classification, Image Analysis.*

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Spacetime Dependent Scale Factor in FLRW Spacetime with Physical Significance

Mutahir Ali^{*}, Farhad Ali ²

1 Institute of Numerical Sciences, Kohat University of Science & Technology KPK, Pakistan

2 Institute of Numerical Sciences, Kohat University of Science & Technology KPK, Pakistan

^{*}(amutahirg@gmail.com)

Abstract –This research provides the inhomogeneous and non isotropic expansion of the spacetime in the universe. A space dependent term $\alpha(t,r)$ has been introduced in the scale factor of the FLRW (Friedmann-Lemaitre-Robertson-Walker) spacetime to tell about the inhomogeneity and anisotropy of the universe. By calculating the approximate Noether symmetries of the FLRW spacetimes, the corresponding first integrals have been used to calculate the effective potential as well as effective force of particles in FLRW spacetimes. Then the motion of a test particle in FLRW spacetimes is observed. By graphical analyzing the dynamics of particle, it provides the useful information about flat as well as perturb FLRW spacetimes related to the dark matter and also about the source of universe expansion.

Keywords – *Spacetimes, FLRW Spacetimes, Scale Factor, Symmetries, First Integrals*



Application of Bat algorithm and Taguchi design for Grading ring geometric dimensions optimization of 220 kV Polymeric Surge Arrester

Alti Nadjim^{1*}, Belhouchet Khaled² and Ouchen Lyamine¹

¹*Department of Electrical Engineering, Faculty of Technology, Ferhat Abbas University, Setif – 1, 19000, Algeria*

²*Department of Electrical Engineering, Faculty of Technology, Mohamed Boudiaf University, M'sila 28000, Algeria*

^{}(alti.nadjim@yahoo.fr) Email of the corresponding author*

Abstract –The distribution of potential and electric field along a surge arrester under normal operating conditions is non-uniform. As a result, the ZnO discs placed near HV electrode are more stressed than the ZnO discs in the bottom section. Moreover, E-field distribution along varistors column is an important factor that needs to be taken into account during designing of metal oxide surge arresters. It can be improved by installing grading ring at the top of the surge arrester.

This paper aims to improve the distribution of the potential and the electric field along a 220 kV polymeric surge arrester by optimizing the design of the grading ring namely its position from HV electrode (H), its radius (R), and ring tube thickness (T). In order to reduce the number and the simulations time performed to optimize the grading ring parameters, an optimal design requires a smaller number of simulations is adopted based on the model L9 of Taguchi. It was employed using MINITAB software. A combined method based on 3D-FEM using COMSOL MULTIPHYSICS software, and Taguchi design is opted in order to obtain the objective function. It consists of a mathematical relationship between the maximum E-field magnitudes and grading ring parameters (H, R, T) and their interactions. In this paper, the optimal design of grading ring is achieved by minimizing the electric field along the active column of varistors using a Bat algorithm. This algorithm has been implemented using JAVA Script software. The objective function achieves its minimal value after a few numbers of iterations, and corresponds to the optimal values of grading ring geometric dimensions. By the use of an optimal design of grading ring, the distribution of the electric field is improved along the active column of the varistors, and its value is reduced by 42% in the upper part of the metal oxide arrester 220 kV. The advantage of BAT algorithm is a simple and very fast program, which allows rapid convergence to an accurate solution.

Keywords – *Surge arrester, E-field, Potential, 3D-FEM, COMSOL MULTIPHYSICS, Taguchi design, Bat algorithm, optimization.*



A Generative AI Solution for Healthcare Problems : Application of Large Language Model

Hadj Ahmed Bouarara¹ Slimani Islem Abdelkader², Becharef Mohamed Amine ²

¹Gecode laboratory university of saida, Algeria

²Department of informatics/MICR 2, University of Dr tamer moulay, Saida, Algeria

Emails : (bouararaahmed1990@gmail.com, slimaniislam60@gmail.com, mohamedaminebecharef@gmail.com)

Abstract – our solution is poised to revolutionize the healthcare industry with its cutting-edge AI-driven chatbot platform. Designed to provide immediate medical consultation and assistance, it utilizes advanced algorithms and natural language processing to deliver prompt diagnoses, treatment guidance, and patient education. Its primary objective is to address the pressing issue of healthcare congestion by offering accessible and efficient healthcare solutions for users of all ages.

Through our proposition, individuals can receive instant medical support by simply typing their queries or uploading multimedia files (Images And Videos) of their medical conditions. The platform's ability to swiftly analyze and diagnose illnesses enhances the efficiency of care delivery, mitigating the challenges posed by overcrowded healthcare facilities. Moreover, it serves as a valuable resource for disease prevention and treatment education, empowering users to make informed healthcare decisions.

To sustain its operations and drive growth, Dawitech employs various monetization strategies, including subscription plans, licensing agreements with healthcare institutions, sponsored content, and telemedicine services. These revenue streams enable Dawitech to provide high-quality healthcare services while generating sustainable income.

Keywords – *AI-Driven Chatbot Platform; Immediate Medical Consultation; Healthcare Congestion; Healthcare Innovation; Natural Language Processing; Treatment Guidance; Patient Education; Deep Learning; Generative AI*

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A Proposed Method based on Machine Learning to Predict the Lattice Constant of Double-peroxide Materials

Inas Bouzateur ^{*}, Sarah Guenou ² and Hedjar Hakima ³

¹*LASS, Department of Electronics, Faculty of Technology University of Mohamed Boudiaf of M'Sila*

²*ECP3M Laboratory, University of Mostaganem, 27000 Algeria*

³*LMSEERGE, Department of Electronics, Faculty of Technology University of Laghouat*

^{}inas.bouzateur@univ-msila.dz*

Abstract – Over the past decade, double perovskite oxides have garnered considerable attention due to their distinctive and versatile material properties. Among the six parameters defining the cubic structure, the lattice constant stands out as a crucial variable, pivotal for tailoring materials for specific technological applications and unequivocally defining the crystal structure. In this study, we employ the Long Short-Term Memory (LSTM) network method to establish correlations between the lattice constant of $X_2 YY' O_6$ cubic perovskite compounds and their physicochemical properties, including ionic radii, electronegativity, and oxidation state, with the aim of predicting the lattice constants of new cubic perovskite compounds with enhanced accuracy. We investigate 147 compounds, with lattice constants ranging between 7.700 Å and 8.890 Å.

Through evaluation metrics such as root mean square error (RMSE), mean absolute error (MAE), and coefficient of determination (R^2), we compare the proposed LSTM model with the existing model by Sandra et al. The LSTM model demonstrates superior performance, with a 14% and 22% improvement in RMSE and MAE, respectively, over the Sandra et al. models. Consequently, our prediction method exhibits a high level of accuracy and stability, enabling precise predictions of lattice constants.

Keywords – Double Cubic Perovskite Oxides; Lattice Constants; Prediction; LSTM.



Use of artificial intelligence for estimating oil rates from producing wells in an Algerian oil field

Zakaria Adjou^{*}, Djamila Boufades² and Mustapha Miloudi³

¹*Department of Hydrocarbon Production, KasdiMerbah University, Ouargla, Algeria*

²*Department of Hydrocarbon Production, KasdiMerbah University, Ouargla, Algeria*

³*Department of Hydrocarbon Production, KasdiMerbah University, Ouargla, Algeria*

^{*}(dradjou2019@gmail.com)

Abstract – The estimation of oil rate in two types of wells: eruptive and non-eruptive, using several artificial intelligence techniques based on data weighing of the selected producer wells in an Algerian oil field. The integration of SLR simple linear regression, RLM multiple linear Regression, RNAS single artificial neuron network and RNAM multiple artificial neurone network was done to determine oil flow. The calculations prove that the RLM method gives the best correlation coefficient between the actual oil flow and the estimated oil flow (Erreur de 0,2). On the other hand, the RLS method shows a significant difference between estimated flow rate and measured flow rate (Erreur de 2,7). RNAS and RNAM methods yield unsatisfactory results (Erreur de 1,15 et 0,86 respectivement). In this study, the Visual Studio Code and python codes were used for the deployment of a codical system to estimate the future rates of the candidate wells. The results confirm the effectiveness of artificial intelligence techniques applied to predict production gains based on time and investment.

Keywords – *Artificial Intelligence, Oil Rate, Weighing Test, SLR, MLR, SANN, MANN, Visual Studio Code, Python*



Some Reasons to use Artificial Intelligence in Civil Engineering

Chalabi Youssouf ^{1*}, Aissaoui Soufyane ², Mouaissa Mohamed Salah ¹ and Benali Khaled ³

¹ *Smart Structures Laboratory (SSL), Department of Civil Engineering and Public Works, Faculty of Sciences and Technology, University of Ain-Témouchent, Algeria*

² *Department of Civil Engineering and Public Works, Faculty of Sciences and Technology, University of Ain-Témouchent, Algeria*

³ *Laboratoire des Structures et Matériaux Avancés dans le Génie Civil et Travaux Publics LSMAGCTP*

* *youcef.chalabi@univ-temouchent.edu.dz*

Abstract – The increasing integration of artificial intelligence (AI) in various fields of civil engineering, such as geotechnics, infrastructure, smart cities, and intelligent buildings, marks a significant evolution in the engineering sector. AI offers substantial benefits by facilitating the analysis and interpretation of complex data in geotechnics, enhancing understanding of soil and structure behaviors for more precise planning and design of foundations. In the realm of infrastructure, AI optimizes the design and maintenance of bridges, tunnels, and dams by predicting potential failures and recommending repair or reinforcement strategies. Smart cities also benefit from AI by efficiently managing resources, optimizing transportation infrastructures, and enhancing residents' quality of life through intelligent energy, water, waste management systems, and improved public transportation coordination. Regarding intelligent buildings, AI is used to monitor and control security, heating, ventilation, and air conditioning systems, optimizing energy performance and ensuring occupants' comfort. This research addresses a trending topic, namely the reasons for using artificial intelligence in the field of civil engineering. The utilization of AI in these various domains represents a significant advancement, not only in terms of operational efficiency and sustainability but also by opening new avenues for innovation and development in the engineering sector.

Keywords –Artificial Intelligence (AI); Civil Engineering; Infrastructure; Smart Cities; Intelligent Buildings



ManagementAssist (MA): An AI-Powered Tool for Integrating AI into V-Cycle and Agile Methodologies

Nevzat DONUM ^{1*}, Huseyin KARACALI ² and Efecan CEBEL ³

¹ TTTech Auto Turkey, Turkey

² TTTech Auto Turkey, Turkey

³ TTTech Auto Turkey, Turkey

*nevzat.donum@tttech-auto.com

Abstract – Automotive software development is a complex process that is often challenging to manage effectively, especially in the wake of the COVID-19 pandemic, which has led to changes in the way that Scrum teams operate. The integration of artificial intelligence (AI) into automotive software development methodologies presents a promising solution to this complexity. This paper introduces ManageAssist (MA), an offline AI-focused tool aimed at improving V-Cycle and Agile methodologies. MA integrates with an ALM tool, uses its project management data, and analyzes defects and time tracking data to generate a three-section report. The first section includes progress charts of developers and identifies their strengths and weaknesses, providing recommendations to improve the latter. The second section categorizes defects and their root causes at the project and individual member levels. The third section provides recommendations for reducing deviations in task duration allocations and deviation rates. MA's primary goal is to improve the efficiency of automotive software project management processes by assisting project managers. Additionally, MA can be developed in terms of automation, with the feature of creating automatic tasks to be submitted to the project manager for approval as a result of analysis. MA has the potential to significantly improve the efficiency and effectiveness of automotive software development projects.

Keywords – Artificial Intelligence, , Application Lifecycle Management, V-Cycle, Agile, Automotive Software Development



Artificial Intelligence-Driven Solution for Improving Automotive Software Development Processes

Nevzat DONUM ^{1*}, Huseyin KARACALI ² and Efecan CEBEL ³

¹ TTTech Auto Turkey, Turkey

² TTTech Auto Turkey, Turkey

³ TTTech Auto Turkey, Turkey

*nevzat.donum@tttech-auto.com

Abstract – Increasing competition in the automotive industry has resulted in the complexity of automotive software development, necessitating faster and more reliable processes. Artificial intelligence (AI) presents a promising solution to these challenges. This study introduces DevPro (DP), an offline AI-focused tool designed to enhance automotive software development processes. The primary aim is to expedite development, minimize errors, ensure high software quality, and optimize release time. DP generates tested and documented atomic units that conform to the C11 and MISRA C:2012 standards. Additionally, DP is able to be trained using a company's specific source code repositories to meet its coding standards. The software development process begins with developers inputting software requirements into the tool. Source codes that align with the specified requirements are generated by DP. Unit test is then generated, executed, and reported by DP. Furthermore, a code editor is included in the tool UI, where developers can review and manually edit the generated. The overarching goal of this tool is to accelerate and improve the automotive software development process by generating tested and documented atomic units by AI. Moreover, the study suggests the integration of CI/CD pipelines into DP to further improve process efficiency and reliability.

Keywords – Artificial Intelligence, Automotive Software Development Process, MISRA C



The Impact of Artificial Intelligence on EFL Vocabulary Learning

Mehmet ASLAN

¹School of Foreign Languages/Van Yüzüncü Yıl University, Turkey

(m.aslan@yu.edu.tr)

Abstract – Artificial Intelligence (AI) is no longer science fiction. In fact, artificial intelligence has already reshaped various aspects of our lives, and one area where its transformative potential shines is in language learning. Language learning has become much faster and easier thanks to artificial intelligence, which has been developing rapidly recently. In general, AI-assisted language learning supports learners in terms of personalized language learning, language assessment, and language translation. It is clear to see the impact of artificial intelligence on EFL speaking skills or pronunciation, but what about vocabulary development? Vocabulary, the backbone of language learning, has also had its share of this contribution, and many vocabulary-teaching applications supported by AI have been created. AI can assess the vocabulary level of the learner and offer a learning plan to them considering the appropriate time, length, and amount. For incidental vocabulary learning, AI can create texts and podcasts that include vocabulary at the level of the learner. In the point of intentional learning, AI can prepare different types of vocabulary questions at the level of learners after assessing the learner's vocabulary knowledge through an AI-based test. Additionally, to learn the pronunciation of words, AI is a significant supporter. Some vocabulary teaching platforms, such as Vocabulary.com, Memrise, Quizlet, and WordUp, are already assisted by AI in the mentioned points. In short, AI can support EFL vocabulary learners in personalized vocabulary development and vocabulary assessment.

Keywords – Artificial Intelligence, Vocabulary Learning, EFL, AI-assisted Vocabulary Learning



Modeling and Control of the Nonlinear Tubular Solid-Oxide Fuel Cell System Based on TS Fuzzy Theory and Predictive Control

Fayssal Ouagueni^{*1}, Kada Boureguig², Abdelghafour Herizi¹ and Riyadh Rouabhi¹

¹ LGE Laboratory, Electrical engineering department, Faculty of Technology, University of M'sila, Algeria.

² Department of Mechanical Engineering, University Ibn Khaldoun Tiaret, Tiaret, Algeria.

^{*}(fayssal.ouagueni@univ-msila.dz) Email of the corresponding author

Abstract – The solid oxide fuel cell (SOFC) is broadly used for distributed and clean power generation. The main problem related to SOFC lies in the difficulties to control the output voltage of the SOFC due to the strong nonlinearity, the rapid changes of the load and the limited fuel flow. The objective of the control of the SOFC system is to maintain the output voltage at a constant level and the fuel utilization rate in a safety interval. In this context, a multiple-input multiple-output (MIMO) discrete-time Takagi-Sugeno (TS) fuzzy dynamic model with feed forward input is used in this study to describe the dynamic properties of the nonlinear voltage and the fuel utilization rate in a tubular SOFC system. This obtained fuzzy model will be used for the application of constrained fuzzy model predictive control. The simulation results are provided to show the accuracy and the effectiveness of the proposed strategy.

Keywords – Solid Oxide Fuel Cell (SOFC), Takagi-Sugeno (TS) Fuzzy Model, Model Predictive Control

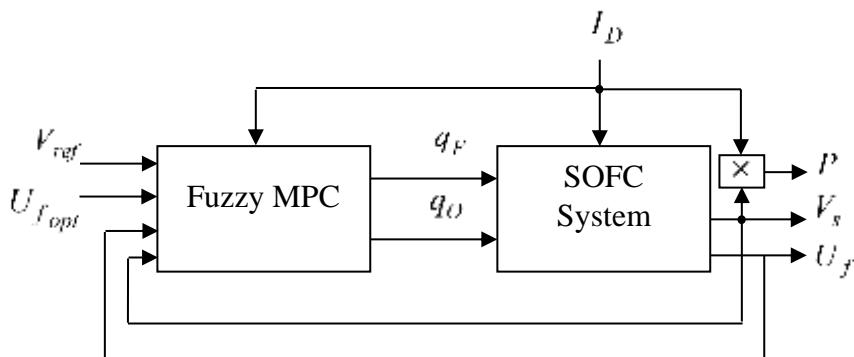


Fig. Diagram of the proposed FMFPC



Gıda Tedarik Zincirinde İsrafları Azaltmaya Yönelik Dijital Dönüşüm Süreçlerinin İncelenmesi

Leyla Kardelen Yıldırım^{1*} ve Emel Yontar²

¹Endüstri Mühendisliği Bölümü / Fen Bilimleri Enstitüsü Yüksek Lisans, Tarsus Üniversitesi, Türkiye

² Endüstri Mühendisliği Bölümü / Mühendislik Fakültesi Tarsus Üniversitesi, Türkiye

^{*}(220925008@tarsus.edu.tr)

Özet – Gıda tedarik zinciri, dünya nüfusunun büyülüüğü ve tüketim alışkanlıklarındaki değişiklikler nedeniyle giderek daha karmaşık ve zorlu hale gelmektedir. Bu büyümeye ve değişim, gıda üretimi, dağıtımını ve tüketimi üzerinde gıda israfı noktasında ciddi etkilere yol açmaktadır. Bu çalışma, gıda tedarik zincirindeki israfı azaltmaya yönelik dijital dönüşüm süreçlerini detaylı bir şekilde ele almaktır ve bu süreçlerin etkilerini incelemeyi amaçlamaktadır. Temel hedef, gıda üretiminden tüketiciye ulaşana kadar olan süreçlerde oluşan israfın dijital çözümlerle nasıl en aza indirilebileceğini gözlemlemektir. Araştırma, veri analitiği ve yapay zekâ destekli tahmin modelleri, akıllı tedarik yönetimi sistemlerinin kullanımı, izlenebilirlik ve şeffaflık çözümleri, akıllı depolama ve raf yönetimi, sürdürülebilir ambalaj ve taşıma çözümleri gibi dijital dönüşüm süreçlerini kapsamlı bir şekilde literatür odaklı incelemektedir. Bu süreçlerin gıda tedarik zinciri üzerindeki etkisini değerlendirmek için literatürde yer alan çalışmalar ve etkileri detaylı bir şekilde incelenmiştir. Araştırmanın elde ettiği önemli bulgular, dijital dönüşüm süreçlerinin gıda tedarik zincirinde israfı azaltmada etkili olduğunu göstermektedir. Akıllı tedarik yönetimi ve izlenebilirlik çözümleri, stok kontrolünde önemli iyileştirmeler sağlarken, veri analitiği ve yapay zekâ destekli tahmin modelleri, talep tahminlerini daha hassas hale getirerek israfı minimize etmektedir. Akıllı depolama ve raf yönetimi ise depo içindeki israfı azaltarak ürün bozulmalarını etkili bir şekilde engellemektedir. Gıda tedarik zincirinde dijital dönüşüm süreçlerinin benimsenmesinin hem ekonomik hem de çevresel açıdan sürdürülebilirliği güçlendirmede önemli bir rol oynayabileceğini vurgulamaktadır. Bu çözümlerin geniş kapsamında uygulanmasıyla, gıda tedarik zincirindeki israf sorununun etkin bir şekilde kontrol altına alınması ve kaynakların daha verimli kullanılması mümkün olacaktır.

Anahtar Kelimeler – Gıda Tedarik Zinciri, İsraf, Dijital Dönüşüm, Yapay Zekâ



Gemini x ChatGPT: A discussion of two Chatbots about Artificial Intelligence in the Education

Norbert Annus^{1*}

¹*Department of Informatics, J. Selye University, Slovakia*

^{}(annusn@ujs.sk) Email of the corresponding author*

Abstract – The use of Artificial Intelligence (AI) and intelligent teaching and learning tools is becoming increasingly common in everyday education. At present, chatbots are undoubtedly the AI technology that is easily accessible not only to educators but also to students from almost any internet-connected device. However, we know that chatbots, in addition to their many potentials, also pose risks to education. Depending on this, we need to use them within appropriate limits. The first half of our study builds on international literature that examines the impact of chatbots on education. In addition, we reviewed literature that measured the potential of today's most popular chatbots within the teaching of specific subjects. Many surveys show that both teachers and students are open to the use of AI. But how do these intelligent systems and tools relate to the AI-influenced educational process? To answer this question, we conducted a small study using two chatbots, ChatGPT and Gemini, formerly known as Bard. Our study was based on a discussion between the two chatbots, which focused on the potential applications of AI within education. The results of our survey show that, although the chatbots highlighted some of the possibilities that AI offers within education, they did not cover the whole field. Rather, the communication focused on a few points that were repeatedly touched on, ignoring the fact that they had already been discussed in detail a few paragraphs earlier. In any case, we consider it an interesting aspect to examine the subject from an AI perspective. Further research, possibly involving more chatbots, may be necessary in the future.

Keywords – Artificial Intelligence, Education, Chatbots, Gemini, ChatGPT



The Revolutionary Impact of Artificial Intelligence in Healthcare and the Challenges in New Drug Design: The Case of Gliclazide

Hassina Fisli^{1*} and Mohamed Lyamine Chelaghmia ²

¹*Material sciences department/Laboratory of Applied Chemistry (LCA), 8 mai 1945 Guelma University, Algeria*

²*Process Engineering Department/ Materials analysis and engineering laboratory (LAIGM), 8 mai 1945 Guelma University, Algeria*

^{}(fisli_ha@yahoo.fr; fisli.hassina@univ-guelma.dz)*

Abstract – Artificial intelligence (AI) is revolutionizing healthcare by accelerating the identification of potential new drugs through machine learning algorithms. By simulating the interaction of drugs with biological targets, AI enables the design of more effective drugs. In medical diagnosis, AI systems help doctors diagnose diseases more quickly and accurately by analyzing clinical data and medical images. Additionally, AI can personalize treatments by analyzing patients' genetic characteristics. AI systems also improve the management of electronic medical records, thus facilitating clinical decision-making. However, AI has limitations in the field of new drug design. Although it can accelerate the identification of promising compounds, it cannot completely replace human work in the drug development and testing process. Moreover, AI may pose challenges in terms of data privacy and liability in case of errors. Gliclazide, a commonly used antidiabetic medication, highlights these challenges. Although effective, gliclazide has side effects and limitations in its use, underscoring the importance of developing new therapies using technologies like AI to meet the needs of patients with type 2 diabetes. AI aids humans but cannot replace them. It offers powerful tools to accelerate drug research and design, but the drug development and testing process still requires human intervention to ensure the safety and efficacy of treatments. Researchers and clinicians remain essential to interpret results, make ethical decisions, and take responsibility for prescribed treatments. Ultimately, it is the collaboration between AI and healthcare professionals that will fully realize AI's potential in healthcare.

Keywords – Artificial Intelligence, Healthcare, Drug Discovery, Limitations, Gliclazide, Type 2 Diabetes.



Evaluation Of Medical Diagnosis Capabilities Of Three Artificial Intelligence Models – ChatGPT-3.5, Google Gemini, Microsoft Copilot

Yordanka Eneva*, Bora Doğan

Department of Physics and Biophysics, Faculty of Pharmacy, Medical University of Varna "Prof. Dr. Paraskev Stoyanov", Bulgaria

*yordanka.eneva@mu-varna.bg

Abstract – The widespread adoption of artificial intelligence (AI) in various domains, including medicine, has prompted extensive research into its diagnostic capabilities. This study conducts a comparative analysis of three prominent AI models – ChatGPT-3.5, Microsoft Copilot, and Google Gemini – to evaluate their performance in medical diagnosis. Clinical vignettes from Texas Tech University Health Sciences Center were utilized to assess the accuracy and precision of the AI models in diagnosing internal medicine cases. Results indicate that ChatGPT-3.5 achieved the highest accuracy rate, correctly diagnosing 70.59% of cases, outperforming Google Gemini and Microsoft Copilot. While all models demonstrated the potential to assist in diagnosis, variations in approach and performance were observed. ChatGPT-3.5 provided concise answers without explicitly stating its lack of medical expertise, while Google Gemini and Microsoft Copilot acknowledged their limitations but offered more detailed explanations and recommendations. Statistical analysis, conducted using the chi-square test for independence revealed significant differences in diagnostic capabilities among the AI models, emphasizing the importance of careful selection in clinical decision-making. This study contributes valuable insights into the application of AI in medical diagnosis and underscores the need for continued refinement of AI models to enhance diagnostic accuracy and support healthcare professionals in delivering optimal patient care.

Keywords – Artificial Intelligence, Medical Diagnosis, ChatGPT-3.5, Microsoft Copilot, Google Gemini, Diagnostic Capabilities, Comparative Analysis



Comparative Analysis of AI-Supported and Manual JMeter Tests: The Role of Generative AI and LLM in Software Performance Testing

Burak TUZLUTAŞ¹, Murat ŞİMŞEK²

¹*Software Engineering / Institute of Science, Ostim Technical University, Türkiye*

²*Artificial Intelligence Engineering / Institute of Science, Ostim Technical University, Türkiye*

buraktuzlutas@gmail.com

Abstract - This paper addresses the challenges of conducting software performance testing and the challenges encountered in the pre-testing process. The focus is on the importance of software performance testing and evaluation methodologies. At the same time, the main theme of large language models (LLM) and the characteristics of modeling and its role in this process are examined.

The overall aim of the study is to investigate how Generative AI- Large Language Models (LLM) can be used efficiently in performance testing in important stages such as creating test plans, constructing test profiles, creating and preparing data, and interpreting the reports received as a result of the tests. The advantages of Artificial Intelligence, more precisely Generative AI- Large Language Models (LLM), are discussed in terms of optimizing the processes carried out in performance testing in a positive sense and accelerating the process.

This study is envisioned as a contribution to the traditional methods used in performance testing. The potential of Generative AI-Large Language Models (LLM) to effectively solve the problems in traditional testing methods and to create more efficient testing processes may guide the development of performance testing methodologies in the future.

Keywords: *Software Performance Testing, Artificial Intelligence, Generative AI, Large Language Models, Software Testing*



Role of artificial intelligence in construction safety: A Comprehensive Review

Kabeer Aftab^{*}, Iqbal Khan² and Qasim Hassan³

¹*Department of Civil Engineering, University of Engineering and Technology, Lahore, Pakistan*

²*Department of Civil Engineering, University of Engineering and Technology, Taxila, Pakistan*

³*Department of Civil Engineering, University of Engineering and Technology, Taxila, Pakistan*

^{*}(kb.aftab289@gmail.com)

Abstract – Ensuring the safety of buildings has emerged as a critical concern, encompassing not only the financial stability of buildings but also the safety of individuals. Several research studies have been carried out to investigate methods for enhancing building affordability, energy efficiency, and safety. With the development of science, artificial intelligence (AI) has become more and more integrated into the design and construction of buildings. Artificial Intelligence (AI) holds great promise for revolutionizing the construction sector, particularly regarding improving safety protocols on construction sites. Artificial intelligence (AI) can assist construction companies in detecting and anticipating potential risks, monitoring worker behaviour and equipment use, and fostering improved coordination and communication among workers using machine learning algorithms and real-time data analysis. This paper aims to provide a comprehensive overview of research on artificial intelligence and building safety conducted in the last ten years, covering the entire lifecycle of a structure from early planning to the end. By examining its many uses, this review seeks to shed light on the advantages and disadvantages of implementing AI in construction safety. By synthesizing the body of existing literature, it seeks to provide insights into the evolving field of construction safety practices and the revolutionary potential of AI-driven methodologies.

Keywords – Artificial Intelligence, Construction Safety, Machine Learning, Building Safety.



AI-Powered Fecal Diagnosis: Empowering Poultry Farmers

BENMOHAMED Mohamed Said^{1*}, MEKKAOUI Ahmed¹ and BOUARARA Hadj Ahmed¹

¹*Computer science department, University of Saida Dr. Moulay Tahar, Algeria*

*(*bouararaahmed1990@gmail.com) Email of the corresponding author*

Abstract – Poultry diseases significantly impact global food security and livelihoods [1]. Early and accurate diagnosis is crucial but traditional methods can be inaccessible to farmers, particularly in resource-limited settings. This study investigates the potential of deep learning models for improving poultry disease diagnosis using readily obtainable fecal samples.

An annotated dataset of poultry fecal images from Tanzania [2], with classes including Coccidiosis, Healthy, Newcastle Disease, and Salmonella, was used to train and evaluate various pre-trained convolutional neural networks. DenseNet169 achieved the highest accuracy (97.39%), demonstrating the potential for reliable and automated diagnosis.

This approach offers several advantages:

Reduced reliance on resource-intensive methods: Deep learning models can potentially replace traditional, resource-intensive diagnostic methods.

Non-invasive and stress-free: Fecal sample analysis eliminates the need for invasive procedures, reducing stress on birds.

Empowerment for small-scale farmers: Deployment as a mobile application or web platform could empower small-scale farmers with limited veterinary access to make informed decisions on disease control, potentially leading to improved animal health, reduced economic losses, and increased poultry production. The study paves the way for further exploration, including expanding the dataset, investigating model interpretability, and testing in real-world settings. This research highlights the promising potential of deep learning models for accessible and accurate poultry disease diagnosis, offering a valuable tool for improving poultry health management with significant economic and societal benefits.

Keywords - Poultry Disease Diagnosis, Dataset, Deep Learning, Densenet169, Fecal image analysis...

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A Decision support for Construction Safety Risk Management Based on Artificial Intelligent

Ikram Nabila NEKKACHE^{*}, Fethi HAMZAOUI², Nesrine EL HOUARI³

¹*Civil Engineering Department, University of Tlemcen, Algeria, ikramnabila.nekkache@univ-tlemcen.dz*

²*Civil Engineering Department, University of Tlemcen, Algeria, fethi.hamzaoui@univ-tlemcen.dz*

³*Civil Engineering Department, University of Tlemcen, Algeria, nesrine.elhouari@univ-tlemcen.dz*

^{}(ikramnabila.nekkache@univ-tlemcen.dz) Email of the corresponding author*

Abstract – The prevention of construction safety risks by an early decision-making is very important to balance competing priorities (performance, risks and costs), manage various external and internal influence factors and ensure an equilibrium between long-term benefits and immediate needs.

In the field of construction safety risk management, systematic engineering projects involving various stakeholders throughout the different stages of their life cycle.

Integrating human knowledge with modeling tools, an intelligent decision support system (DSS) is developed to assist decision makers during different phases of risk management in construction. The DSS is developed as a virtual planning tool and can address both engineering and non-engineering issues related to risk management. Different models (safety, forecasting, and economic) that are part of the DSS share data and communicate with each other by providing feedback. The DSS is able to assist in: forecasting risks and modeling the operation of risk control structures.

Decision making is a complex task that involves a multitude of perspectives, constraints, and variables. Multiple Criteria Decision Analysis (MCDA) includes a series of steps that systematically help Decision Maker(s) (DM(s)) and stakeholders in structuring a decision making problem, identifying their preferences, and building a decision recommendation consistent with those preferences. Over the last decades, many studies have demonstrated the conduct of the MCDA process and how to select an MCDA method of construction safety risk management.

Given the confirmed links and synergies between MCDA and artificial intelligence (AI), it would be interesting to see how new models based on AI would perform with a wider set of decision characteristics and MCDA methods. AI has the potential to automatically differentiate the impact of individual features as well as their combinations when deciding on the most relevant MCDA approach.

This study aims to show what contribution artificial intelligence (AI) can make to multi-criteria decision analysis.

The AI techniques used generally concern declarative knowledge representation modes, deductive problem solving techniques as well as “inductive” techniques for symbolic knowledge learning. The research was carried out in two opposing directions in terms of the modeling approach followed: - the first direction consisted of defining what the contribution of AI could be in the context of "classic" multi-criteria analysis: namely, by providing a performance table downstream and according to operational approaches for the aggregation of commonly accepted preferences (synthesis criterion approach, outranking approach and interactive approach), how to replace traditional algorithms with relevant techniques of 'AI'.

Furthermore, the paper concluded that advanced artificial intelligence techniques are yet to be exploited to develop a smart decision support model that will assist stakeholders in selecting the most appropriate decision for successful construction safety risk management.

Keywords – Decision Support- Construction- Safety- Risk Management- Artificial Intelligence- Multiple Criteria Decision Analysis



Evaluation of Text Summarization Technology: Potential for Improvement in Scientific Texts through the Pegasus Model

Ayşe Melek ÖZTÜRK*, Cem ÖZKURT^{2,3}

¹*Computer Engineering/ Faculty of Technology, Sakarya University of Applied Sciences, Turkey*

²*Computer Engineering /Faculty of Technology, Sakarya University of Applied Sciences, Turkey*

³*Artificial Intelligence and Data Science Application and Research Center, Sakarya University of Applied Sciences, Turkey*

**(cemozkurt@subu.edu.tr) Email of the corresponding author*

Abstract – Text summarization refers to a technology within the natural language processing discipline. The primary goal of this technology is to express the main ideas of texts in a shorter and more understandable way compared to the original text. Models in this field often evaluate their performance by conducting similarity analyses with summaries produced by humans. This evaluation is typically carried out using various similarity metrics. At the core of these studies is the comparison of text summarization models' performance with summaries generated by humans. In other words, to measure the effectiveness of a model, the focus is on comparisons with summaries created by humans. Using similarity metrics such as Rouge, models' alignment with human-generated summaries is meticulously measured. The study generally demonstrates that the Pegasus model effectively conveys the main message of texts. However, it identifies a need for further improvement in the model's performance, particularly in scientific summarization tasks. Training different Pegasus models on the same dataset has resulted in better outcomes, reaching Rouge values of around 40%. The results emphasize the necessity of developing a model that can comprehend the meanings of scientific texts more deeply and handle specialized terms more effectively. In this context, it is evident that there is potential for further work and improvement to enhance Pegasus's performance on scientific texts. While highlighting the overall success of the Pegasus model, the study emphasizes the need for improvement, specifically in dealing with more specific and technical texts in the scientific field.

Keywords – Rouge score, Pegasus, Natural Language Processing (NLP), Text Summarization, Artificial Intelligence



Optimization of UPFC Device Parameters Using Artificial Intelligence Techniques

ELAGUAB Mohamed^{1*} and Elbar Mohamed

Applied Automation and Industrial Diagnostics Laboratory, Faculty of Science and Technology, University of Djelfa, 17000 DZ, Algeria.

**(mh.elaguab@univ-djelfa.dz) Email of the corresponding author*

Abstract – In this article, we propose a method of unsupervised optimization based on the Particle Swarm Optimization (PSO) algorithm. This algorithm is a metaheuristic approach inspired by the collective and homogeneous movement of bird swarms. The PSO optimization technique is based on mechanisms of natural selection and evolution and is applied in this study to determine the optimal parameters of the UPFC device. We observed that the results show improvement compared to classical methods. We addressed the synthesis of UPFC parameters using PSO. The main objective in the optimization procedure is to obtain UPFCs that are sufficiently robust to potential changes in the operating conditions of the electrical system.

Keywords – Power System, Optimal Placement, FACTS, UPFC, Perturbed Particle Swarm Optimization.



Title Artificial intelligence and computational methods in drug discovery process: challenges, opportunities, and strategies

R. Ghemit ^{*1}, A. Makhloifi ^{2,3}, and M. El Kolli ²

¹ *Laboratory of Multiphase Polymeric Materials, Ferhat Abbas University, Sétif 19000, Algeria*

² *Laboratory of biopharmacy and pharmacotechnics. Ufas1. Sétif, Algeria*

³ *Industrial engineering department, Abbas Leghrour University, Khenchla 40000, Algeria*

^{*} *Email of the corresponding author sssalim@yahoo.fr; mekhloifi_abdesslem@univ-khenchela.dz*

Abstract – The development of new pharmaceutical drugs is a long and costly process. Discovering and getting it to market can currently take 10–15 years at a cost of more than \$2.5 billion. Over the past years, Artificial Intelligence (AI) has become one of the most transformative technologies of the 21st century, impacting every aspect of our lives and offering remarkable improvements in various fields, particularly in the pharmaceutical industry, many pharma companies are promised artificial intelligence-drug discovery approaches for detecting, treating, and understanding several diseases. This work focuses on the AI applications implemented in drug discovery processes, such as predicting protein structures, drug-target interaction, physicochemical and ADMET characteristics, bioavailability, and toxicity of new bioactive molecules. The advantages and limitations of using AI for this purpose are discussed in the last section.

Keywords – *Artificial Intelligence, Drug Design, Computational Methods, Bioavailability, Drug-Target.*



Strategic Integration of Artificial Intelligence for the Enhancement and Optimization of Daylighting in Architectural Structures

Alla Eddine KHELIL ^{*}, Hathem KHELIL ² and Ahmed KAIHOUL ³

^{1,3} Department of Architecture and Industrial Design, University of Campania -Luigi Vanvitelli, via San Lorenzo Abazia di San Lorenzo ad Septimum - 81031 Aversa (CE)/ ITALY

²Laboratory of Informatics and its Applications of M'sila (LIAM), Computer ScienceDepartment, Mohamed Boudiaf University, M'sila, 28000 M'sila, Algeria

**allaeddine.khelil@unicampania.it*

Abstract – This paper delves into the application of artificial intelligence (AI) to optimize daylighting strategies within buildings, highlighting its potential to revolutionize building design and operation. Daylighting, the controlled use of natural light, significantly impacts occupant well-being, energy efficiency, and overall building performance. Researchers and practitioners are harnessing AI and machine learning to analyze various factors affecting daylighting, including building orientation, window placement, shading devices, and interior layouts.

By integrating historical climate data, building characteristics, and user preferences, AI algorithms can generate tailored daylighting solutions. These algorithms predict and assess daylight availability, distribution, and quality across different seasons and times of day, aiding architects in decisions regarding window size, glazing, and shading systems. AI-driven systems adapt to changing conditions in real-time, adjusting lighting levels and blinds to maintain a balance between natural and artificial light, reducing energy consumption while providing a comfortable indoor environment.

AI's integration extends to building automation, where machine learning continuously learns from sensor data and user feedback to enhance daylighting strategies over time, aligning with evolving standards. This approach enhances sustainability, occupant comfort, and building performance. By leveraging AI algorithms and machine learning, designers can create spaces that optimize natural light benefits, reduce artificial lighting reliance, and enhance overall building performance. AI-driven daylighting design represents a transformative step towards sustainable, intelligent, and human-centric buildings.

Keywords – Artificial Intelligence, Machine Learning, Daylighting, Optimization, Sustainability



Application of Deep Learning for Predicting the Financial Position of Pakistani Banking Sector

Asmatullah Zubair*, Sania Bhatti ² and Areej Fatemah Maghji ³

^{1,2,3}*Mehran University of Engineering & Technology, Jamshoro, Sindh, Pakistan*

**(asmatullahzubair@gmail.com) Email of the corresponding author*

Abstract – Prediction is becoming increasingly critical in decision making operations, especially in financial investments. Evaluating the potential risks and rewards of specific actions is vital before making investment choices, as it requires significant time, money, and effort. Pakistani banking industry uses traditional prediction methods like ratio analysis, data envelopment analysis, and regression analysis, these mechanisms are not precise in today's dynamic and complex environment where COVID-19 and political instability are the challenges that need to be addressed. Highlighting the current demand for such research. Consequently, this study endeavors to bridge this research gap by developing predictive models using Long Short-Term Memory, Support Vector Regression, and Prophet Algorithm. This research uses data from five Pakistani banks to train and create forecasting models. These models are then compared using evaluation metrics. The most efficient model is selected for final prediction. The findings reveal that Facebook's prophet algorithmic model is the best choice to predict the financial position of Pakistani banks. In predicting assets of Pakistani banks prophet model gives accuracy of 96% to 99%. While SVR outperformed in predicting profits of some Pakistani banks, with a negligible amount of difference between SVR and Prophet model. Notably, the Accuracy to predict profits of banks lies between 40% to 90%, due to fluctuation in market trends. The model created in this research can be implemented by Pakistani banks to predict their future possible assets and profits. This created model will provide the valuable insights for economic stack holders in the Pakistani banking sector.

Keywords – Prediction, Forecasting, Machine Learning, Facebook Prophet



Graphs Unveiled: Graph Neural Networks and Graph Generation

LÁSZLÓ KOVÁCS, ALI JLIDI

University of Miskolc, Hungar, Institute of Information Technology

Ali.jlidi85@gmail.com

Abstract – One of the hot topics in machine learning is the field of GNN. The complexity of graph data has imposed significant challenges on existing machine learning algorithms. Recently, many studies on extending deep learning approaches for graph data have emerged. This paper represents a survey, providing a comprehensive overview of Graph Neural Networks (GNNs). We discuss the applications of graph neural networks across various domains. Finally, we present an advanced field in GNNs: graph generation.

Keywords – *Machine Learning, Deep Learning, Graphs, GNN, Graph Generation*



Automatic university course scheduling in two separate phases and with two hybridized methods: a real case study

Asmaa HOUAR^{1*} and Talib Hicham BETAOUAF^{2*}

¹Department of Industrial Engineering/ Manufacturing Engineering Laboratory of Tlemcen, University of Tlemcen, Algeria

²Department of Industrial Engineering/ Biomedical Engineering Laboratory of Tlemcen, University of Tlemcen, Algeria

**(asmaa.houar@univ-tlemcen.dz / hichem.betaouaf@univ-tlemcen.dz) Email of the corresponding author*

Abstract – Efficient management of academic timetables is one of the main tasks of the department managers in every academic year. Their generation takes many working days and a huge effort in order to manage all the necessary tasks, satisfying all the hard constraints and the maximum of the soft constraints. It also requires the use of efficient algorithms to find a satisfactory solution within a reasonable time, due to the classification of this type of problem as a difficult combinatorial optimization problem (NP-Hard). Therefore, our study was carried out in an Algerian department with data really used to manage its timetables. The problem treated in our study was separated in two approaches, one for assigning teachers to teachings by satisfying all its related constraints with the use of a heuristic solved in CPLEX. The second uses the genetic algorithm to manage the space and time of the activities resulting from the first heuristic (i.e., the teacher-teaching pair, and not forgetting the student groups), satisfying the spatial, temporal and pedagogical constraints. The results obtained by this hybridization are compared with those obtained manually by the department managers using several parameters. Furthermore, we conclude that our system generates better results than those obtained manually, thus maximizing the teachers' preferences satisfactions.

Keywords – Automatic Generation Of University Course Timetables; MILP Mathematical Modeling; Genetic Algorithm; Hybridization; Preference Satisfaction.



Leveraging Hierarchical Timed Coloured Petri Nets and Machine Learning for Performance Evaluation Prediction in WSNs

Siham Zroug^{*1} and Laid Kahloul¹

¹*Computer Science Department/LINFI laboratory, Biskra University, Algeria*

^{*}(siham.zroug@univ-biskra.dz)

Abstract – Numerous researchers are drawn to employing formal methods for specifying, modelling and verifying WSN protocols. However, these methods encounter scalability challenges, particularly in state-space exploration, when dealing with complex WSN protocols. To address this issue, this study proposes leveraging machine learning techniques to forecast system behaviour, especially as the complexity increases with a growing number of nodes.

This study's main goal is to forecast important CSMA/CA MAC protocol performance metrics employing a Multi-Layer Perceptron (MLP). Historical data produced by Hierarchical Timed Coloured Petri Nets (HTCPNs) models that capture the whole behaviour of WSNs, is exploited to predict the evolution of a set of performance metrics when increasing the number of nodes. These metrics include waiting time, throughput, waiting time for acknowledgement, and delay performance. Research results highlight the success of the proposed MLP architecture compared to other machine learning methods (SVR and LR), as determined by a number of assessment metrics (MAE, MSE, RMSE).

Across all metrics datasets, the MLP model performs higher than the others, outperforming the other models every time. The outcomes highlight the effectiveness of combining machine learning techniques focused on artificial neural networks with formal models, especially Hierarchical Timed Coloured Petri Nets.

Keywords – *Formal Methods, Hierarchical Timed Coloured Petri Nets, Multi-Layer Perceptron, Machine Learning, Performance Evaluation, WSNs.*



Image Authenticity Detection Based on the Local Features and Similarity Features

Mahin Malik^{*}, Aqsa Ijaz², Maryam Malik³, Muhammad Awais⁴

¹*Department of Computer Science, Capital University of Science and Technology, Islamabad, Pakistan*

²*Department of Computer Science, University of Lahore, Sargodha, Pakistan*

³*Department of Computer Science, University of Sargodha, Sargodha, Pakistan*

⁴*Department of Software Engineering, Capital University of Science and Technology, Islamabad, Pakistan*

^{}(mahin.malik@cust.edu.pk) Email of the corresponding author*

Abstract – Picture is better than tons of words but in this era of modern technology, Forgery has become very popular. Due to the use of digital editing tools it becomes very easy to manipulate someone's personal information. Mostly forgery has been done so accurately that it becomes tough to identify the parts where forgery has attacked. Copy Move forgery detection is used to identify the local variants in image where forgery has been attacked. The existing methods are used to check the authenticity of the images has performed results on limited data sets or sets of images. We purpose a novel forensics technique that is used to extract features from small regions or parts of images. Scale Invariant Feature Transform (SIFT) is a feature detector and descriptor that is used to extract local features in the images. After detect the blobs or corner point in the image, the next step is to extract different features using SIFT. These feature vectors of the images are supposed to very different and invariant to rotation, blurring, noisy, and different geometric transformations. The proposed method gives a good result at MICC_F220, MICC-F2000, and MIC-F8MULTI. Our algorithm is good at detecting very small forged parts in the foreground and background of the image. Moreover, the proposed method improves the accuracy of the algorithm and gives good satisfactory performance.

Keywords – *Image Forgery, Local Features, Similarity Features, Geometric Transformation, Scale Invariant Feature Transform*



Automatic Verification of Arabophone Speaker by Hybrid Modelisation GMM-PSO

DJEMAI Mohamed^{1*} and Elbar Mohamed

Applied Automation and Industrial Diagnostics Laboratory, Faculty of Science and Technology, University of Djelfa, 17000 DZ, Algeria.

**(m.djemai@univ-djelfa.dz) Email of the corresponding author*

Abstract – The aim of this work is the application of Particle Swarm Optimization (PSO) to the task of Automatic Speaker Verification (ASV). The majority of current ASV are based on the Gaussian Mixture Model (GMM) using the Maximum Likelihood (ML) method. The latter is widely used because of its simplicity and mathematical traceability; however, it generally leads to a suboptimal model for all arbitrary initial models chosen. To overcome this limitation, we propose a hybrid PSO-ML algorithm for speaker modeling based on GMMs. We applied PSO to speaker learning to verify their identity due to their capabilities regarding the most complicated optimization problems. We used ML re-estimation as a heuristic operator to improve the convergence speed of the PSO. We obtained a Recognition Rate (TR) equal to 98%, which shows that the proposed hybrid PSO-ML method is better than that of traditional ML estimation in speaker modeling, based on GMMs.

Keywords – Gaussian Mixture Model, Automatic Speech Recognition; automatic speaker verification; Particle Swarm Optimization; Maximum Likelihood.



Modeling and Prediction using the Polynomial Regression Method of Electrical Quantities Found by Photovoltaic Modules under the Effect of Dust

Thameur OBEIDI^{*1}, Mohamed ZITOUNI², Tahar BENAISSE³, Tarek HAMMINE⁴, Noureddine BENHABIB⁴, Lakhdar BESSISSA⁴, Mohamed HOURIER and Abdelbaki OBEIDI

¹ University Ziane Achour , PO Box 3117, Djelfa 17000, Algeria

² University Ziane Achour, PO Box 3117, Djelfa 17000, Algeria

³Renewable Energy Systems Applications Laboratory, University Ziane Achour, PO Box 3117, Djelfa 17000, Algeria

⁴Materials Sciences and Informatics Laboratory, University Ziane Achour, PO Box 3117, Djelfa 17000, Algeria

^{*1}(t.obeidi@univ-djelfa.dz), ^{*2}(med.zitouni@univ-djelfa.dz)

Abstract – This document presents a new approach based on the modeling and prediction of the electrical performance characteristics of two photovoltaic modules, under the influence of dust accumulated on the surfaces of the photovoltaic modules studied based on polynomial interpolation. The database used in this work is obtained by experimental tests of four photovoltaic modules found by Ababacar Ndiaye. The experiment carried out makes it possible to monitor the variation of the main performance characteristics of the quantities. By using two modules in new condition from the same manufacturer but with different structures (Monocrystalline, Polycrystalline). The two new modules, after having been well cleaned are characterized before being exposed to natural sunlight under the same conditions (Sunshine, Temperature, Humidity). The measurements are carried out in one-week increments over six weeks of exposure. Throughout the week, average environmental parameters such as wind speed, sunshine, ambient temperature and humidity are measured. At the end of each week, the performance characteristics of the modules are measured under standard test conditions with a PV module analyzer (IV-400). The density of dust deposited on each module is also determined by a method which consists of using two 67 gram glass strips exposed side by side of each module and with the same inclination as it. The slats are identical with a surface area of 10 cm² or 10cm x 10cm. At the end of each week, the strips are weighed with a high precision balance. The nominal value of each parameter is determined by taking as a reference the value of the parameter measured on the specific module at the start of the experiment.

Based on the data collected, we developed an empirical models to predict the performance characteristics (Short-Circuit Current (I_{sc}), Maximum Power (P_{max}) and the Form Factor (FF) of two BP SX type photovoltaic modules (3200 and KG 200 GT depending on time and dust density). The results obtained show the effectiveness of the modeling approaches developed. The multi-variable polynomial regression used in this study presents great capacity and flexibility in the modeling phase. Modeling with the multi-variable polynomial regression was done in three modeling stages: training, testing and verification. The approaches developed are capable of modeling and predicting the performance characteristics (I_{cc} , P_{max} and FF) of two photovoltaic modules studied as a function of time and dust density from measurements of the performance characteristics of these modules.

Keywords –Multi-Variable Polynomial Regression - Photovoltaic Modules – Short Circuit Current (Icc)- Puissance Maximum Power (Pmax)- Form Factor (FF)



Digital Twin Model for Elevator Anomaly Detection: A LOF Approach

Elif Cesur^{*}, Ayşe Balci²

¹ Endüstri Mühendisliği / Mühendislik ve Doğa Bilimleri, İstanbul Medeniyet Üniversitesi, Türkiye

² Endüstri Mühendisliği / Mühendislik ve Doğa Bilimleri, İstanbul Medeniyet Üniversitesi, Türkiye

^{*}elif.karakaya@medeniyet.edu.tr

Abstract – Digital twins provide the capability to transfer real-time data into a virtual environment through sensors, enabling the detection and prediction of abnormalities in production processes. A review of the literature reveals that digital twins play a significant role in improving efficiency in production processes and have become a crucial element in industrial competition. When anomalies are predicted and detected in advance, our ability to intervene increases. This allows for the prevention of potential problems, minimizing damage, and facilitating the implementation of predictive maintenance activities. Furthermore, it reduces costs resulting from unexpected failures and contributes to the reliable operation of systems. In this study, data from three sensors installed in an elevator were collected to attempt to create a digital twin of the elevator. The aim was to detect anomalies in the collected data and improve effectiveness through predictive maintenance. Real-time data analysis and anomaly detection were facilitated using the Local Outlier Factor (LOF) algorithm, an anomaly detection algorithm. LOF evaluates the uniqueness of each event based on its distance to its k-nearest neighbors. It is an unsupervised anomaly detection method advantageous for cases where labeling large amounts of data is not feasible. In total, we collected 107,267 data points, of which 4,734 were identified as outliers, enabling us to comprehensively analyze the reasons behind their outlier status.

The intended contribution of this study is to demonstrate that the creation of digital twins in systems leads to the detection of anomalies in production processes, thereby increasing efficiency and reducing costs by minimizing unplanned downtime.

Keywords - *Digital Twin, Anomaly Detection, Predictive Maintenance, Local Outlier Factor, Smart Manufacturing*



Optimizing Heat Exchanger Efficiency: A Machine Learning Approach to Performance Modeling

Saidoune Fatma Zohra*

¹ Mechanical engineering, University of Medea 26000, Algeria,

*(saidoune.fz@gmail.com^)

Abstract – An intelligent approach to performance modeling and optimization using machine learning (ML) techniques for optimizing Heat exchangers efficiency is investigated in this study. Heay exchanger are critical components in various industrial processes, and their efficient operation is crucial for energy conservation and process optimization. Traditional methods for performance prediction often rely on simplified models, which can be costly and time-consuming. the application of Artificial Intelligence (AI) techniques, particularly machine learning (ML), offers a promising approach to develop accurate and efficient predictive models for heat exchanger performance evaluation.

The efficacy of the developed AI models is validated through a case study involving a shell-and-tube heat exchanger employed in a chemical processing plant, leveraging experimental data. The results underscore the AI-based approach's remarkable predictive prowess, outperforming traditional empirical correlations and simplified numerical models. The AI models exhibit heightened accuracy and robust generalization capabilities, enabling reliable performance predictions across previously unseen operating conditions.

Keywords – Heat Exchanger, Optimization, Machine Learning Approach, Performance Modeling,



Climate Intelligent control in agricultural greenhouse

Ahmed Medjber*, Mohamed Ridha Skender ² Fethia Hamidia ³

¹ Department of Electrical Engineering/ Renewable Energy and Materials Laboratory(REML), Medea University, Algeria

²Department of Electrical Engineering/ Renewable Energy and Materials Laboratory(REML), Medea University, Algeria

³ Electrical Engineering Department, University, Media, Algeria

**(medjber_elec@yahoo.fr) Email of the corresponding author*

Abstract – This document presents the agricultural greenhouse is a suitable place to control climatic factors and the requirements necessary for the proper growth of the plant. In this study aims to solve the problem of manual regulation of environmental conditions in greenhouses, using a new approach combining the methods (feedback and feedforward) and fuzzy logic controller. for the linearization and decoupling of our system.

Keywords – Decoupling- Nonlinear System-Meta Heuristic-Regulator (PID, PDF)-Agricultural Greenhouse.



Asynchronous Machine Controlled by A Series Multi-Cells Converter Using FOPIID Controller Tuning with ALO

Mohamed redha SKENDER ^{*}, Ahmed MEDJBER ², Fethia HAMIDIA ³, Amel ABBADI ⁴, Abdelhalim TLEMCANI ⁵

^{1,2} Department of Electrical Engineering/ Renewable Energy and Materials Laboratory(REML), Medea University, Algeria
^{3,4,5} Electrical Engineering/ Laboratory of Electrical Engineering and Automatics (LREA), Medea University, Algeria

^{*}skender_mohamed@yahoo.fr

Abstract – This article focuses on a configuration based on multi-cells converters, reducing harmonic distortion. It introduces a fractional-order PID controller optimized by the Antlions optimization algorithm (ALO) for efficient system control in multi-cell converters. The paper's objective is to apply this control scheme to a multi-cell converter connected to an asynchronous machine, offering an effective solution for speed regulation.

Keywords – *Nonlinear Control, Inverter, Series Multi-Cells Converter, Fractional Order PID- Antlions Optimization Algorithm, Chopper, Asynchronous Machine.*
