ICAIAME 2023

International Conference on Artificial Intelligence and Applied Mathematics in Engineering

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Accepted Abstracts
E-Book

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International Conference on Artificial Intelligence and Applied Mathematics in Engineering 2023

This e-book contains only accepted abstracts. Full paper publication later may include updates and additions / removals according to the event conditions.

Briefly About

5th International Conference on Artificial Intelligence and Applied Mathematics in Engineering (ICAIAME 2023) held within 03-04-05 Nov 2023 at the Antalya, which is the pearl of the Mediterranean, heaven corner of Turkey and the fourth most visited city in the world.

The main theme of the conference, which will be held at Innvista Hotel with international participations along a three-day period, is solutions of Artificial Intelligence and Applied Mathematics in engineering applications. The languages of the ICAIAME 2023 are English and Turkish.

Scope / Topics

Conference Scope / Topics (as not limited to): In Engineering Problems:

- Machine Learning Applications
- Deep Learning Applications
- Intelligent Optimization Solutions
- Robotics / Softrobotics and Control Applications
- Hybrid System Based Solutions
- Algorithm Design for Intelligent Solutions
- Image / Signal Processing Supported Intelligent Solutions
- Data Processing Oriented Intelligent Solutions
- Cyber Security Intelligent Solutions
- Real-Time Applications in Cyber-Critical Infrastructures
- Security Protocols based on Intelligent Systems
- Intelligent Solutions in Intrusion Detection/Prevention Systems
- Prediction and Diagnosis Applications
- Linear Algebra and Applications
- Numerical Analysis
- Differential Equations and Applications
- Probability and Statistics
- Cryptography
- Operations Research and Optimization
- Discrete Mathematics and Control
- Nonlinear Dynamical Systems and Chaos
- General Engineering Applications
- General Topology
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"Artificial Intelligence in Project Management"

2- Prof. Dr. Gerhard-Wilhelm WEBER (Poznan University of Technology, Poland)
"RMARS under Cross-Polytope Uncertainty – a New Machine Learning method in the Natural Gas Market of Turkey"

3- Prof. Dr. Ender ÖZCAN (University of Nottingham, England)
"Tuning the Parameters of a Steady State Memetic Algorithm for Cross Domain Search"

4- Prof. Dr. Hüseyin ŞEKER (Birmingham City University, England)
"The Power of Data and The Things It Empowers"

5- Prof. Dr. Jude HEMANTH (Karunya Institute of Technology and Sciences, India)
"Is innovation possible in deep learning models?: Out-of-the-box approaches"

6- Prof. Dr. Nabi IBADOV (Warsaw University of Technology, Poland)
"3M site (modern, multi-ethnic and multi-cultural) management as the basis for selecting a construction site manager"

7- Prof. Dr. Viladimir OBRADOVIC (IPMA: International Project Management, Serbia)
"PM And AI: A Competence Gap"

8- Dr. Reinhard WAGNER (IPMA: International Project Management, Germany)
"The Evolution Of Technology In Artificial Intelligence And Its Impact On Project Management"

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Gamze Yakut, Rabia Ilknur Çay, Hasan Hüseyin Öztürk

Makine Öğrenimi Teknikleri Kullanılarak Isparta İli için Tarımsal Ürün Önerme Sistemi

Abstract: Kırsal bölgelerde, toprağın besin değerlerine uygun ürünlerin yetiştirilmemesi ve bilinçsiz gübreleme/ sulama gibi uygulamalar, toprak kalitesi ve ürün verimi açısından olumsuz sonuçlar doğurmaktadır. Toprak analizleri, tarım alanlarının sahip olduğu özgün besin değeri oranlarını belirlemek için önemlidir. Çiftçilerin, toprak analiz yöntemlerini kullanmadan tarlalarında ne ekeceklerine karar vermeleri, ilerleyen yıllarda hasat edilecek ürünlerin verimini düşürebilir. Hasat edilecek ürünü seçerken organik madde, pH, tuzluluk, satürasyon, derinlik, potasyum, fosfor ve kireç gibi parametreler incelenmelidir. Ayrıca belirli bir bölgede hangi ürünün yetiştirileceğine karar verirken, güneş ışığı, nem, yağış ve rakım gibi iklim ve coğrafi özelliklerle ilgili faktörler de dikkate alınmalıdır. Bu çalışma, toprak yapısını analiz eden parametreleri ve konum bazlı iklim özelliklerini göz önüne alarak istenen bölgede yetiştirilecek en verimli ürünleri önermeyi amaçlamaktadır. Daha iyi bir model oluşturmak için keşifsel veri analizi yöntemleri kullanılmıştır. Toprak değerlerine dayalı olarak ürün önerileri yapmak için Random Forest, XG Boost ve Bagging gibi algoritmalar kullanılmıştır. Bu modeller arasında Bagging algoritmasının %63 doğruluk oranı ile en doğru tahminlemeyi yaptığı görülmüştür. Ayrıca, sınıflandırma sistemimizin doğruluğunu değerlendirmek için bir karmaşıklık matrisi kullanılmıştır.

Keywords: toprak verimi, yapay zekâ, randomforest, bagging algoritması, tarımda verim

Konstantin Matveev

Computational Modeling of Trailing Operations by Autonomous Boat

Abstract: The interest in autonomous marine vessels has been rapidly growing in recent years. Unmanned platforms are used for gathering data, performing inspection tasks, and serving as transportation means. In this study, a 3-DOF dynamics model, involving surge, sway and yaw, is applied for modeling a fast displacement-type hull. This model, utilizing hydrodynamic coefficients for the selected hull configuration, is employed for simulating autonomous operations. The boat actuators involve a propulsor and a rudder. A simulated set of autonomous operations includes several trailing scenarios. As a general pursuit algorithm, the constant-bearing method is utilized. Since the main objective for a pursuer is to approach a mobile target but remain at a desired relative position away from it, non-linear modulation of the desired relative speed is incorporated. Besides considering a target that moves with a constant speed along a straight line in calm weather, more complicated situations, such as oscillatory target trajectories and wind presence, are also investigated. A more challenging scenario, where the pursuer is required to change positions around the target with the purpose of inspection, is modeled as well. The selected control rules are found to perform well for all considered cases. The pursuing vehicle trajectories, relative velocities, and variations of the rudder angle and propulsor thrust are presented and discussed in the paper. In situations with the oscillating target trajectory and with variable desired position of the pursuer, the boat actuators have to work harder, reaching saturated states. The findings presented in this study can help engineers develop control algorithms for fast autonomous boats and select desirable hydrodynamic characteristics for hulls intended for autonomous trailing operations.

Keywords: Autonomous boat, ship dynamics, constant-bearing pursuit, numerical simulation. ,

Anıl Kuş, Çiğdem Inan Acı

Performance Evaluatıon of the Extractıve Methods In Automatıc Text Summarızatıon Usıng Medıcal Papers

Abstract: The rapid advancement of technology has resulted in a surge in the volume of digital data available. This situation creates a problem for users who need assistance locating specific information inside this massive collection, result-ing in a time-consuming process. Automatic Text Summarizing systems have been developed as a more effective solution to conventional summary techniques to address this issue and improve users' access to relevant information. It is well known that, because of their busy schedules, researchers in the field of health sciences find it challenging to keep up with the most recent literature. The goal of this study is to generate comprehensive summaries of Turkish-language scientific papers in the field of health sciences. Although abstracts are already present in scientific papers, more thorough summaries are still required. To the best of our knowledge, no previous attempt has been made to automatically summarize academic papers on health in the Turkish language. For this, a dataset of 105 Turkish papers from DergiPark was collected. Term Frequency, Term Frequency-Inverse Document Frequency, Latent Semantic Analysis, TextRank, and Latent Dirichlet Allocation algorithms were chosen as extractive text summarization methods due to their frequent usage in this field. The performance of the text summarization models have been compared using Recall, Precision, F-score and ROUGE metrics. The obtained summaries have achieved a success rate of %75, indicating that these results are satisfying results for Turkish.

Keywords: Automatic Text Summarization, Extractive Method, Scientific Papers, Health Sciences,

Fatih Kürşad Gündüz, Serdar Biroğul

Karşılaştırmalı Bir Analiz: Consensus Algoritmalarının Karşılaştırılması

Abstract: Yapay zeka (YA) algoritmalarının konsensüs algoritmalarına uygulanması, dağıtık yapılarda veri analitiği, öngörülebilirlik ve karar verme süreçlerinde büyük bir potansiyele sahiptir. Yapay zeka algoritmaları, karmaşık veri setlerinden anlamlı bilgiler çıkarabilir, örüntüleri tanımlayabilir ve tahminler yapabilir. Bu nedenle, yapay zeka algoritmalarının konsensüs algoritmalarıyla birleştirilmesi, daha etkili ve verimli bir konsensüs sağlama potansiyeli sunar. Yapay zeka algoritmalarının konsensüs algoritmalarına uygulanması, dağıtık sistemlerde veri analitiğini, öngörülebilirliği ve karar verme süreçlerini geliştirebilir. Bununla birlikte, bu tür uygulamaların performansı, güvenlik ve ölçeklenebilirlik gibi diğer faktörler dikkate alınmalıdır. Bu alanda yapılan araştırmalar ve uygulamalar, yapay zekanın konsensüs algoritmalarıyla birlikte nasıl kullanılabileceği konusunda daha fazla bilgi ve anlayış sağlamaktadır. Blokzincir teknolojisi son yılların popüler teknolojisidir. Satoshi Nakotomi tarafında 2008 yılında Bitcoin: A Peer-to-Peer Electronic Cash System isimli makaleyle ilk kez ismi duyulmuştur. Blokzincir üyesi olduğu kullanıcılarının (düğümlerin) her birinin bir kayıt defterine sahip olduğu dağıtık bir sistemdir. Bu sistemde bir işlemin tüm kopyaları kayıt defterlerinde tutulur. Kayıtlardan bir tanesi değiştirilmek istendiğinde diğer kopyaların olduğu defterlerle karşılaştırılma yapılıp sistemde değişikliğe izin verilmemektedir. Sistem bu sayede manipüle edilememektedir. Sistem merkezi bir sistem yerine kullanıcıların güvenliğini paylaştığı dağıtık bir sistem önermektedir. Kullanıcıların her birine sistemin güvenliğinde rol almaktadır. [2] Blokzincir kavramı dağıtık veritabanı teknolojisine benzemektedir. Kısaca tanımlamak istenirse konsensüs (fikir birliği) yoluyla işlerin dağıtık olan veritabanlarına eklenmesidir. Dağıtık veri tabanları node (düğüm) adı verilen IP adresi alıp blokzincir ağına bağlanabilen masaüstü notebook ve mobil cihazlardır. Blokzincirde işlemlerin gerçekleşmesi ve veritabanında tutulabilir hale gelmesi için geçerli ve doğrulanmış bir bloğun oluşturulmuş olması gereklidir. Sonraki adımda ise blok diğer node yapılara dağılır. Bloğu alan her node bloğu doğrulayıp işlemleri çalıştırır. İlgili blok node yapısındaki zincirin son halkasına eklenir [1].

Keywords: Blokzincir, Optimizasyon, Genetic Algorithm, TSP,

Zakaria Benfarhı, Orhan Gemikonakli, Mostafa Ayoubi Mobarhan

Evaluation of Authentication and Key Agreement Approaches of 5g Networks

Abstract: In the last few decades, cellular telecommunication systems have been developed and spread all over the world. One of the most significant communication systems is the 5G network, which offers various features, such as high-speed download rates, reduced end-to-end delay, and effective integration of new network solutions. As a result, the 5G system is suitable for real-time applications like IoT. However, despite its benefits, the 5G network presents security challenges related to authentication mechanisms, privacy, and potential attacks such as DoS and DDoS attacks, MitM attacks and eavesdropping. Additionally, there are concerns about battery damage and weak upload speed. The primary focus of this paper is to address the security issues within the 5G system. The 5G network employs the 5G-AKA protocol for mutual authentication between subscribers and the network, but improvements are needed to meet security requirements adequately. Proposed solutions for 5G security challenges are reviewed in this study. This paper, thoroughly examines the main security weaknesses and potential attacks in 5G networks, with a specific focus on security loopholes such as DoS/DDoS, Jamming, MitM, spoofing, and eavesdropping attacks. A comprehensive survey of related works is conducted, summarizing findings from other studies. Evaluation criteria include performance metrics and resistance such as the type of cryptosystem being used, resistance to Signalling, Replay, Redirection, and Impersonation attacks, etc. Security properties (e.g.: confidentiality, integrity, protection, KFS/KBS, optimized handover, etc). And testing/simulation tools (e.g.: AVISPA, Matlab, Scyther, and BAN Logic, etc,) used in the research. The primary aim of this survey paper is to provide a comprehensive overview of 5G security, encouraging further academic investigation. Research findings highlight the critical role played by the 5G-AKA protocol in securing the network through mutual authentication and key agreement. Robust security mechanisms and protocols are essential for privacy and authentication, particularly in the context of IoT devices and applications. Addressing these vulnerabilities is crucial to protect network integrity and ensure high-quality service for IoT applications. Ongoing efforts in developing and implementing robust security methodologies and protocols are necessary for the success and widespread adoption of the 5G network. Last but not least, the study emphasizes the importance of addressing the identified security vulnerabilities and the significance of the 5G-AKA protocol in achieving robust security measures.

Keywords: 5G systems, 3GPP networks, authentication, 5G-AKA protocol, MitM attacks

Abdoun Sylia, Taleb Samira

Game-theoretic Analysis of an Unobservable M/m/1 Queue With Differentiated Vacations

Abstract: In this paper, we analyze the equilibrium behavior of customers based on a reward-cost structure in a single server queue with differentiated vacations. The server takes type 1 vacation after a busy period and type 2 vacation after returning from a vacation (type 1 and type 2), and there is no customer waiting in the system. Customers make the decision to join or not the queue based on the information available to them when they arrive. Two information levels are considered : Partially Unobservable queue and the Fully unobservable queue. In the Partially Unobservable queues, customers only have knowledge of the server's state and in the Fully Unobservable queues, customers have no information on both the server's state and the number of customers in the system. In each scenario, we evaluate the steady state distribution and derive the Nash mixed equilibrium strategies and analyze the customers behavior in the system. By using numerical experiment, we show how the joining probabilities and social benefit are affected by various system parameters and the different information level. This research contributes to understanding customer behavior in queueing systems with differentiated vacations and sheds light on the implications of information availability on equilibrium outcomes.

Keywords: Queueing Sytem, Game Theory, Equilibrium Strategies, Social benefit, Nash equilibrium.

Belaıza Dıhıa, Taleb Samira

an Analyze on Unreliable M/m/1 Retrial Queue With Negative Arrivals.

Abstract: This paper analyzes a single repairable server constant retrial queuing system with negative arrivals and breakdowns. The server is subject to passive and active Poisson breakdowns . Passive breakdowns can occur when the server is free, while active breakdowns can occur when the server is busy . When an active breakdown occurs, the customer in service is lost, after repair, the server becomes free. A negative arrival has the effect of eliminating a customer from the orbit. If the server is free, an arriving positive customer is served immediately and leaves the system after service completion (if no breakdowns had occurred during his service time). Otherwise, the positive customer joins the orbit and becomes a repeated customer. In order to derive the system performance measures , the matrix geometric technique is used combined with the direct truncation method. From the reliability view point, we analyze the mean time to the first failure of the system by using the Laplace transform method. Finally, we investigate through numerical analysis the effects of some system parameters, such as the arrival rate, the repair rate, and the breakdowns rates, on the system performance measures and the server reliability (the mean time to the first failure).

Sergey Bushuyev, Natlia Bushuyeva, Victoria Bushuieva, Denis Bushuiyev

"clıp" Thınkıng In Artıfıcıal Intellıgence As the Tools of Agıle Projects Management

Abstract: Clip thinking in Artificial intelligence is the tool Agile project management refers to the practice of breaking down a large project into smaller, manageable parts, or "clips," in order to plan, execute, and monitor the project more effectively. This approach is closely aligned with the principles of Agile project management, which emphasize flexibility, adaptability, and continuous improvement. By breaking a project down into clips, Agile teams can focus on one specific area at a time, allowing them to more effectively manage their resources, avoid scope creep, and deliver value to stakeholders timelier and more efficiently. The iterative nature of Agile allows for adjustments to be made to the project as it progresses, based on feedback and data-driven insights. Clip thinking also encourages collaboration and communication among team members, as they work together to identify the most critical areas of the project and prioritize their efforts accordingly. This approach helps ensure that everyone is working towards a shared goal and that progress is being made towards that goal regularly. Clip thinking is a valuable approach for Agile project management, as it helps teams to stay focused, agile, and responsive to changing needs and priorities throughout the project lifecycle. In the paper have been discussed clip thinking is a powerful approach to Agile project management because it allows teams to focus on delivering value to the customer in small, incremental steps. It also provides a framework for continuous feedback and iteration, which helps teams to adapt to changing requirements and deliver a final product that meets the customer's needs.

Keywords: (clip thinking, Artificial intelligence, Agile methodology, project management, project lifecycle)

Demet Özdek

Chebyshev Polynomıal Solutıon for the Sır Model of Covıd 19

Abstract: In this study, we deal with solving numerically initial value problem of a mathematical model of COVID-19 pandemic in Turkey. This model is a SIR model consisting of a nonlinear system of differential equations. In order to solve these equations, a collocation approach based on the Chebyshev polynomials is used. Chebyshev polynomials are orthonormal polynomials and the orthonormality reduces the computation cost of the method as an advantage. Another advantage is that the present method does not require any discretization of the domain. So the method is easy to implement. The main idea of the method is to convert the model to a system of nonlinear algebraic equations. For this we write the approximate solution of the system and its first derivative as the truncated series of Chebyshev polynomials with unknown coefficients in matrix forms and then utilizing the collocation points, the SIR model is converted to a system of the nonlinear equations. The obtained system is solved for the unknown coefficients of the assumed Chebyshev polynomial solution by MATLAB, and so the approximate solution is obtained. In order to check the robustness of the method, residual error of the solution is reviewed. The results show that the method is efficient and accurate.

Keywords: SIR model, collocation method, COVID-19 modeling, error analysis, mathematical modeling

Sedat Dikbaş, Sibel Arslan, Muhammed Furkan Gul, Saltuk Buğra Selçuklu

Electrıcıty Prıce Forecastıng Usıng Automatıc Programmıng methods

Abstract: In today's world, where demands are constantly increasing, energy has become an essential requirement for modern life. The increasing demand for energy has led to the growing importance of electricity markets. To contribute to the overall efficiency and reliability of these markets, Electricity Price Forecasting (EPF) helps market participants optimize their approaches and reduce risks by providing valuable insights. Therefore, EPF plays a vital role in the decision-making processes of market participants. Over time, various methods have been tested to improve the accuracy of EPF. Automatic Programming (AP) methods propose models with high prediction accuracy in solving many complex engineering problems. In this study, different AP methods are compared for the first time for EPF. The first method is Artificial Bee Colony Programming (ABCP), which is based on the search for food sources by honeybees. Other methods are and Genetic Programming (GP), which is developed by genetic operators such as crossover and mutation, Immune Plasma Programming (IPP) inspired by plasma therapy. The main findings of the study show that AP methods can be effectively applied to complex problems such as EPF and that GP produces models with higher predictive accuracy compared to other methods.

Keywords: Electricity Price Forecasting, Automatic Programming, Artificial Bee Colony Programming, Immune Plasma Programming, Genetic Programming

Tiachachat Meriem

Some Applications of Partial R-bell Polynomials

Abstract: Stirling numbers of the second kind have indeed attracted significant interest throughout history due to their applications in graph theory, probability, and combinatorics. These numbers can be constructed using various methods, but a common definition characterizes them as the count of partitions of the set {1, 2, ..., n} into k non-empty subsets. Over time, Stirling numbers have been generalized and constrained in various ways, leading to a diverse range of related concepts. One notable generalization is the introduction of r-Stirling numbers by Broder, where the constraint is that the first r elements must be placed in different subsets of the partition. This additional condition distinguishes r-Stirling numbers from the traditional Stirling numbers of the second kind and adds a specific constraint to the partitioning process. Such generalizations and constraints on Stirling numbers provide valuable tools for exploring different combinatorial problems, examining permutations with specific properties, and studying partitions and arrangements. A recent natural constraint on Stirling numbers of the second kind is introduced by Belbachir and Tebtoub. They defined a variant called the t-successive associated Stirling numbers of the second kind, they count the number of partitions of the set $[n] := \{1, 2, \ldots, n\}$ into k non-empty subsets, so that each subset contains at least t consecutive numbers. Moreover, the last element, n must either form a part with its predecessors or belong to another part satisfying the previous property. In a recent paper by Mihoubi and Rahmani, they present a unified approach for generating a class of exceptional combinatorial sequences called the exponential partial r-Bell polynomials. These polynomials serve as an extension of the exponential partial Bell polynomials and encompass various well-known numbers as special cases, including the r-Stirling numbers and other related sequences. The exponential partial r-Bell polynomials possess combinatorial interpretations in terms of set partitions, providing insight into their underlying combinatorial structure. The authors define these polynomials using a generating function, which captures their properties and Motivated by the fascinating nature of these polynomials, the paper proposes a new family of special polynomials known as the t-successive exponential partial Bell polynomials. This family of polynomials is closely connected to prominent numbers and polynomials such as Stirling numbers, Lah numbers, partial Bell polynomials, and more. The properties of the t-successive exponential partial Bell polynomials are investigated using generating functions and combinatorial proofs, enabling a deeper understanding of their characteristics and relationships with other combinatorial objects.

Keywords: Partial r-Bell polynomials, partition set, generating function, recurrence relation, t-successive exponential partial Bell polynomials

Buket Çetiner Leylek, Ebru Yılmaz Ince, Murat Ince

Classification of Elective Courses According to Kolb Learning Style Inventory by using Machine Learning Methods

Abstract: Education and training systems provide students with the knowledge, skills and gains that they will use throughout their lives through the courses they contain. These courses have specific rules, content, learning outcomes and target audience. Students should choose the courses most appropriate for their academic and professional careers. Since there are many parameters in the course selection process, tools such as recommendation systems and decision support systems have been developed to assist students in the course selection process. While developing these systems, artificial intelligence methods are also used. In this study, students were classified by machine learning methods according to Kolb Learning Style Inventory. The course information of the classified students of the relevant class was compared with the results of the questionnaires made to the students. With the applied method, the correct course selection process of the students was 92.07%. The results show that the proposed system can be used successfully in the course selection process.

Keywords: course classification, machine learning, kolb inventory, artificial neural networks, svm

Gökçe Ok, Yusuf Sönmez, Murat Dener

Performance Analysis of Machine Learning Algorithms for Intrusion Detection In Wireless Sensor Networks

Abstract: With the development of technology, the use of wireless sensor networks is becoming increasingly common. The sensitive nature of wireless sensor networks necessitates protection against attacks. Various intrusion de-tection methods are being studied against cyberattacks on wireless sensor network services and infrastructures. However, the impact of Denial of Service (DoS) attacks on wireless sensor networks remains a broad field of study. In this study, machine learning-based detection of DoS attacks on wireless sensor network data was performed. The effect of uneven distribution of wireless sensor network traffic on intrusion detection is investigated. The study was carried out on WSN-DS, which includes four different DoS attacks in addition to normal traffic. In Google Colab environment, two-class classification was performed using Logistic Regression, Decision Tree, Bernoulli Naive Bayes, K-Nearest Neighbors, AdaBoost, Gradient Boosting, CatBoost algorithms. In addition, a hybrid approach including SMOTE oversampling and RandomUnderSampler undersampling was used for data balancing. The performances of the models were compared using Accuracy, Precision, Recall and F1-Score metrics. In addition, Confusion Matrix and ROC curve were examined. As a result of the study, it was seen that data balancing methods caused a decrease in the accuracy of the models but reduced the number of misclassified DoS attacks.

Keywords: Wireless Sensor Network, Intrusion Detection, Machine Learning, Data Balancing, Denial-of-Service

Abdullah Burak Keşkekçi, Merdan Özkahraman, Hilmi Cenk Bayrakçı

a Review on the Impact of Polylactic Acid (pla) Material on Products Manufactured using Fused Deposition Modeling (fdm) Additive Manufacturing Method

Abstract: This compilation article extensively examines the role and impact of Polylactic Acid (PLA) material in products manufactured using the Fused Deposition Modeling (FDM) additive manufacturing method. PLA, due to its biological compatibility, biodegradability, and excellent printing characteristics, is frequently favored as a material for three-dimensional (3D) printing via FDM. Presently, 3D printing technologies are rapidly proliferating across numerous industries and applications, with PLA playing a significant role in this technological advancement. PLA is a bioplastic, derived from corn starch or sugarcane, and serves as a renewable polymer. These attributes render PLA ideal for sustainable production and environmentally friendly applications. The utilization of PLA in FDM 3D printing offers advantages such as high resolution, strong adhesion, and ease of processing. Additionally, PLA's low thermal expansion coefficient ensures consistent printing of products. These properties of PLA enable its utilization across a wide array of applications, ranging from industrial prototypes to medical implants, packaging materials, and toys. However, PLA's performance and impact in the FDM 3D printing process can vary based on factors like printing parameters, infill patterns, and printing orientation. Printing parameters encompass factors such as PLA's melting temperature, feed rate, and layer thickness. Infill patterns and printing orientation significantly affect the mechanical durability, surface quality, and printing duration of the product. Hence, the identification and optimization of suitable parameters are crucial for the effective utilization of PLA in 3D printing. This compilation gathers research from the existing literature regarding PLA's role and performance in the FDM 3D printing process, encompassing PLA's structural and mechanical attributes, the influence of printing parameters and infill patterns, and the industrial applications of products manufactured using PLA. Specifically, the physical and chemical characteristics of PLA, optimization of printing parameters, geometry of infill patterns, printing orientation, and layer structure are examined. Furthermore, the focus is on the mechanical durability, surface quality, thermal behavior, and biological compatibility of products manufactured using PLA. This study aims to provide a comprehensive reference regarding the characteristics and performance of PLA to enhance the effective use of FDM 3D printing technology. It is intended to be a valuable resource for researchers, industry professionals, and academics engaged in the fields of design and engineering. Additionally, it offers significant information for those interested in exploring PLA's potential for future development and new application domains.

Keywords: Additive Manufacturing (AM), Fused Deposition Modeling (FDM), Polylactic Acid (PLA), Strength Testing, Polymer

Abdullah Burak Keşkekçi, Merdan Özkahraman, Hilmi Cenk Bayrakçı

Examination of Tensile Strength of Polylactic Acid (pla) Materials Processed by Fused Deposition Modeling (fdm) Additive Manufacturing Method at Different Production Parameters

Abstract: This study involves the experimental evaluation of the tensile strength of Polylactic Acid (PLA) materials processed using the Fused Deposition Modeling (FDM) additive manufacturing method. PLA is a frequently preferred material in 3D printing technologies due to its advantages such as biocompatibility, biodegradability, and excellent printing properties. The aim of this study is to analyze the effects of printing parameters and material properties on the tensile strength of PLA and to provide potential strategies for optimizing the durability and efficiency of PLA materials produced using 3D printing technology. The methodology of the study focuses on examining four carefully selected key parameters: fan speed, infill pattern, infill density, and part orientation. A total of 81 samples were produced and experimentally tested with different combinations of these parameters. The purpose of these comprehensive tests is to analyze in detail the effects of these parameters on the tensile strength of PLA materials and to determine the parameter combinations that provide the best performance. The experimental results obtained demonstrate that printing parameters and material properties have a significant impact on the tensile strength of PLA. Factors such as fan speed, infill pattern, infill density, and part orientation have been identified as critical elements determining the overall durability of the material. For example, when the fan speed is low, the material spends more time during the cooling process, resulting in an increase in tensile strength. Infill pattern and infill density affect the internal structure of the material and are therefore important factors determining tensile strength. Part orientation determines the direction in which the material stretches during printing and is another important parameter affecting tensile strength. This study provides valuable information for optimizing the tensile strength of PLA materials produced using 3D printing technology. With the proper adjustment of parameters such as fan speed, infill pattern, infill density, and part orientation, it is possible to obtain PLA products with the desired mechanical properties. This information serves as an important guide for researchers, engineers, and designers in various fields, from industrial production to prototype development, who use 3D printing technology. In conclusion, this study emphasizes the need for careful control of parameters that affect the tensile strength of PLA materials. The durability of PLA can be optimized with the appropriate combinations of factors such as fan speed, infill pattern, infill density, and part orientation. This information guides researchers and industry professionals in making 3D printed PLA materials more reliable and effective.

Keywords: Additive Manufacturing (AM), Fused Deposition Modeling (FDM), Polylactic Acid (PLA), Strength Testing, Polymer

Ekaterına Lupol, Darya Kavernaya, Arına Skraschuk

Project Management In the Fıeld of Envıronmental Safety of Cıvıl Constructıon

Abstract: Environmental safety of construction should be ensured throughout the entire life cycle of the facility, starting with the development of the idea of construction and ending with the liquidation of the facility. Environmental safety is formed by a system of measures, approaches, principles, methods and techniques that are mandatory at every stage of the life cycle of a construction object, including using project management. The article briefly describes the main factors that negatively affect the environment during construction. The basic requirements for ensuring environmental safety of construction are considered. The principle of the application of project management in construction is described, which allows not only artificial intelligence to be used, but also to make the construction stages safe for people using digital technologies. The goals and objectives of the investment and construction project are also considered, starting with the formation of investment intentions, the selection of land plots or facilities, engineering surveys, pre-design and project preparation of construction and ending with the construction, reconstruction or overhaul of facilities, their subsequent commissioning and acceptance into operation. The main measures for environmental protection in the implementation of civil construction are also considered. The results are based on surveys conducted by large construction companies of the Russian Federation.

Keywords: Project management in construction, digital technologies, artificial intelligence, environmental safety of construction, environmental protection.

Begüm Yetişkin, Sibel Arslan

Investıgatıon of the Best Automatıc Programmıng Method for Predıctıng Compressıve Strength In Recycled Aggregate Concrete

Abstract: The use of recycled aggregate concrete (RAC) in the construction industry can contribute to environmental protection and sustainability by reducing the consumption of natural resources. The quality of RAC is of vital importance for the durability and safety of structures. Poor quality or low durability RAC can lead to structural weaknesses and pose a safety risk. For this reason, comprehensive testing of RAC quality is required prior to implementation. There are several parameters that indicate the structural strength of RAC. One of the most important of these parameters is the compressive strength (f'RAC). Adequate compressive strength of the RAC allows the structures to withstand the expected loads. Various automatic programming methods are used to predict f'RAC. In this study, one of these methods, namely Immune Plasma Programming (IPP), and its versions were used for reliable prediction of f'RAC values. The success of IPP and its versions was compared with that of Artificial Bee Colony Programming (ABCP) and its versions. The best and mean values of all algorithms were analyzed to evaluate the results. The results indicate that IPP and its versions were successful in predicting f'RAC and furthermore, the versions of IPP outperformed the standard IPP by providing better values.

Keywords: Automatic Programming, Immune Plasma Programming, Artificial Bee Colony Programming, Compressive Strength Predict, Symbolic Regression

Milena Savković, Danijela Ćirić Lalić

Leveraging Machine Learning for Enhanced Project Audits and Internal Control Systems

Abstract: The field of project auditing and internal control systems is undergoing significant transformations fueled by advances in machine learning. This paper delves into how machine learning, with its ability to analyze vast data sets and predict outcomes, can enhance project audits and internal control systems, ensuring robust risk management and effective problem-solving. It examines the application of machine learning in various aspects of internal audits, including problem identification, problem remediation, predictive analytics, and real-time auditing. Furthermore, it highlights the fundamental change in audit competencies required by these technological advancements. The traditional auditor skill set needs to be supplemented with an understanding of machine learning fundamentals, data literacy, technology expertise, AI risk assessment, and effective communication skills. Augmenting human expertise with machine-generated insights can lead to more informed and effective risk management strategies. By embracing the potential of machine learning, auditors can position themselves as strategic partners within organizations. The ability to harness data-driven insights and leverage advanced technologies empowers auditors to provide proactive recommendations and contribute to the achievement of organizational objectives. This transformation from a compliance-focused role to a value-added advisor strengthens the relevance and impact of internal audits in a rapidly evolving business landscape. The paper presents practical insights and recommendations for building these competencies and discusses potential challenges and limitations such as data privacy concerns and over-reliance on automation. By addressing these challenges, auditors can navigate the transformative power of machine learning and ensure the responsible and ethical use of data. The findings of this paper highlight the promise that machine learning holds for improving project audits and internal audit procedures, shaping a more efficient, proactive, and data-driven audit environment. Embracing machine learning enables auditors to harness its capabilities, enhance risk management practices, solve problems effectively, and foster a transformative shift in the field of auditing.

Keywords: Project auditing, Internal control systems, Machine learning, Risk management, Problem-solving

Ümran Kaya, Ismail Altunhan

Usage of Anfıs and Integrated Bım Supported With Fuzzy Linguistic Summarization on Risk Management at Natural Gas Pipeline Project: a Case Study

Abstract: Risk management is a multi-criteria decision making problem that includes various factors according to literature research and expert opinions. In order to solve the relationship between these criteria and to establish effective models; Researchers have presented a wide variety of methods or models in the literature. In order to manage the Risk Management effectively and to minimize its impact on the project parameters, the strategic selection of this subject with the most appropriate methods and criteria is required. In this article, a case study is implemented using the multi-criteria Adaptive Neuro-Fuzzy Inference System (ANFIS), which enables grading of 40 real risk types covering the design and construction processes of projects. Combining the structures and advantages of adaptive networks with fuzzy inference methodology has demonstrated an effective risk management and assessment that is more comprehensive, efficient and requires less man/hour work. It has been shown by the Root Mean Square Error (RMSE), Average Absolute Percent Error (MAPE) and R2 performance indicators that the artificial intelligence supported risk management approach created with the Adaptive Neuro Fuzzy Inference System gives better results. The main contribution of this study; It is the approach of evaluating and rating the risks effectively and quickly with the hybrid learning method of artificial intelligence and then assigning warning texts by assigning linguistic expressions on the related risk items using software that can make 3D BIM drawings and FLS (Fuzzy Linguistic Summarization) systems.

Keywords: Risk Management, Neural Fuzzy Logic, Artificial Neural Networks, Adaptive Network Based Fuzzy Inference System (ANFIS) BIM and Fuzzy Linguistic Summarization,

Boumesbah Asma, Chergui Mohamed El-Amıne

an Approach That Combines Different Methods to Estimate an Approximation of the Pareto Front for the Most Problem.

Abstract: The main objective of this study is to provide a method to deal with the multi-objective minimum spanning tree (MOST) problem and produces a high-quality approximation of the Pareto front. To achieve this, we introduce a hybrid algorithm called NSGA-II, multi-VNS, which combines the Non-Sorting Genetic Algorithm (NSGA-II) and the Variable Neighborhood Search (VNS) technique. The NSGA-II, multi-VNS algorithm utilizes a two-point crossover operator and a mutation operator based on the k-opt procedure. In the mutation step, a child solution T is created, and k edges are randomly selected from G \T (the set of edges in graph G that are not present in tree T). These selected edges are added to T, resulting in a partial graph H derived from G. Occasionally, with a low probability, the algorithm solves the multi-objective spanning tree problem using the partial graph H and generates several mutated solutions for T. Once the NSGA-II algorithm completes, the VNS algorithm is employed to improve each point on the Pareto front obtained by NSGA-II. The VNS algorithm aims to enhance the quality of the solutions by iteratively exploring different neighborhoods around each point. The proposed NSGA-II, multi-VNS algorithm demonstrates several advantages in computational studies. It exhibits high speed, scalability to handle instances with complete graphs containing more than 200 nodes, and the capability to discover both supported and non-supported spanning trees. Moreover, the algorithm overcomes limitations observed in previous approaches.

Keywords: Minimum spanning tree , Multiple objective linear optimization , Combinatorial optimization , Non-Sorting Genetic Algorithm , Variable Neighborhood Search.

Qasem Al-Mdallal

the Effect of a Heated Oscillating Circular Cylinder on the Heat Transfer Process: a Computational Study

Abstract: Numerical analysis is used to examine forced convection from a heated, circular, non-rotating cylinder with a constant radius motion that is positioned in a uniform crossflow of fluid with constant characteristics. The cylinder is placed horizontally with its longitudinal axis coinciding with the axis of the Cartesian coordinate system. At $=0+$, the cylinder impulsively acquires both constant surface temperature, T_w, and two-dimensional motion in $-$plane. To identify the properties of the flow field and the parameters governing heat transfer, the two-dimensional governing equations of flow motion and energy are numerically solved using Fourier spectral analysis and finite difference approximations. Reynolds numbers, Prandtl numbers, the amplitude of circular motion, and the frequency ratio, $Fr=f^*/f_0^*$, which denotes the relationship between the frequency of circular motion, f^*, and the frequency of natural vortex shedding, f_0^*, all have a significant impact on the flow and thermal fields. The Prandtl number is held constant at 0.7 when the parameter ranges are $60 \leq Re \leq 180$, $0.1 \leq Ar \leq 1$, and $0.5 \leq Fr \leq 3$. Overall, the study demonstrated that the heat transfer rate significantly increases in the high range of Re, Ar, and Fr. In addition, the relation between the lock-on regimes and heat transfer enhancement is carefully investigated. Verification of the correctness and validity of the current work is done through comparisons with earlier numerical and experimental results.

Keywords: Fourier spectral method, cylinder, Circular motion, Forced convection, Vortex shedding

Hakan Durgun, Ebru Yılmaz Ince, Murat Ince, H. Oğuz Çoban, Mehmet Eker

Evaluation of Tree Diameter and Height Measurements In Uav Data by Integrating Remote Sensing and Machine Learning Methods

Abstract: This study evaluates the effects of different ground sampling distances on the diameter and height measurements of brutian pine trees in point cloud data from unmanned aerial vehicle photographs. The study is located within the Çandır Forest Management Directorate of the Isparta Regional Directorate of Forestry. The results serve as independent variables in machine learning methods to predict field-measured diameter and height values. Nine distinct machine learning techniques were used, including AdaBoost Regression, Artificial Neural Networks, Deep Neural Networks, Decision Tree Regression, Gradient Boosting Regression, Linear Regression, Random Forest Regression, Support Vector Regression, and eXtreme Gradient Boosting Regression. The results show that predictions made using data with a low ground sampling distance had the lowest correlation values for diameter and height, while predictions made using data with a high ground sampling distance had the lowest correlation values. Deep Neural Network achieved the highest success rate for diameter estimation, while Decision Tree Regression had the lowest success.

Keywords: Machine learning, Unmanned aerial vehicle, Remote sensing, Point cloud, Photogrametry

Gürcan Çetin, Osman Özkaraca, Ercüment Güvenç, Murat Sakal

Genetic Algorithm-based Optimization for Nurse Scheduling Problem

Abstract: Hospitals, healthcare institutions, and clinics must have an adequate nursing workforce to provide quality patient care and medical services. Nurses play a fundamental role in the healthcare sector and assume a critical role in the care, treatment, and recovery processes of patients. However, ensuring the correct number and qualified nurses are assigned can be a time-consuming and complex task for administrators. This is a highly challenging problem to calculate due to various factors influencing the nursing workload. These factors include the number of patients, support services provided, patient care requirements, and legal limitations. Additionally, seasonal effects or extraordinary situations like natural disasters or pandemics can significantly impact these factors. The nursing workforce problem is essentially a scheduling problem. Scheduling problems involve the efficient planning and sequencing of specific resources, aiming to find the best time schedule that meets all constraints. In recent years, heuristic algorithms have been widely used to address complex scheduling problems where classical and manual methods struggle to find precise and quick solutions. One effective optimization technique based on natural evolution processes is the Genetic Algorithm method, which can be utilized to solve scheduling problems effectively. In this study, taking into account the success of the Genetic Algorithm in scheduling problems, a software has been developed in the Python environment to ensure the optimal assignment of nurses in clinics. The Genetic Algorithm-based software operates on a population basis, seeking to find the best schedule that satisfies various tasks and constraints. During the study, the planning of nursing staff considered the possibility of different clinics within the hospital, each dealing with patients requiring different care durations. It was assumed that a nurse works according to legal restrictions. Furthermore, a 4-week period was taken into consideration during the scheduling process, and the program was executed for a total of 28 days (a total working time of 160 hours). As a result, a software solution was presented that can successfully achieve an optimal nurse assignment, enabling the complete fulfillment of patients' care requirements in a given clinic.

Keywords: genetic algorithm, nurse scheduling, optimization, ,

Elif Ünal, Fatih Sağlam, Burkay Genç

Developing a Comprehensive Emotion Lexicon for Turkish

Abstract: The objective of this article is to construct an extensive lexicon of emotions that is specifically tailored for the Turkish language. An emotion lexicon is a linguistic tool that establishes connections between emotion-related terms in a specific language and corresponding words present in the language's dictionary. From this perspective, an emotion lexicon can be defined as a fine grained sentiment lexicon that offers a classification into multiple sentiments, where as a simple sentiment analysis links positive or negative evaluations to specific linguistic expressions. After conducting a comprehensive review of the available literature related to different languages, such as English and Spanish, it becomes apparent that there are substantial lexicons specifically focused on emotions. Nevertheless, it is important to acknowledge that certain languages, such as Finnish and Turkish, characterised by complex morphological structures and prominent compounding, do not demonstrate the same level of richness in emotion lexicons. An important observation can be made with respect to the lack of studies on emotion-based natural language processing (NLP) in the Turkish language. Therefore, this study signifies one of the primary initiatives in the domain of constructing an emotion lexicon specifically for the Turkish language. To achieve our objective, it was imperative to first assemble an extensive list of Turkish emotion terms. Consequently, a comprehensive compilation consisting of 167 emotions was produced, establishing the most extensive emotion lexicon in the Turkish language up to this day. A corpus consisting of sentences was compiled by using a compilation of one hundred regarded literary works in the Turkish language. The construction of a matrix has been carried out to show the co-occurrence of emotion terms and other words within the sentences, employing a methodology similar to the Word2Vec methodology. Owing to the significant dimensions of the matrix, the term frequency inverse document frequency (TF-IDF) method was applied to reduce the count of emotion-related words as a normalisation process. By applying this method in a two-dimensional space, we successfully generated separate vectors corresponding to each emotion word. A detailed analysis was conducted using a test sample size of 50 distinct texts obtained from a range of literary sources. The texts were inserted into a test interface, and the cosine distance was calculated between the vector generated from each text and the vectors representing emotions. By utilising this distance metric, it becomes feasible to extract the emotions embedded within the text. Upon identifying the emotions, our cross-validation study, which involved comparing human-based emotion assignments with ChatGPT-based emotion assignments, led to our emotion lexicon exhibiting a reasonably high accuracy when applied to textual data. In the conducted tests, it was observed that a total of four individuals reached a consensus on experiencing at least one emotion out of the five emotions that were extracted from the sample texts. This finding demonstrates that the dominant emotion conveyed in the text was effectively recognized. Following the completion of this study, a unique vector has been obtained for each significant emotion that exists in the Turkish language. The research involved an analysis of 167 diverse emotions. Empirical analysis has supported the capacity of our lexicon to generate emotions from textual content, achieving a level of accuracy that is considered satisfactory. In our study, it was observed that the assigned emotions showed higher levels of accuracy compared to transformer models based on GPT.

Seçkin Şen, Ilyas Çiçekli

Weakly Supervısed Relatıon Extractıon

Abstract: Relation extraction is crucial for many natural language processing applications, such as question answering and text summarization. Although there are several different approaches for relation extraction and most of them use the supervised learning approach which requires a large training dataset. These extensive datasets must be hand-labeled by experts, making the annotation process time-consuming and expensive. Another approach that we utilize in this study is called weak supervised relation extraction. Using weak supervised learning, the cost of training data labeling can be reduced. In this study, we propose a weakly supervised relation extraction approach that is inspired by another weakly supervised model named REPEL. Both in REPEL and our relation extraction, extraction patterns are derived from unlabeled texts using given relation seed examples. In order to extract more useful extraction patterns, we introduce the use of labeling functions in our method. These labeling functions consist of simple rules to analyze the candidate pattern's syntax and these labeling functions help to extract more confident candidate patterns. Our proposed method is tested on the same dataset used by REPEL in order to compare our results with the results obtained by REPEL. Both systems require a number of relation seed examples in order to learn patterns from the unlabeled data. When fewer relation seed examples are used our method outperforms REPEL significantly. In experimental tests, our approach is approximately 15 times more successful than REPEL with few relation seeds. Even with more relation seeds, our approach remains more successful.

Keywords: weakly supervisied learning, relation extraction, information extraction, natural language processing, data programming

Fatma Gülşah Tan, Asım Sinan Yüksel, Bekir Aksoy

Deep Learning-based Hyperparameter Tuning and Performance Comparison

Abstract: Accurate detection of small objects remains crucial in many applications, yet challenges persist in this area. In this study, the importance of hyperparameter tuning and its effects on performance were investigated using the deep learning model YOLO for Meningioma detection. Deep learning algorithms hold groundbreaking potential in medical image analysis and this study aims to evaluate the effectiveness of deep learning methods in a critical medical diagnosis task like Meningioma detection. Meningioma is one of the most common tumors of the central nervous system. These tumors are typically benign, meaning they are not cancerous; however, as they grow, they can exert pressure on adjacent brain tissue, leading to various neurological symptoms. To determine significant hyperparameters for the YOLO model, a series of experiments were conducted with different hyperparameter combinations using Random Search and Grid Search algorithms. The results demonstrated that appropriate hyperparameter settings can lead to significant performance improvements in small object detection tasks. A prediction rate of 99.1% was achieved in Meningioma detection. The correct hyperparameter values enabled the model to accurately identify small objects and significantly reduce the number of false positives. Additionally, at the end of the study, the recommended hyperparameter combinations for achieving the best performance were presented. This study represents a crucial step in designing adjustable and effective models in the field of deep learning-based small object detection. The obtained results highlight the potential of using YOLO in Meningioma detection and similar medical diagnosis applications, paving the way for developing more efficient and precise diagnostic methods in the future, while emphasizing the significance of hyperparameter tuning.

Keywords: deep learning, random search, grid search, hyperparameter tuning, object detection

Fatma Gülşah Tan

Derin Öğrenme ve Öğrenme Aktarımı Algoritmalarının Drone Algılama Performansı Üzerine Etkisi

Abstract: Drone teknolojilerinin hızla gelişmesiyle birlikte, özellikle güvenlik ve gizlilik alanlarında ciddi endişelere yol açan drone kullanımı, günümüzde büyük bir önem arz etmektedir. Derin öğrenme ve öğrenme aktarımı yapay zekâ teknikleri, drone tespiti konusunda umut vaat etmektedir. Ancak, bu tekniklerin başarıyla uygulanabilmesi için, karmaşık hava koşulları, değişken hızlar ve yüksek manevra kabiliyetine sahip droneların doğru şekilde saptanabilmesi için yeni ve verimli çözümler geliştirme ihtiyacı kaçınılmazdır. Bu çalışmada, drone nesnelerinin tespiti için EfficientNet modeli kullanarak eğitim modellerinin drone tespiti üzerindeki performansları ve karşılaşılan zorluklar karşılaştırılarak, gelecekteki potansiyel başarıları hakkında bir perspektif sunulmuştur. Elde edilen sonuçlara göre, öğrenme aktarımı yönteminde daha fazla katman dondurulduğunda, eğitim için gereken GPU belleği azalır ve GPU kullanımı düşer. Bu durum, daha büyük görüntü boyutlarıyla eğitilen modellerin daha hızlı eğitilebileceğini göstermiştir. Derin öğrenme yöntemi daha fazla veriye ve GPU kaynağına ihtiyaç duymaktadır, bu da eğitim süresini uzatmaktadır. Yapılan deneylerde derin öğrenme yöntemiyle eğitilen modelin en iyi başarı oranı %97.3, öğrenme aktarımı yöntemiyle eğitilen modelin en iyi başarı oranı ise %99.7 olarak belirlenmiştir. Bu, öğrenme aktarımı yönteminin az veriyle daha yüksek bir doğruluk oranı sağladığını göstermektedir. Ancak, derin öğrenme yöntemiyle elde edilen başarı oranı da oldukça tatmin edici bir sonuç olarak değerlendirilebilir.

Keywords: EfficientNet, derin öğrenme, öğrenme aktarımı, nesne tespiti, drone tespiti

Gürcan Durukan, Meryem Tuğba Nar, Abdullah Özcan, Lütfü Çakıl, Hüseyin Kara

Multimodal Classification Algorithm for Turkish Document Archiving: Improving Digital Document Storage by Unifying Image and Text-based Classifiers

Abstract: Common usage and widespread availability of the image-taking devices have made digital archiving of government and private sector documents a cheap and feasible alternative to conventional document storage despite its own disadvantages. Indeed storing digital documents as directly as images or converting them to texts via some OCR libraries[1] have its own problems including but not limited image noises, brightness problems, incomplete sentences and punctuations as well as non-standard image resolutions. Another issue lies in the incomplete extraction of sentences and punctuations during OCR. Due to the complexity of document layouts and fonts, OCR may fail to accurately recognize and capture the entire text, resulting in missing or fragmented sentences. Moreover, the interpretation of punctuation marks might be erroneous, leading to potential disruptions in the flow and meaning of the extracted text. The combination of any of the problems make it difficult to classify such digital documents without human intervention. To overcome this problem; this paper propose a multimodal classification algorithm for classifying such documents by unifying features from image based and text based classifiers. While proposed method utilizes pretrained network of vgg-16 [2] with transfer learning with 1.6M trainable parameters for image classification part; It uses easyOCR library[1] with word embedding obtained from fasttext[3] for text classification. By unifying the features from both methods with simple concatenation and re-classifying with XGBOOST [4], algorithm achieves a classification performance over %98.

Keywords: Image Document Classification, Text Document Classification, Multi-modal Classification, vgg-16, easyOCR

Ekaterina Khalimon, Maria Sitnikova, Irina Brikoshina

Practical Application of Neurotechnologies In the Field of Project Management

Abstract: Advances in neuroscience, informational technologies (IT) and artificial intelligence (AI) determined the development of practical solutions in the field of neurotechnology. Neurotechnology find application in other fields, creating new directions in science: neuroeconomics, neuromarketing, neuro project management, neurofeedback and others. In the theoretical part of this article, the authors reviewed existing examples of the use of neurotechnology in project and program management, economics and marketing. In the practical part, the experimental results of the use of neurotechnology in project management was described. The aim of the experiment was to study the stress level among participants, and the possibility of increasing the stress resistance, by applying neurofeedback. The experiment was carried out using brain-computer interface and technology of functional neurofeedback. The results of the theoretical study can be useful for further application of advanced neurotechnology. The results of the practical research can be useful for further study of psycho-emotional states of employees of organizations, receptivity to information, as well as for the practical application of neurofeedback technologies in the activities of companies and project teams.

Keywords: Neurotechnology, Neuro Project Management, Neuromarketing, Neurofeedback, Brain-computer interface

Mustafa Demirbilek, Serdar Çiftçi

Ghost-free High Dynamic Range Imaging Based on Two-stage Dense Image Alignment

Abstract: High Dynamic Range (HDR) imaging extends the illuminance of a digital image beyond its limited range. There are several approaches to obtaining an HDR image, and one of the most commonly used is the fusion of multiple differently exposed images. However, this approach can result in visually distorted images, especially if the scene is dynamic or the capturing device is in motion. In this case, the distortion appears as a ghost effect in the output image, and this flaw decreases visual quality. In this study, we propose a deep learning-based approach for ghost-free HDR imaging using the Ransac-flow algorithm to align low exposure and high exposures images to mid-level exposed images from coarse to fine, followed by our specialized merging algorithm inspired by Exposure Structure Blending Networks (ESBNs). The merging algorithm gets aligned images and the mid-level exposed image as input for generating HDR images using Convolutional Neural Network (CNN). We performed our experiments on the Kalantari and Prabhakar datasets. Only a limited experiment shows that the proposed approach results in ghost-free HDR images. The ablation studies are continuing, and the final results will be compared with the results of state-of-the-art methods' using the Peak Signal Noise Ratio (PSNR) and Structural Similarity Index Measurement (SSIM) metrics.

Keywords: Deghosting, High Dynamic Range Imaging, Ransac-flow, Exposure Fusion, Exposure Structure Blending Networks

Mert Anıl Yılmaz, Nihan Kesim Çiçekli

Snıppet Generatıon Usıng Local Alıgnment for Informatıon Retrıeval (laır)

Abstract: A snippet is a small section of text that is displayed as a summary or a preview of a document, providing an idea whether the document contains the desired information without requiring the reading of the entire document. Snippets play a crucial role in improving the search experience by enabling users to make informed decisions about which links to click on to find the information they are seeking. This paper proposes the method LAIR, which is an adaptation of the local sequence alignment method, commonly used in bioinformatics to identify similarities between gene sequences, for information retrieval in snippet generation. This adaptation is achieved through a series of logical steps. Firstly, it draws parallels between detecting similarity in DNA and gene sequences and the query search process. Documents are likened to target gene sequences, and queries to gene query sequences. Once the similarity is established, local sequence alignment can be used in snippet generation, similar to its application in bioinformatics. A basic scoring function is utilized to score document-query matches, enabling the extraction of the starting and ending words of the matching segments. In the next step, query expansion and IDF weights are integrated into the local sequence alignment algorithm to improve the quality of the generated snippets. We propose the use of a substitution matrix to make the basic local sequence alignment algorithm suitable for query expansion. By using the substitution matrix, the algorithm can be executed with the desired query expansion method. In this study, WordNet is used to find the synonyms of the query words to be used in query expansion. Additionally, we show how the IDF weights can be integrated into the local sequence alignment using the substitution matrix. In the final step, the snippet is generated using the proposed method. During snippet generation, the most important point is obtaining the best starting and ending words of the snippet through local sequence alignment. In evaluating snippets, automated quality measures such as snippet length, the number of query terms in snippets, number of highlighted query terms per snippet, number of ellipsis in snippets are used to measure their informativeness and readability. We have also used these automated measures to assess the quality of the generated snippets. When the results were compared with Google snippets, LAIR is observed 5-8% better in each of these evaluation metrics. This snippet generation is implemented in YouTube videos as well. Essentially, the algorithm still requires documents to work, and we use autogenerated subtitles of the videos for this purpose. Unlike documents, the output for video snippets is a small part of the video that matches the information need of the user.

Keywords: Information Retrieval, Bioinformatics, Local Sequence Alignment, Snippet Generation,

Ahmet Gürbüz, Aybars Uğur

Feature Processing on Artificial Graph Node Features for Classification With Graph Neural Networks

Abstract: Graph Neural Networks are often used for graph related problems such as graph, node, and edge classification. Node features and connections between nodes are used for learning graph representations for such classification problems. However, many graph datasets don't have node attributes and this leads to an obstacle while working with featureless graph datasets. It's possible to overcome this obstacle with various feature initialization methods. These methods can be categorized as structural and positional artificial feature initialization methods. Features that are generated by these methods are not always flawless. Sometimes these features can contain unnecessary information that leads to decreased classification performance and increased memory consumption and training time. Based on our research it has been seen that there are very few studies addressing this problem. In this study, we aim to overcome this problem by using structural graph information. We propose a method that is mainly focused on computing measures of nodes and creating node representations by clustering model. Our proposed method computes node measures such as degree, clustering coefficient, number of triangles, and average neighbor degree and trains a clustering model. Experiments on featureless datasets such as Malnet and Github Stargazers graph datasets have shown that our proposed method which is based on measure and clustering improves the classification performance compared to artificial node degree features.

Keywords: graph neural networks, deep learning, classification, node features, hyper-parameter optimization

Muhammed Abdulhamid Karabıyık

a Framework for Parametric Model Selection In Time Series Problems

Abstract: People make future plans to make their lives easier. These plans are necessary in order to be prepared for future challenges. Forecasting approaches are brought to the forefront in order to plan for the future. Time series data is one type of data used to forecast the future. In this study, a framework for selecting the optimum model for classical artificial neural networks to use in time series forecasting was developed. Classical artificial neural networks include the LSTM, CNN, and ANN models. For selecting the best model, the framework uses parameters such as data set, model depth, loss functions, minimal success rate in model performance, epochs, and optimization algorithms. Users can modify these parameters to address specific problems. By default, it uses 7 different loss functions and 5 different optimization algorithms for model selection. The mean average error loss function determines model performance. Brent oil prices were employed as the data set in the framework tests, and the data set included 9000 daily price data. The dataset is splitted into 80% training and 20% testing. The trainings in the framework test were performed with 50 epochs. In the tests, the price on the eighth day was calculated using price data from the previous seven days. As a consequence, a mean average error score of 1.1239657 was obtained. The LSTM model with two layers, Adadelta optimization algorithm, and mean square error loss function was the most successful.

Keywords: Time series, lstm, cnn, ann, froecasting

Esen Gül Ilgün, Yusuf Sönmez, Murat Dener

Makine Öğrenme Yöntemi Kullanılarak Darknet Trafiği Tespiti ve Sınıflandırması

Abstract: Tor veya VPN tarafından tünellenen şifreli trafiğe, karanlık ağ trafiği denir. Bu ağlar, bir IP adresini izlenemez hale getiren anonimleştirilmiş bir dizi bağlantı, proxy ağları aracılığıyla yüksek düzeyde anonimlik sağlar. Bu durum medya korsanlığı, uyuşturucu satıcılığı, terörizm, insan kaçakçılığı ve çocuk pornografisi gibi suç faaliyetlerini kolaylaştırır. Bu suç faaliyetlerini engellemek için karanlık ağ trafiğinin makine öğrenimi ve derin öğrenme teknikleri kullanılarak tespiti ve sınıflandırılması, önemli bir çalışma alanıdır. Bu çalışmada, karanlık ağ trafiğinin yüksek doğrulukta tespiti ve sınıflandırılması için üç aşamalı bir metodoloji önerilmiştir. Bu metodoloji kapsamında kullanılan CIC-Darknet2020 veri setine kategorik veri kodlama, ölçeklendirme, öznitelik seçimi ve veri dengeleme ön işlemleri ayrı ayrı ve birlikte uygulanarak farklı veri setleri elde edilmiştir. Elde edilen veri setleri ve Logistic Regression (LR), Gaussian Naive Bayes (GNB), Decision Tree (DT), K-Nearest Neighbor (KNN), Multi Layer Perceptron (MLP), Random Forest (RF), eXtreme Gradient Boosting (XGBoost), Light Gradient Boosting Machine (LightGBM) ve Category Boosting (CatBoost) makine öğrenimi algoritmaları kullanılarak çok sayıda karanlık ağ trafiği tespit modeli oluşturulmuştur. Oluşturulan modeller ile Encryption (Şifreli, Standart), Category (Tor, Non-Tor, Non-VPN, VPN), Subcategory (Audio-Stream, Browsing, Chat, E-mail, P2P, Transfer, Video-Stream, VOIP) sınıfları olmak üzere 2'li, 4'lü, 8'li sınıflandırma yapılmıştır. 2'li ve 4'lü sınıflandırmada %99.9 doğruluk oranına, 8'li sınıflandırmada ise %94 doğruluk oranına ulaşılmıştır.

Keywords: Karanlık Ağ, şifreli ağ trafiği, makine öğrenme, sınıflandırma,

Ali Tunç, Şakir Taşdemir

Uzun Kısa Süreli Bellek (lstm) Algoritması Yardımıyla Atm'lerde Nakit Yönetim Optimizasyon Çalışması

Abstract: ATM nakit yönetimi, ATM cihazları üzerinde bulundurulması gereken en ideal tutardaki para miktarının optimizasyonunu sağlamak adına yapılan işlemler bütünüdür. ATM Nakit Yönetimi Optimizasyonu çalışmaları, bankacılık sisteminde yer alan ATM'lerin türleri ve modellerine göre her zaman dilimine uygun olacak şekilde ATM üzerinde en uygun değerde nakit para miktarını tutmak için yapılmış çalışmalardır. Yapılan bu çalışmada ATM nakit yönetimi, bir optimizasyon problemi şeklinde ele alınarak hazine ve operasyon maliyetlerinin minimum yapacak karar değişken değerlerinin hesaplanması sağlanacaktır. Çalışmadaki temel amaç ATM cihazlarında günlük bazda olması gereken para miktarının en uygun miktar değerinin tahmin edilmesini sağlayarak sistem sahiplerine ATM de olması gereken nakit miktarının önerilmesidir. Çalışmada literatürde kullanılan Uzun Kısa Süreli Bellek (Long Short-Term Memory) (LSTM) algoritmasından yararlanılarak en ideal sonuç bulunmaya çalışılmıştır. Öncelikle ATM verileri üzerinde karar değişkenleri ve özelliklerin neler olacağı detaylı bir çalışma ile belirlenmiştir. Belirlenen veri alanlarının zaman serisi verileri olduğu göz önünde tutularak en uygun sonuç üretmesi için LSTM algoritmasına karar verilmiştir. LSTM algoritması için girdi parametresi olarak kullanılan değerlerin yıllara göre enflasyon verilerine göre değişim ve kaybının önlenmesi için normalizasyon bir değere dönüştürülerek işleme alınmıştır. Elde edilen normalizasyon değerleri LSTM algoritmasında kullanılarak olması gereken en uygun nakit miktarı değerinin ne olacağı bir araştırma olarak önerilmiştir. Bu sayede derin öğrenme bir yaklaşım sergilenerek başarılı bir çözümün ortaya konulması amaçlanmıştır. Elde edilen sonuçlar sistemdeki değerlerle karşılaştırılarak başarı oranları ortaya konulmaya çalışılmıştır.

Keywords: ATM, LSTM, Uzun Kısa Süreli Bellek, Nakit Optimizasyonu,

Aurite Bytyci, Lorik Ramosaj, Bardh Shala, Eliot Bytyci

Reasoning on Relational Database and Its Respective Knowledge Graph: a Comparison of the Results

Abstract: The use of relational databases has been a longstanding practice for data storage and information retrieval. Nevertheless, the emergence of knowledge graphs has led to a gradual displacement of relational databases in various domains. Thus, in this study we tend to analyze knowledge graphs' reasoning abilities and perform a comparison with relational databases. To achieve optimal reasoning in data, we have incorporated neural networks algorithms. We tested aforementioned algorithms on a pre-existing knowledge graph along with its associated dataset and this paper presents the outcomes of our experiments. A subset of the HETIONET dataset related to cancer diseases, represented as a knowledge graph in neo4j, was carefully selected as the standard for our analysis to ensure objectivity and precision. The performance of the top algorithms employed in relational databases and knowledge graphs was our main goal. Our research contributes valuable insights to the comparative analysis of reasoning algorithms between relational databases and knowledge graphs. By shedding light on the strengths and weaknesses of different approaches, this study serves as a foundation for further advancements in database management and data extraction techniques. This study's findings can be used to create more complex algorithms and improve the functionality of knowledge graph-based systems.

Keywords: Knowledge graphs, Relational Databases, Neural Networks, Neo4j, Reasoning

Rıza Erhan Akdoğan, Muhammed Abdulhamid Karabıyık, Yasemin Altuncu

Classification of 2d Buried Basic Geometric Objects With Machine Learning Methods In Half-space Problem

Abstract: In this study, machine learning-based approaches were used to classify cylindrical objects with triangular, round, and square cross-sections buried under lower half-space using electromagnetic field measurements from the upper half space. Electromagnetic field measurement data were created synthetically using the MATLAB (2018b) program. Within the scope of this study, the region of interest, assuming that the objects are buried 0.5 m below the interface, is illuminated by a plane wave excited in the upper half-space. Half-Space illuminated by 33 different angles with a plane wave and measurements were made at 200 different points along a 20 meters line 0.5 meter above the surface. Furthermore, the objects were rotated about their own axis and measurements were taken at various rotations. In this way, a total of 4786 scattered field data were obtained. These data were used as the dataset for machine learning classification algorithms and the dataset was divided into two parts as 60% training and 40% testing. Realized classification problems were tested as two classes and three classes. While the square and triangle were used in the two-class operation, the square, triangle and circle were used in the three-class operation. KNN, SVM, Decision Tree, Adaboost and Naive Bayes were used in the tests as classification algorithms. The KNN algorithm gave the most successful results in the experiments performed with two classes and three classes. When the results of both experiments were evaluated together, KNN gave the most successful result.

Keywords: Electromagnetic Scattering, Half-Space, Buried Objects, Machine Learning, Classification

Simge Kacar Eroğlu, Gamze Yüksel

Dynamıc Mode Decomposıtıon Wıth Control: a Case Study of Covıd-19 and Vaccınatıon

Abstract: Özet metin mail atılmıştır. Özet metin mail atılmıştır .Özet metin mail atılmıştır. Özet metin mail atılmıştır. Özet metin mail atılmıştır. Özet metin mail atılmıştır. Özet metin mail atılmıştır. Özet metin mail atılmıştır. Özet metin mail atılmıştır. Özet metin mail atılmıştır. Özet metin mail atılmıştır. Özet metin mail atılmıştır. Özet metin mail atılmıştır. Özet metin mail atılmıştır. Özet metin mail atılmıştır. Özet metin mail atılmıştır.

Keywords: Dynamic Mode Decomposition, Control, Data Driven Dynamic Systems, Singular Value Decomposition, Machine Learning

Ibrahim Alper Doğru, Egemen Taşkın

Blockchain ve Kötü Amaçlı Yazılımların Kesişimi: Kapsamlı Bir İnceleme ve Analiz

Abstract: Bir Dağıtık Defter Teknolojisi biçimi olan blokzincir, karşılıklı olarak birbirine güvenmeyen ya da birbirini bilmeyen varlıklar veya uygulamalar arasındaki etkileşimleri kolaylaştırmak için güvenilir ve şeffaf bir mekanizma olarak ortaya çıkmıştır. Bu güven, öncelikle değişmezlik, kriptografik şifreleme, denetlenebilirlik ve izlenebilirlik gibi temel özellikleri aracılığıyla kurulur. Başlangıçta finans sektörü tarafından yönlendirilen blokzincir teknolojisinin yaygın olarak benimsenmesi, uygulamalarını sağlık, tedarik zinciri, emlak, hukuk ve bilgi güvenliği gibi çeşitli sektörlere genişletmiştir. Endüstri 4.0, Nesnelerin İnterneti, Makine Öğrenmesi, Yapay Zekâ ve blokzincir teknolojilerinin entegrasyonuyla birlikte ilerlerken, siber güvenlik alanı hem ilerleme hem de zorluklarla karşı karşıya kalmaktadır. Kötücül yazılım oluşturan bilgisayar korsanları, geleneksel savunma önlemlerine direnen kontrol bilgilerini yaymak için blok zincirinin esnek tasarım ilkesinden yararlanmak üzere Endüstri 4.0 araçlarından yararlanır. Sonuç olarak, blokzincir teknolojisi ve kötücül yazılımların yakınsaması, bu dinamik manzaranın kapsamlı bir şekilde incelenmesini gerektirmektedir. Bu araştırma, alana üç ana hat çerçevesinde katkıda bulunmaktadır. İlk olarak, blokzincir sistemlerini hedef alan güncel ve ileri seviye kötücül yazılımların kapsamlı bir incelemesini sunar. Bu analiz, blokzincir ağlarındaki güvenlik açıklarından yararlanmak için tasarlanmış geniş bir kötücül yazılım yelpazesini kapsar. İkinci olarak, tehdit aktörleri tarafından kötü niyetli amaçlar için blok zincirinin özelliklerinden yararlanmak için kullanılan stratejileri araştırarak, kötücül yazılım saldırılarını düzenleme ve yürütmede blokzincir teknolojisinin kendisinin kullanımını araştırır. Son olarak, çalışma, blokzincir teknolojisini kullanan hem genel bilgi işlem ortamlarına hem de Android işletim sistemlerine odaklanarak kötücül yazılım analiz tekniklerini tartışmaktadır. Bu kapsamlı analiz, bu bağlamlarda blok zinciri tabanlı kötü amaçlı yazılım tehditlerini algılamayı, analiz etmeyi ve azaltmayı amaçlamaktadır. Sonuç olarak, bu araştırma, blokzincir ve kötücül yazılımlar arasındaki etkileşimi anlamanın kritik önemini vurgulamaktadır. Bu alanda ortaya çıkan riskleri ve zorlukları ortaya çıkaran bu çalışma, araştırmacıları ve siber güvenlik uygulayıcılarını blokzincir ağlarını güçlendirmek ve kötü niyetli tehditlerle etkili bir şekilde mücadele etmek için değerli bilgilerle donatmayı amaçlamaktadır.

Keywords: Blokzincir, Makine Öğrenmesi, Kötücül yazılım Tespiti, ,

Necaattin Barışçı, Merve Güllü, Ibrahim Alper Doğru

Derin Transfer Öğrenmeye Dayalı Pirinç Bitkisi Hastalıklarının Tespiti

Abstract: Çeltiğin işlenmesi sonucu elde edilen pirinç, dünyada en çok tüketilen gıda ürünlerinden bir tanesidir. 2021-2022 yılı arasında pirinç tahıl üretiminde 509,87 milyon ton ile üçüncü sırada yer almaktadır. Enerji kaynağında temel gıda olarak dünya nüfusunun yarısından fazlası tarafından tüketilmektedir. Özellikle Asya, Latin Amerika, Afrika bölgelerinde beslenmenin hayati bir parçası olarak kabul edilir ve dünya çapında insanlar tarafından tüketilen kalorinin beşte birinden fazlası pirinçten sağladığı tahmin edilmektedir. Bitki yapraklarında özellikle, çeltik yapraklarında oluşan hastalıklar çiftçilerin karşılaştığı önemli sorunlardan biridir. Çeltik bitkisi hastalıkları tespiti uzman bilgisi gerektirdiğinden zor bir problemdir. Çiftçiler genellikle mahsul hastalıkları hakkında yeterince bilgi sahibi olmadıklarından hastalık için yanlış tespitte bulunmakta ve yanlış tedavi uygulanmaktadır. Hastalıkları hızlı ve doğru tanıma, sağlıklı ve verimli üretimin artmasındaki en önemli süreçtir. Bu probleme çözüm sunma amacıyla çeltik bitki hastalıklarını tespit eden derin öğrenme tabanlı bir model geliştirilmiştir. Model, dört farklı çeltik bitkisi hastalığı içeren veri seti üzerinde eğitilmiş ve 0.0014 kayıp değeri ile başarılı bir model oluşturulmuştur. Dört farklı derin öğrenme algoritması Imagenet ile eğitilmiş modelleri üzerinde transfer öğrenme metodu ile modeller oluşturulmuş ve bu modellerin karşılaştırmaları sunulmuştur. En başarılı model InceptionV3 transfer öğrenme mimarisi ile elde edilmiştir. Deneysel sonuçlar, bu makalede önerilen transfer öğrenme yönteminin, pirinç yaprağı hastalıklarını tanıyabildiğini ve bunun da birçok bitkinin yaprak hastalıklarını tanımak için güvenilir bir yöntem sağladığını göstermektedir.

Keywords: çeltik bitkisi hastalıkları, derin öğrenme, transfer öğrenme, InceptionV3, Evrişimsel Sinir Ağları

Salih Taze, Abdul Samad, Hacer Özcan, Muhammed Kürşad Uçar

Machine Learning Based Detection of Forest Fires using Sensors Placed In Forests

Abstract: Background and Objective: Fire forests can occur for several reasons, and the spreading of fire can be the reason for the partial and complete burning of forests in a large area. It can be dangerous if the fire did not control in the first 15 - 20 minutes. Early detection is required to prevent the forest from the effect of fire. For this reason, the early detection of fires can be extinguished in a much shorter time and with less damage. There are many difficulties in detecting fires in forest areas because forest spreads over large areas and are far from residential areas. Due to delayed detection, it becomes increasingly difficult to control the fire and sometimes could be the reason for large-scale damage. This study aimed to determine whether there is a fire in the region using data taken from the sensors placed in the forests using machine learning. Material and Method: The project was carried out according to the following steps: In the study, artificial intelligence techniques were used to create several models for fire detection with the help of sensor data. In this project, machine learning classification algorithms were used to detect fires. The models were developed in the Matlab environment and tested with performance evaluation criteria. Results: As a result of the conducted research, the decision tree models utilized yielded an average accuracy value of approximately 99%, with a positive predictive value of 100%. For ensemble models, the average accuracy was around 97%, accompanied by an average positive predictive value of 96%. In the K-Nearest Neighbors (kNN) models, the average accuracy reached approximately 91%, while the average positive predictive value was about 89%. Regarding Support Vector Machines (SVM) models, an average accuracy of around 93% was achieved and an average positive predictive value of 96%. Through feature selection, model performance, and sensitivity were enhanced up to a success rate of 100%. Conclusion: According to the obtained results, it is evaluated that the developed sensors with the information and the artificial intelligence-based system can be used in practice with a high accuracy rate.

Keywords: Forest Fire, Forest Fire Detection, Machine Learning, Classification,

Kevser Büşra Yıldırım, Berna Kiraz, Shaaban Sahmoud

Calculatıng Bus Occupancy by Deep Learnıng Algorıthms

Abstract: The increase in the world population causes unbalanced densities in public transport. While planning transportation networks, one of the most competing problems is to use an appropriate number of vehicles to reduce the increased load and not cause traffic. Although sensors or card reading systems are currently used to solve this problem, it will be more efficient to deal with real-life anomalies adaptively using Deep Learning algorithms. In this paper, we propose an approach consisting of three steps: person detection, tracking, and counting to automatically calculate bus occupancy. First, the person is detected by using the YOLO algorithm which is trained to detect persons in various environments. Second, the detected person is tracked by using the DeepSORT algorithm to determine if the passenger is leaving or entering the bus. Finally, the entrance and exit of passengers are counted by utilizing a virtual line drawn on the bus doors over camera images. The bus occupancy rate is estimated by comparing the current number of passengers with the maximum allowed number of passengers in every bus type. Two public datasets are used to test the proposed algorithm. These datasets contain images from embedded cameras that are fixed on public transport system buses. After testing the proposed algorithm on these two public datasets, our experimental results show that the proposed system can estimate bus occupancy with up to 94% accuracy.

Keywords: Bus occupancy, Person detection and tracking, Person counting, Crowd counting, Computer Vision

Ali Berkol, Idil Gökçe Demirtaş

Exploring the Potential Interplay of Gpt, Edge Aı, and the Defense Industry

Abstract: This abstract delves into the intriguing interrelation among Generative Pre-trained Transformer (GPT), Edge Artificial Intelligence (AI), and the defense industry. The advancements in AI have witnessed the emergence of groundbreaking technologies like GPT and Edge AI, redefining operational paradigms across various sectors. This study scrutinizes the potential implications of integrating GPT and Edge AI. GPT, exemplified by its proficiency in text generation and comprehension, holds potential to revolutionize defense operations. It can be harnessed for intelligence analysis, document classification, and autonomous decision-making systems. Furthermore, Edge AI, with its energy-efficient and real-time capabilities, offers transformative possibilities for enhancing real-world decision-making in the military arena. Portable sensors, drones, and smart devices could optimize military operations, enabling prompt responses. The synergy between GPT and Edge AI creates opportunities for developing sophisticated, intelligence-driven systems. Portable language translation systems, for instance, could transcend language barriers in command and control centers. However, ethical and security concerns remain pertinent. The ethical implications of AI-integrated defense technologies and ensuring data security warrant meticulous consideration. In conclusion, the convergence of GPT, Edge AI, and the defense industry paves the way for enhanced defense systems. Yet, the utilization of these technologies should be guided by a thorough evaluation of ethical, security, and privacy considerations

Keywords: Generative Pre-trained Transformer, Edge Artificial Intelligence, defense industry, intelligence analysis, ethics

Ulaş Yamancı, Duygu Uslu

Inequalities of Hardy-hilbert Type for Berezin Number of Operators and Their Applications

Abstract: The Berezin symbol and the Berezin number are very useful tools in studying operators on the reproducing kernel Hilbert spaces, including Hardy, Bergman and Fock spaces. For example, boundedness, invertibility, compactness and positivity of some operators are characterized or related with their Berezin symbols and Berezin number. Using the Hardy-Hilbert type inequalities and some well-known inequalities, some important results about the Berezin number inequalities were obtained. By using the new Hardy-Hilbert type inequality, we improve some inequalities for the Berezin symbol and the Berezin number inequalities operators in reproducing kernel Hilbert spaces. Also, we obtain Berezin number inequalities for convex functions. References 1) Aronzajn N. Theory of reproducing kernels. Trans Amer Math Soc. 1950;68:337-404. 2) Berezin FA. Covariant and contravariant symbols for operators. Math USSR-Izv. 1972;6:1117-1151. 3) Hardy G., Littlewood JE., Polya G. Inequalities. 2nd ed. Cambridge: Cambridge University Press; 1967. 4) Karaev MT. Berezin symbol and invertibility of operators on the functional Hilbert spaces. J Funct Anal. 2006;238:181-192. 5) Kian M. Hardy-Hilbert type inequalities for Hilbert space operators. Ann Funct Anal. 2012;3:128-134. 6) Yamancı U., Gürdal M., Garayev MT. Berezin Number Inequality for Convex Function in Reproducing Kernel Hilbert Space. Filomat. 2017;31:5711-5717. 7) Yamancı U., Gürdal M. On numerical radius and Berezin number inequalities for reproducing kernel Hilbert space. New York J Math. 2017;23:1531-1537.

Keywords: Berezin symbol, Berezin number, reproducing kernel, self-adjoint operator, reproducing kernel Hilbert spaces

Ulaş Yamancı

Some Improvement Inequalities for Reproducing Kernel Hilbert Space Operators and Related Questions

Abstract: A functional Hilbert space (or reproducing kernel Hilbert space) H=H(Ω) is a Hilbert space of complex valued functions, which has the property that point evaluations are continuous, i.e., for each $\lambda \in \Omega$ the map $f \to f(\lambda)$ is a continuous linear functional on H. The Berezin number for an operator A$\in$B(H(Ω)) were introduced by formula ber(A):=sup$\{|A(\lambda)|:\lambda \in \Omega\}$. We give some reverse inequalities for operators in reproducing kernel Hilbert spaces. Also, we characterize the operators in terms of Berezin number. References 1) Berezin, F. A.: Covariant and contravariant symbols of operators. Math. USSR, Izv. 6 1972, (1973) 1117--1151. (In English. Russian original.); translation from Russian Izv. Akad. Nauk SSSR, Ser. Mat. 36 (1972), 1134--1167. 2) Dragomir, S. S., Reverses of the Schwarz inequality in inner product spaces generalising a Klamkin-McLenaghan result, Bull. Austral. Math. Soc., 73 (1) (2006), 69-78. 3) Halmos, P. R.: A Hilbert space problem book. Second edition. Graduate Texts in Mathematics, 19. Encyclopedia of Mathematics and its Applications, 17, Springer-Verlag, New York-Berlin, 1982 4) Karaev, M.T., Berezin symbol and invertibility of operators on the functional Hilbert spaces, Journal of Functional Analysis, 238 (2006), 181-192. 5) Kittaneh, F.: Notes on some inequalities for Hilbert space operators. Publ. Res. Inst. Math. Sci., 24 (1988), 283--293. 6) Pečarić, J., Furuta, T., Hot, J. M., Seo, Y.: Mond-Pečarić method in operator inequalities, inequalities for bounded selfadjoint operators on a Hilbert space. Monographs in Inequalities, Element, Zagreb, 2005 7) Zhu K., Operator theory in function spaces. Second ed., Mathematical Surveys and Monographs, Vol. 138, American Mathematical Society, Providence, R.I. 2007.

Keywords: Berezin symbol, Berezin number, reproducing kernel, self-adjoint operator, reproducing kernel Hilbert spaces

Bekir Aksoy, Muzaffer Eylence, Asım Sinan Yüksel, Seyit Ahmet Inan

İnsansız Hava Araçları Kullanılarak Deforme Olmuş Karayolu Çizgilerinin Tespitinde Yapay Zekâ Yöntemlerinin Kullanılması

Abstract: Günümüzde teknolojinin hızla gelişmesi ile birlikte yapay zeka yöntemleri birçok alanda sıklıkla kullanılmaktadır. Yapay zeka yöntemleri, eğitim, sağlık, güvenlik, savunma gibi birçok alanda etkili çözümler sunmaktadır. Yapay zekanın önemli kullanım alanlarından birisi de karayollarıdır. Özellikle otonom araçların yaygınlaşması ile birlikte karayolu güvenliğinde karayolu işaret çizgilerinin önemi daha da artmıştır. Gerçekleştirilecek olan çalışma ile insansız hava aracı kullanılarak karayolları üzerinde sıcaklık, kullanım kaynaklı problemler gibi birçok nedenden dolayı karayolu işaret çizgiler üzerinde deformasyonlar meydana gelerek otonom sürüş gerçekleştiren araçların çizgileri tespitinde sıkıtılar oluştuğu ve bu durumunda trafik güvenliği oldukça olumsuz etkilediği gözlemlenmiştir. Çalışmada insansız hava aracı ile oluşturulan özgün görüntü veri seti hazırlanacaktır. Hazırlanan veri seti üzerinde farklı görüntü işleme teknikleri ve derin öğrenme modelleri kullanılacaktır. Çalışmada ilk olarak görüntü işleme teknikleri ile görüntüde oluşan kirlilikler giderilecektir. İkinci aşamada ise oluşturulan özgün veri seti üzerinde en az üç farklı derin öğrenme modeli kullanılarak çizgilerin olası bölgeleri tespit edilecektir. Derin öğrenme modellerinde elde edilen sonuçlar farklı performans değerlendirme metrikleri kullanılarak değerlendirilerek istenilen en yüksek doğruluk değerine ulaşılıncaya kadar eğitimler devam ettirilecektir. eğitim sonucunda yapay derin öğrenme modeli ile insansız hava aracı ile yer istasyonunda yer bilgisayar sistemi ile gerçek zamanlı uygulaması gerçekleştirilerek hatalı veya eksik tespit edilen karayolu çizgilerine ait konum bilgileri belirlenerek yetkililere bildirilerek olası trafik güvenlik problemlerinin önüne geçilecektir.

Keywords: Derin Öğrenme, İnsansız Hava Aracı, Görüntü İşleme, ,

Bekir Aksoy, Muzaffer Eylence, Mustafa Melikşah Özmen,

Detectıon of Faults In Hıgh Voltage Power Transmıssıon Lınes Usıng Unmanned Aerıal Vehıcle Wıth Artıfıcıal Intellıgence Methods

Abstract: With the rapid development of artificial intelligence technologies, the areas of use of artificial intelligence are increasing day by day. Artificial intelligence is frequently used in many fields such as agriculture, security systems and health. One of the important areas of use of artificial intelligence is the field of engineering. Especially deformations in high voltage lines, which are one of the important components of electrical engineering, cause major problems in the transmission of electrical energy. A number of important factors such as regular maintenance of energy cash lines, energy security, uninterrupted energy flow, safety, efficiency, environmental protection and cost effectiveness are important parameters in electricity transmission lines. The maintenance of energy cash lines ensures that the energy flow, which forms the basis of modern life, continues uninterruptedly and safely. Paying due attention to the maintenance of energy cash lines that meet the needs of society is a critical step in building a sustainable future. For this reason, with the study to be carried out, a hybrid data set will be created with a specific data set to be created by an unmanned aerial vehicle and a hybrid data set to be obtained from online websites. With the created dataset, images will be trained with at least three different deep learning models. Training on deep learning models will be continued until the desired results are obtained. The results obtained from the deep learning models will be used in different performance evaluations.

Keywords: deep learning, UAV, Image Processing, ,

Orçun Demir, Murat Özbayoğlu

Optimizing Technical Analysis Indicator Parameters With Grey Wolf Optimization

Abstract: Technical market indicators play an important role in the technical analysis due to their key role of predicting trend changes and making trade decisions. Besides choosing an indicator to use, deciding the right parameters for higher returns is a common problem for market professionals. Even though technical indicators with common parameters create a general perspective for most of the financial securities, it is possible to tune these parameters specific for each security. In this paper, Grey Wolf Optimization (GWO) algorithm is proposed to determine the right parameters to achieve the maximum Sharpe Ratio on 5 different U.S. stocks individually. Relative Strength Index (RSI) is chosen to be optimized, even though other technical indicators can also be considered as standalone or combined together with RSI. The parameters are optimized during the training period of 3 years and then tested for 2 years following the training period. Optimizations are implemented for two scenarios, with or without considering the trend of the underlying stock. After optimizing the RSI parameters, mean returns of the stocks increased 24.987% without and 104.395% with trend specification on test sets. Even though this is a preliminary study, the results indicate that GWO can be useful for optimizing algorithmic trading strategy parameters.

Keywords: Technical Analysis, Grey Wolf Optimization, Algorithmic Trading, Stock Market, Financial Trading

Başak Demirok, Murat Özbayoğlu

a Brief Survey on Exploring the Application Areas and Scope of Chatgpt

Abstract: Chatbots based on Large Language Models (LLMs) have lately attracted a lot of interest from both academia and industry due to their tremendous potentials. Among these models, ChatGPT has emerged as a prominent player. Even though other companies and research institutions have come up with similar implementations, chatGPT remains the most preferred application in this field. In this brief survey paper, we delve into the use cases, application areas and scope of ChatGPT, aiming to shed light on its potentials and possible setbacks. We give a general overview of the fundamental architecture and training methodology of ChatGPT and its underlying transformer-based neural network, which enables it to generate contextually coherent responses in a conversational setting. By understanding the model's foundations, we lay the groundwork for comprehending its subsequent applications. We also analyzed various use cases in different implementation scenarios. However, even though ChatGPT excels at generating human-like responses, it can occasionally produce incorrect or biased information. We discuss challenges related to maintaining ethical standards, ensuring user safety, and addressing issues of transparency and accountability through some use cases. Such factors limit the scalability and generalizability of ChatGPT. We hope that the findings of this study contribute to the ongoing discourse surrounding AI systems and serve as a foundation for future research, enabling the responsible and effective integration of ChatGPT into various real-world scenarios.

Keywords: ChatGPT, Chatbot, Large Language Model (LLM), artificial intelligence (AI), Natural Language Processing (NLP)

Reinhard Wagner, Philipp Wagner

the Evolution of Technology In Artificial Intelligence and Its Impact on Project Management

Abstract: The rapid advancement of Artificial Intelligence (AI) has the potential for an immense impact on Project Management (PM), given the ability to auto-mate, assist, and predict project outcomes in an increasingly generalizable and accurate fashion. The public discussion, however, is at the moment mainly concerned with the possible applications of AI, such as ChatGPT in PM, and its detrimental effects on employment without a solid knowledge of technological evolution. Based on a systematic literature review, our research, therefore, explored the development of AI technology over the past few years and any trends, investigated the state of application of AI in PM, and based on this, developed propositions for future developments. The results of our research indicate an accelerated development of machine learning (ML) technologies towards deep learning (DL), natural language processing (NLP), and computer vision (CV) with multiple potential applications in PM. Surprisingly, the literature shows that the majority of examples of AI applications in PM occur in the conventional construction industry. In general, the application of AI in PM is still in its infancy. Based on the research results, we show the potentials and application areas of AI in PM, which can be utilized as a basis for future research and practical application.

Keywords: Artificial Intelligence, Project Management, Machine Learning, Deep Learning, Computer Vision

Zeliha Uçar, Betül Çiçek

Artıfıcıal Intellıgence Based Estımatıon of Indıvıduals' Daıly Energy Requırements Wıth Anthropometrıc Measurements and Demographıc Informatıon

Abstract: Energy should be taken regularly for the body to maintain its vitality in a healthy way. Age, gender, physical activity, body weight, and height determine the energy required to sustain life. There are various methods to measure energy expenditure. These methods can be counted as; direct calorimetry, gold standard indirect calorimetry, respiratory coefficient, and double action water method. . These methods are impractical for many reasons, such as conditions of use, inconvenience to the individual, difficulty, and costs. Therefore, new methods are needed. This study proposes anthropometric and demographic information of the individual and artificial intelligence-based estimation of energy requirements . Artificial intelligence models were created by selecting 14 characteristics of individuals with the help of selection. As artificial intelligence modelsLinear Regression, Gaussian Process Regression (GPR), Neural Network (NN), Support Vector Machine (SVM), and ensemble methods were used. For increased performance, gender-based modelsare also developed . The best model performance was determined in the models developed for all individuals as RMSE=1.6, R2=1 MSE=2.58 and MAE=0.74 with a GPR-based 50\% feature. In the models developed for males, the best model performance was determined as RMSE=0, R2=1 MSE=0 and MAE=0 with a linear-based 50\% feature. In the models developed for females, the best model performance was determined as RMSE=0, R2=1 MSE=0 and MAE=0 with a linear-based 75\% feature. According to the results, anthropometric and demographic information and artificial intelligence-based energy requirements can be calculated accurately for all individuals or based on gender.

Keywords: Energy Requirement, Energy Calculator, Artificial Intelligence, Dietitian,

Remzi Gürfidan, Enes Açıkgözoğlu, Oğuzhan Kilim, Tuncay Yiğit, D. Jude Hemanth

Classıfıcatıon of Facıal Images and Moods Usıng Image-based Algorıthms

Abstract: Sentiment analysis is an important application that aims to extract human emotions from images. The study is carried out using deep learning methods to identify and classify emotional expressions in images. The paper starts by introducing the concept of sentiment analysis and emphasizes its importance in sentiment analysis. It explains that an accurate understanding of emotional expressions in images has applications in many industries. Then, the role of deep learning approaches in sentiment analysis is discussed. The research is carried out using three different deep learning algorithms, namely CNN, ResNet50 and VGG19. Then, the training results of all three models are described, hyperparameters and training parameters are specified. The methods section of the paper describes in detail the dataset used, the data preprocessing steps and the architecture of the machine learning model. Data collection, labeling and data augmentation strategies are presented in detail. Next, the training process for all three models is described, including hyperparameters and training parameters. The results section presents the performance of all three models on the sentiment analysis task. After training, the success rates of CNN, ResNET50 and VGG19 algorithms are 90.8%, 86.7% and 75.9% respectively. The results show how effective each model is in successfully classifying emotional expressions. Furthermore, the advantages and limitations of each model are discussed.

Keywords: Mood classification, image classification, machine learning, CNN, ResNET50

Muhammad Anshari, Mohammad Nabil Almunawar, Masairol Masri

Modelling Autonomous Vehicle Safety In Road Scenarios Considering User Behaviour

Abstract: The purpose of this study is to analyze the rapidly changing environment of autonomous vehicles (AVs), with a particular emphasis on their implications for the safety of pedestrians and passengers. AVs, also known as self-driving automobiles, are emerging as potential game-changers in the existing transportation landscape. They promise greater safety and increased efficiency in traffic. Ethical challenges may arise in situations where autonomous vehicles (AVs) must make complex decisions to prioritize either the safety of passengers or the safety of pedestrians. This study utilized root cause analysis techniques such as the Five Whys and Fishbone/ Ishikawa Diagram Analysis to identify potential safety problems. Through an in-depth examination, the research navigates the complex landscape of autonomous mobility, focusing on the factors that determine the extent to which autonomous vehicles (AVs) are safe when interacting with passengers and pedestrians. The study is expected to contribute to the body of knowledge aimed at improving discussions about the safety of AVs.

Keywords: Autonomous Vehicle, Artificial Intelligence, Safety, Road Safety,

Sofiane Touatı, Mohammed Said Radjef

Least Core Computation of Weighted Voting Games

Abstract: The theory of cooperative games with transferable utility, encompasses diverse scenarios, with weighted voting games forming a specific subset. These games model situations akin to voting and find application in various domains. A conventional approach to modeling such games employs characteristic function form. This approach assumes that winning coalitions hold complete power, while others possess none. Power indices are used to solve these games, measuring a player's potential to transform a losing coalition into a victorious one. On the other hand, core-related concepts are interested in the stability of coalitions, where The aim is to ensure that every coalition of players receives at least the amount it can guarantee for itself. The concept of the least core is introduced to address situations where the core is empty, proposing a tax model to discourage coalition breakaways. In the context of weighted voting games without veto players, achieving an equitable distribution of total power amongst coalitions proves challenging. The least core allocates maximal power to winning coalitions while ensuring the grand coalition retains total power. Another perspective on the least core seeks to minimize claims by victorious coalitions, striving to minimize the largest substantial claim. A subsequent refinement, the nucleolus, extends this concept by iteratively selecting allocations that reduce excesses, converging upon a unique allocation. Studies have explored the complexity of the core, least core, and nucleolus. The existence of veto players ensures the core's non-emptiness in simple games, a property that extends to weighted voting games through polynomial determinations. This principle also holds for Boolean combinations of weighted voting games. Additionally, broader terrain of Boolean combinations within simple weighted voting games has been explored. While the nucleolus equally distributes power among veto players when the core is non-empty, its computation becomes intricate in the absence of a veto player. Approaches for computing the nucleolus and least core have been proposed, each with its unique considerations and challenges. This paper introduces a pseudo-polynomial method to compute the least core of weighted voting games through linear programming. The approach leverages the interconnectedness between the least core computation and the Gilmore and Gomory model originating from the bin packing problem. The study encompasses three weighted voting game variants: simple, multiple, and the disjunction of simple weighted voting games. Each variant is matched with its corresponding Gilmore and Gomory model from the Bin Packing problem, solved using a Bin Packing Solver founded upon an equivalent pseudo-polynomial linear programming formulation. The real application cases presented require solving a linear program ranging from a few hundred variables to several thousand. The computational time does not exceed a minute.

Keywords: Cooperative game theory, Weighted voting games, least core computation, Bin Packing,

Çilem Koçak, Tuncay Yiğit

Gpt-3 Sınıflandırma Modeli Ile Türkçe Twitlerin Siber Zorbalık Durumlarının Belirlenmesi

Abstract: İnsanlar genç yaşlı fark etmeksizin günümüz iletişim teknolojilerinden olan telefon, tablet, bilgisayar ve akıllı cihazlar ile internet dünyasına hızlı bir şekilde adım atmışlardır. İnternetin insanların hayatında yeri arttıkça sosyal medya platformlarını çeşitlenmekte ve kullanıcılar bu platformlarda yer almak istemektedirler. Sosyal medya kullanıcı sayısının artışı ile de bazı olumsuzluklarla karşılaşılmaktadır. Sosyal medya da karşılaşılan en önemli sorun da siber zorbalık durumlardır. Siber zorbalık sosyal medya kullanıcıları ya da gruplar arasında gerçekleşen günlük diyaloglar gibi görünse de paylaşılan bilgi, içerik, gündem sosyal medya ortamlarının çeşitlenmesi ile günden güne karşılaşma durumu artmaktadır. Bu makale, tweet'leri siber zorbalık içerenler ve içermeyenler olarak sınıflandırma görevi için bir GPT-3 sınıflandırma modelinin performansını değerlendirmektedir. Model ilk olarak Türkçe tweet'ler üzerinde eğitildi ve test edildi ve toplamda %55'lik bir doğrulukla sonuçlandı. Veriler İngilizce'ye çevrildikten ve model yeniden eğitilip test edildikten sonra doğruluk %66'ya yükseltildi. Her iki tweet sınıfı için kesinlik, hatırlama ve F1 puanı, siber zorbalık içermeyen tweet'ler için sırasıyla 0,65, 0,68 ve 0,67 ve siber zorbalık içeren tweet'ler için sırasıyla 0,67, 0,64 ve 0,65 olarak bulundu. siber zorbalık Modelin karışıklık matrisi, 17 tweet'in doğru bir şekilde siber zorbalık içerdiğini, 9'unun ise yanlış bir şekilde siber zorbalık içerdiğini gösterdi. Bu makalenin sonuçları, GPT-3'ün tweet'leri siber zorbalık içerenler ve makul bir doğruluk derecesi ile içermeyenler olarak sınıflandırma görevi için kullanılabileceğini göstermektedir.

Keywords: Cyberbullying, Twitter, Artificial intelligence, Text Classification, GPT-3

Asuman Yayla, Iclal Çetin, Özge Öztimur Karadağ

Analyzing Bias In Machine Learning Models: Insights from the Alexnet Architecture on Balanced and Unbalanced Data

Abstract: Machine learning is being applied in almost every field nowadays. Consid-ering its abilities, this wide usage and rapid extension so many domains is not sur-prising. Machine learning and artificial intelligence applications, especially deep learning models are developing rapidly and starting to play an effective role in dif-ferent fields. This wide usage of these methods in various domains gives rise to some concerns and problems along with positive effects on our lives. With the be-ginning of its use in selection and decision-making mechanisms in social life, some concerns related to its fair and equal work have emerged. The fairness of the algo-rithms and data used in this field has started to be the subject of some contro-versy. In this study, taking these concerns into account, the biases that can be cre-ated by balanced and unbalanced data sets on the same algorithm are examined using two well-known datasets; MNIST and EMNIST, using a commonly used deep architecture AlexNet. The recognition performance of AlexNet for each class in these datasets is evaluated and its behavior is analyzed in detail. In the end, it is observed that additional to the data imbalance, the dataset content and the com-plexity of the classes should be considered carefully to be able to avoid bias in machine learning methods.

Keywords: Bias, AlexNet, Emnist Digits, Mnist, Machine Learning

Hamdi Sayın, Koray Özsoy, Seyit Ahmet Inan, Sema Çayır

Deep Learning-based Anomaly Detection In the 3d Modeling Production Process

Abstract: The 3D printing is a technology that is predicted to be one of the most widely used production technologies in the future. This technology allows for the three-dimensional output of products designed using 3D modeling software. Despite being an effective method in production, this technology also has disadvantages. Disadvantages are the occurrence of abnormal developments during printing. In order to solve this problem, the aim of this study is to develop a CNN deep learning model to create a computer vision system that follows the printing process and cancels or stops the job when a problem occurs. In this study, a dataset consisting of various possible abnormal images from the open-access Kaggle website was used. The sizes of the training, validation, and test sets were determined as 1000, 400, and 100 images respectively, and the division process was randomly performed. According to the performance measurements conducted during the testing phase, it was observed that it successfully detects abnormal conditions that may occur during printing with a 98% success rate. It is anticipated that the developed model is one of the successful algorithms that can be used for anomaly detection and thus prevent material and time loss caused by abnormal printing.

Keywords: deep leraning, 3D Printing, 3d Modeling, ,

Bekir Aksoy, Mehmet Yücel, Hamdi Sayın, Nergiz Aydın, Özge Ekrem

Hurma Meyvesindeki Kalite Kontrol İşlemlerinin Yapay Zeka İle Tahminlenmesi

Abstract: Günümüzde teknolojinin hızla gelişmesi ile birlikte yapay zeka uygulamaları sağlık, eğitim, savunma sanayi olmak üzere bir çok farklı alanda uygulanmaya başlanmıştır. Yapay zekanın önemli kullanım alanlarından birisi de tarım sektörüdür. Özellikle tarım sektöründe sebze, meyve yetiştiriciliğinde bitkilerin büyümesi, hastalıklarının erken tespitinde sıklıkla yapay zeka teknikleri kullanılmaktadır. Meyve sebze üretiminde ürünün kalitesi en önemli kriterlerden bir tanesidir. Meyve ve sebze pazarlarında ürünlerin kalite sınıflandırmasında dış görünüş önemli bir faktördür. Mevcut manuel yöntemler ile tarımda üretilen ürünlerin kontrol aşamalarında mahsulün hastalık, pestisit ve kalite durumları kontrol edilmektedir. Manuel olarak ürünlerin ayrıştırılıp sınıflandırılması uzmanlık gerektirebilir, bu da zaman alıcı ve büyük emek isteyen bir iştir. Günümüzde teknolojinin ilerlemesi ile tarım ve gıda alanında kullanılan yazılım teknikleri de gelişmektedir. Tarım ve gıda alanında üretilen ürünlerin işlenmesi ve pazara sürülmesi aşamalarında yazılım tekniklerinin kullanılması yaygınlaşmaktadır. Gerçekleştirilecek olan çalışma ile meyve ve sebze pazarında önemli bir payı olan Hurma meyvesi ele alınacaktır. Hurma meyvelerinin kalitelerinin sınıflandırılmasında görüntü işleme ve yapay zeka tekniklerinin kullanılması satış sürecinin daha tutarlı ve zaman açısından verimli hale gelmesini sağlayabilir. Ayrıca bu alanda kullanılacak olan yazılım teknikleri otomasyon sistemleri ile entegre edilebilir. Yapay zeka ve görüntü işleme tekniklerini kullanan bir otomasyon sistemi meyveleri kalitelerine göre otonom olarak ayırt edebilir. Çalışmanın ilerleyen aşamalarında bu konu üzerinde durulacaktır.

Keywords: Yapay Zeka, Derin Öğrenme, Tarım Uygulamaları, ,

Remzi Gürfidan, Oğuzhan Kilim, Tuncay Yiğit, Bekir Aksoy

Robustness Classıfıcatıon by Machıne Learnıng from Vehıcle Tıre Surface Abrasıons

Abstract: The safety and durability of vehicle tires is an important variable in terms of driving safety and cost effectiveness. Different methods such as visual inspection, tire air pressure control, pattern depth measurements, rotation and balancing can be used to evaluate these factors. In this study, different machine learning algorithms such as ResNET50, DenseNET121, AlexNET, CNN, which are image-based, are used to analyse the images of the tire surface to determine the surface wear of the vehicle tires and to perform robustness classification. For the training of the models, 1447 vehicle tire surface images of different categories (very good, good, bad, very bad) were used. The dataset containing the images belongs to the authors of this study and is unique. In the future, it is aimed to make the dataset available for copyrighted use on an open platform. The results obtained from the trained models are compared. The CNN algorithm, which showed the most successful results, was selected as the final algorithm. In conclusion, this paper represents an important step towards solving safety and efficiency issues in the automotive industry by introducing a machine learning approach to detect surface wear and robustness classification of vehicle tires. This technology has the potential to optimize tire management and maintenance.

Keywords: Tire wear, tire durability, durability classification, machine learning, DenseNET

Bekir Aksoy, Osamah Salman, Özge Ekrem, Nergiz Aydın, Mehmet Yücel

Artificial Intelligence Based Engineerıng Applıcatıons: a Comprehensıve Revıew of Applıcatıon Areas, Impacts and Challenges

Abstract: With the rapid spread of internet use in recent years, artificial intelligence applications have started to be used frequently in the fields of education, health, defense industry and engineering. The widespread use of the Internet, the universal use of sensors, the phenomenon of big data, the rise of e-commerce, the growth of the information community, and the links between data and information, society, physical space and the digital world have radically changed the information environment and initiated a new evolutionary stage for the development of Artificial Intelligence. . With the rapid development of artificial intelligence, it has made great progress in many areas from software algorithms to hardware applications. When artificial intelligence is applied in different areas of engineering, it can increase productivity, optimize processes and offer innovative solutions. In this study, it examines the wide range of artificial intelligence-based engineering applications, how these application areas are used, their effects on industry and technology, and the difficulties encountered in this field. It offers an important resource for those who want to understand the future potential of AI-based engineering applications and shape progress in this field. In this study, it is aimed to provide a different perspective to academicians who want to conduct academic studies on this subject in the future by making an academic literature review on artificial intelligence methods used in engineering applications.

Keywords: Artificial intelligence, Engineering applications, Machine learning, Deep learning,

Osamah Salman, Sema Çayır, Mustafa Melikşah Özmen, Enes Açıkgözoğlu

Alzheimer Hastalığının Erken Teşhisine Yönelik Uzman Sistem Geliştirilmesi

Abstract: 1990 yılların başından itibaren internet kullanımının hızla yaygınlaşması sonucunda ortaya çıkan büyük veri yığınlarının oluşmasına neden olmuştur. Oluşan bu veri yığınlarının değerlendirilerek anlamlı sonuçlar ortaya çıkarılması oldukça önemli bir durum haline gelmiştir. Bu veri yığınlarını analiz etmede yapay zeka teknolojilerinin kullanımı da bu veri artışına paralel olarak önemli ölçüde artmıştır. Yapay zeka uygulamaları sağlık, eğitim, savunma sanayi, askeri sistemler, mühendislik gibi bir çok alanda sıklıkla kullanılmaktadır. Yapay zekanın önemli kullanım alanlarından birisi de sağlık alanıdır. Sağlık sektöründe hastalıkların erken teşhisinde, diş hastalıklarının tespiti gibi bir çok alanda yapay zeka teknolojileri kullanılarak insana özgü hatalarının en aza indirilmesi hedeflenmektedir. Gerçekleştirilecek olan akademik çalışmada özellikle yaşlılarda sıklıkla görülen Alzehiemer hastalığının erken tespiti için bir çalışma gerçekleştirilmiştir. Alzheimer hastalığı, nörodejeneratif bir hastalık olup özellikle yaşlı bireylerde görülen ilerleyici bir bilişsel bozukluktur. Hastalık, beyin hücrelerinin zamanla hasar görmesi ve fonksiyonunu yitirmesi sonucu ortaya çıkan bir hastalıktır. Bu durum, bilişsel yeteneklerin (hafıza, düşünme, dil becerileri vb.) kaybına neden olmaktadır. Alzheimer hastalığının ana belirtisi hafıza kaybıdır, ancak zamanla daha karmaşık bilişsel işlevler de etkilenebilir. Alzheimer hastalığının erken teşhisi büyük önem taşımaktadır çünkü erken dönemde teşhis edildiğinde daha etkili tedavi ve yönetim stratejileri uygulanabilir. Çalışmada açık erişimli bir internet sitesinden (kaggle) elde edilen veri setleri kullanılmıştır. Veri seti üzerinde farklı yapay zekâ yöntemleri kullanılarak alzheimer hastalığının erken teşhisine yönelik bir uzman sistem geliştirmesi hedeflenmiştir.

Keywords: Alzheimer hastalığı erken Teşhisi, Yapay zeka, Uzman sistem, ,

Sema Zergeroğlu , M. Erkan Sarı, M.Cengiz Taplamacıoğlu, Özlem Alpay, M.Ali Akcayol

Analysis of Cervical Neoplasia With Artificial Intelligence

Abstract: Cervical cancer is the second cancer that is the most common one and causes death in women after breast cancer, but it is a type of genital cancer which can be prevented by early diagnosis with screening tests. Most of the cervical cancers (%99.7) is related to the Human Papilloma Virus (HPV), and today it is known that HPV must definitely exist for the development of cervical cancer. Actually, HPV-16 and HPV-18 have been found positive in %70 of the patients. In this study, data on the cervical cancer-HPV relationship, dysplasia and cancer development rates have been analyzed using retrospectively investigated artificial intelligence techniques. This study has been carried out with 1147 patients selected from a total of 2850 patients aged 20-59 years, who applied to the Department of Obstetrics and Gynecology of the University of Health Sciences (SBU) Ankara Training and Research Hospital between in Turkey between June 2018 and June 2020. The clinical information in the file of each selected patient has been-queried, all cases have been examined by the same obstetrician and pap test has been performed. The Pap test has been re-evaluated by the same specialist pathologist using the Bethesta (2001, modified 2014) System. In addition, the results of HrHPV DNA (HPV types 16,18,31,33,35,39 ,45,51,52,56,58,59,66,68) tests performed to the patients included in the study have been reviewed. The results of the patients who were found to have Low Grade SIL (LGSIL) and High Grade SIL (HGSIL) cancer findings in the Pap test and underwent HPV DNA analysis, and other data in the file information were interpreted with artificial intelligence techniques. It has been found that of 1147 patients, 147 have LGSIL, 165 have HGSIL, and 97 have cervical cancer. It has been observed that there has been the highest incidence of LGSIL, HGSIL and cancer in the 30-39 age group while the rate of these diseases is lower in the 50-59 age group compared to other groups. In addition, all patients with SIL and cancer are smokers. 231 of 1147 patients have positive HPV DNA test. The highest positive HrHPV DNA has been seen in 90 patients aged 30-39 years. In 71 of 97 patients with cervical cancer HrHPV DNA positivity has been reported. Moreover, in this study using artificial neural networks it has been measured that the accuracy value is %95, the precision value is %100, the recall value is %92 and the F1-Score value is %96.

Keywords: Cervix Cancer, HPV, Artificial Intelligence, ,

Ercüment Güvenç, Gürcan Çetin, Mevlüt Ersoy

Derin Öğrenme Yöntemleri Kullanılarak Gerçek Mr Görüntülerinden Sentetik Görüntülerin Üretilmesi

Abstract: Günümüzde insan vücudundaki dokularda ve organlarda ortaya çıkan çeşitli hastalıkların teşhisi için farklı teknolojik yöntemler kullanılmaktadır. Bunlardan en önemlileri Bilgisayarlı Tomografi (BT) ve Manyetik Rezonans (MR) görüntüleme teknikleridir. MR görüntüleme işlemi ile insan vücudundaki dokularda yer alan tümörlü bölgelerin büyüklüğü ve şekilleri ortaya çıkartılabilmekte ve uzman yardımıyla tümörün çeşidinin yanında iyi veya kötü huylu olduğu da tespit edilebilmektedir. Bu noktada uzmanlara destek olması amacıyla çeşitli derin öğrenme tabanlı bilgisayar yazılımları geliştirilerek doku üzerindeki tümörlü bölgelerin yüksek doğrulukla işaretlenmesi sağlanmaktadır. Derin öğrenme ile yapılan çalışmalarda kullanılan görüntü verilerinin eksikliğinden ötürü bu alandaki çalışmalarda da doğal olarak bir kısıt ortaya çıkmaktadır. Bu çalışmalardaki görüntü verilerinin eksikliğinin giderilmesi için çeşitli görüntü işleme teknikleri kullanılarak veri çoğaltma yöntemlerinin yanında derin öğrenme yöntemleri ile de görüntü çoğaltma işlemleri gerçekleştirilebilmektedir. Hazırlanan bu çalışmada beyin MR görüntülerinden tümörlü bölge tespiti yapmak için hazırlanan derin öğrenme modellerinin eğitimi aşamasında kullanılacak veri setinde yer alan MR görüntülerinin çoğaltılmasında kullanılan yöntemlerden bahsedilmiş ve yöntemlerin performanslarına değinilmiştir. Hazırlanan çalışmada derin öğrenme yöntemlerinden Üretken Çekişmeli Ağlar (GAN) kullanılarak beyin MR görüntüleri çoğaltılmış ve sentetik görüntüler ortaya çıkartılmıştır. Ortaya çıkan MR görüntüleri çeşitli ön işlemlerden geçirilerek kullanılır hale geldikten sonra veri setinde yer alan gerçek MR görüntüleri ile Frechet Inception Distance (FID), Mean Squere Error ve Öklit Mesafesi gibi metrikler kullanılarak karşılaştırılarak benzerlik oranları hesaplanmıştır. Benzerlik oranlarına bakılarak sonuç olarak uygun görüntüler veri setine eklenmiş ve veri setinin genişletilmesi sağlanmıştır.

Keywords: Derin Öğrenme, Görüntü İşleme, Üretken Çekişmeli Ağlar, ,

Vladimir Obradović, Sara Stojiljković, Marija Todorović

the Impact of Emotional Intelligence on Students With Extracurricular Activities and Regular Students

Abstract: This paper examines the relationship between extracurricular activities among students and the emotional intelligence that influences them. It starts from the premise that students who engage in extracurricular activities also develop motivation, social skills, and empathy, whereas regular students may lack these competencies or have them to a lesser extent. The methodology used in the study involves a questionnaire consisting of generic questions such as gender, years of study, employment status, and a set of questions that assess emotional intelligence, including self-awareness, self-regulation, motivation, empathy, and social skills. The hypothesis posited is that students who participate in extracurricular activities during their studies, particularly those involving project management, develop well-rounded competencies related to social skills, empathy, and motivation, consequently leading to enhanced emotional intelligence. By analyzing the collected responses, it was observed that these competencies are more pronounced and prevalent among the first group of students compared to regular students. The expected contribution of this study is to motivate students to engage in extracurricular activities during their studies, thereby enhancing their emotional intelligence competencies. Findings could be usefull to HR managers and HR departments for recruiting and development of young talents. Additionally, it serves as a foundation for further research in this field.

Keywords: Emotional intelligence, Competencies, Research, Students, Project

Emre Özakyıldız, Oğuzhan Menemencioğlu, Adib Habbal,

an Attempt for Full-stack Prıce Comparator Websıte

Abstract: After the pandemic, e-commerce has become a paramount priority for cus-tomers. The price of a product of the same size varies dramatically across different e-commerce retailers. This study aims to develop a user-friendly price comparison website using Jsoup, state-of-the-art web scraping tech-niques. The proposed platform gathers data from well-known retailers, ana-lyzes the data to extract product information, and presents it to consumers in real time when needed. The collected data includes product names, prices, images, and customer comments in their raw form. The derived information includes unit prices of the products. Furthermore, to assist users in determin-ing product prices, the platform showcases trending data, economical choic-es, products that offer the best value per unit, and highly rated items. By me-ticulously analyzing various product attributes, the platform identifies mean-ingful patterns and correlations by using SVD algorithm. This approach ena-bles the platform to provide users with informed product recommendations based on product attributes and current market trends. Users can find both the most affordable product and the recommended option based on other us-ers' reviews. On the other hand, users can avoid the emotional distress of purchasing a product at a higher price than what the marketplace offers. As a result, users are empowered to make more informed purchasing decisions, benefiting from the comprehensive analysis conducted by the platform. The paper compares the performance of current hands on and literature attempts. Although the limited domain is covered in the market, promotional results are satisfied.

Keywords: Price Comparison Website, Crawler, Scraper, Artificial Intelligence, Machine Learning

Mohamed Ali Hajji, Mohamed Ali Hajji

Solving Differential Equations using Neural Networks

Abstract: Solving differential equations is a fundamental task in various scientific and engineering domains, enabling the study of dynamic systems, and predicting their behaviors in the future. Traditional numerical methods, while some of them are effective, can become computationally expensive and challenging to implement for complex and high-dimensional systems. Many of them do not provide approximate analytic solutions. In recent years, neural networks, a subset of machine learning and artificial intelligence, has caught the attention of many researchers for its ability to approximate solutions to differential equations in a data-driven manner. This paper explores the use of neural networks for solving differential equations. The neural network architecture can be of many types: feed-forward (FF), convolutions neural networks (CNNs) or even recurrent neural networks (RNNs). In this work, we focus on using FF neural networks (FFNNs) for their ability to approximate any function to any desired accuracy and their simplicity and ease of implementation. Neural networks learn from provided data to approximate solutions and can handle complex and nonlinear differential equations in any dimension. In contrast to many existing numerical methods, FFNNs can provide analytic approximate solutions whose validity can extend beyond the span of the training data and satisfying physical constraints of the problem. The simulations of complex differential equations show that FFNNs as physics-informed networks can provide accurate analytic solutions which cannot be obtained by other techniques.

Keywords: Neural Networks, Artificial Intelligence, Machine Learning, Physics-Informed Neural Networks, Differential Equations

Süleyman Kesik, Cevriye Altıntaş

Development of a Hyper-heuristic Algorıthm for Vehıcle Routıng Problem In Mılıtary Logıstıcs Dıstrıbutıon

Abstract: Today's war tactics and strategies are planned for the use of smart weapons (artificial intelligence supported) rather than human power. Military software areas together with the "Information Age" or "Digital Age"; It is developing as new weapons, land warfare systems, communication systems, advanced optics and laser, image processing systems, manned or unmanned robot technology based on artificial intelligence. Developments in these areas significantly improve the security systems of countries and cause different countries to develop extreme strategies instead of traditional war strategies. In this study, a vehicle routing and depot management system was developed to enable easy procurement of ammunition for soldiers based on the ammunition shortage they encounter during operations. Google Maps API was used for mapping and determining the soldier's location, Roboflow API was employed for learning and processing the physical conditions of the current location, and C# along with Microsoft SQL Server programs were utilized for the development of the web application. The application consists of two stages. In the first stage of the application, an aerial vehicle is employed to determine the physical conditions (mountainous, forested, road, water, etc.) of the soldier's geographical location. The obtained images are transferred to the web application developed in the ASP.NET environment. These transferred images are then processed by the artificial intelligence trained with supervised learning according to the YOLO architecture using the RoboFlow API, classifying and identifying the physical conditions. In the second stage of the application, optimal results are achieved using hyper-sensory algorithms created with C# and Microsoft SQL Server programs based on the information received from the web application for the routing process. Based on the obtained results, the necessary routing process is performed

Keywords: Military Operations, Resource and warehouse management, Hyper-heuristic Algorithms, YOLO, Routing

Seda Sahın, Cemil Yıldız, Asiye Bükre Çay, Hatice Tuba Sanal

Automatic Classification of Elbow Fractures In Children using Deep Learning Methods

Abstract: The development and effective use of Artificial Intelligence-based medical decision support systems has a great importance in the diagnosis and treatment algorithms of musculoskeletal disorders. In recent years, increasing number of studies on the application of Machine Learning and Deep Learning methods which are related with clinical decision support systems for child and adult fracture diagnosis. According to studies, automatic detection of bone fractures is more difficult than adults due to growth lines of the children bones. The effective usage of Machine Learning and Deep Learning Methods have a big role on accurate and reliable detection of child bone fractures. Also, the optimum detection of these fractures can be increased with the application of enhancement and preprocessing methods on the related images. In this study, child elbow fracture images are used and 4 different data sets are created by using CLAHE and data augmentation methods are applied on these images. Also, it can be seen that F1-score is increased after these preprocessing methods. In this study, using different Deep Learning models such as InceptionResNetV2 and Xception for child elbow fractures are applied to detect automatically. In conclusion, new clinical decision support system has been developed that can help physicians to diagnose before the treatment plans.

Keywords: Artificial Intelligence, Machine Learning, Deep Learning, Orthopaedics and Traumatology, Musculoskeletal Trauma

Seda Sahin, Cemil Yıldız, Merve Ince, Hatice Tuba Sanal

Classifying Hip Dislocation In Children With Cerebral Palsy using Machine Learning Algorithms

Abstract: This study focuses on the utilization of Machine Learning algorithms which are the important branches of an Artificial Intelligence research field for the automatic diagnosis of hip dislocation in children with Cerebral Palsy (CP). CP is a neurological disorder caused by damage to the areas of the brain responsible for controlling motor functions, leading to difficulties in muscle coordination and movement control. Individuals with CP may encounter challenges in performing daily activities such as walking, balance, and coordination. Hip dislocation is a common issue among CP patients, and early detection is crucial for the success of treatment options. However, manually diagnosing hip dislocation is a time- consuming process that requires expertise. In this study, a Machine Learning model has been developed to automatically diagnose hip dislocation in CP X-ray images. The model has been designed to classify hip dislocation into two categories: normal and dislocated which are based on X ray images and some Machine Learning algorithms are used for the accurate, reliable, sensitive classification of these categories. The results demonstrated that the developed model achieved high accuracy rates in automatically diagnosing hip dislocation. This study can be used as a potential tool to aid in the early diagnosis of hip dislocation in CP patients.

Keywords: Artificial Intelligence, Machine Learning Algorithms, Cerebral Palsy, Hip Dislocation , CP patients

Seyitali Ilyas, Yalçın Albayrak

Akıllı Kavşaklarda Trafik Hacmi Tahmini Için Makine Öğrenmesi Modellerinin Karşılaştırılması

Abstract: Modern şehirlerin artan nüfusu ve hareketliliği, ulaşım sistemlerinin verimli yönetimini gittikçe daha kritik hale getirmiştir. Bu bağlamda, dijital ikiz kavramı, fiziksel dünyanın dijital bir yansımasını oluşturarak karmaşık sistemleri anlamak, yönetmek ve optimize etmek için güçlü bir araç haline gelmiştir. Ulaşım da bu alanlardan biridir ki akıllı kavşaklar gibi teknolojik altyapılar sayesinde büyük miktarda veri toplanmakta ve bu verilerle dijital ikiz mimarisinin önemli bir unsuru olan tahmin modelleri oluşturulmaktadır. Ayrıca trafik yönetim sisteminin sinyalize kavşakta oluşabilecek bağlantı kopma arızası, bakım, onarım ve benzeri sebeplerle akıllı kavşak özelliğini kaybedip sabit zamanlı sinyalize kavşak olarak çalışması durumunda trafik hacmi tahmin modeli sonuçları üzerinden operatörler daha verimli sinyal süresi en iyilemesi gerçekleştirebilmektedir. Bu çalışma akıllı kavşaklarda trafik hacmi tahmini uygulamalarında daha etkili ve doğru sonuçlar elde etmek için hangi modelin seçilmesi gerektiğine dair akademik bir anlayış sunmayı amaçlamaktadır. Bunun için Antalya'da bulunan seçilmiş iki akıllı kavşağın her bir geliş kolu için saatlik araç sayım verileri kullanılmıştır. Bu veriler eğitim ve test verisi olarak ayrılmış olup Lineer Regresyon, Polinomal Regresyon, Destek Vektör Regresyonu (SVR) ve Rastgele Orman Regresyonu tabanlı makine öğrenmesi modelleri oluşturulmuştur. Böylece akıllı kavşaklarda her bir kol için trafik hacmi tahmini yapılmıştır. Ortalama Mutlak Hata (MAE) ve En Küçük Kareler (R Kare) yöntemleri ile tahmin modellerinin performans karşılaştırması yapılmıştır. Buna göre Rastgele Orman modelinin diğer önerilen modellere göre daha başarılı performans göstermiş olduğu görülmüştür.

Keywords: Akıllı Kavşak, Dijital İkiz, Büyük Veri, Makine Öğrenmesi, Trafik Hacmi Tahmini

Yunus Hınıslıoğlu, Enes Kaymaz, Uğur Güvenç

Fitness Distance Balance Based Kepler Optimization Algorithm

Abstract: Meta-Heuristic Search (MHS) algorithms are methods that continue to be popular and continue to be developed day by day in solving complex and high-dimensional global optimization problems. Kepler Optimization Algorithm (KOA) is a new physics-based MHS algorithm inspired by Kepler's laws of planetary motion to predict the position and velocity of planets at any given time. In the optimization process of the KOA, the position of each planet represents a possible solution candidate, while the best solution is expressed as the sun. Obtaining the best solution using MHS algorithms in any optimization problem depends on avoiding the local solution traps in the search space. The balance between exploration and exploitation is crucial for the diversity of solution candidates. In achieving this balance, the success of the search process depends on the reference position of the solution candidates determined by the selection method. Fitness Distance Balance (FDB) is an effective selection method for determining the reference positions that guide the search process. Using the FDB selection method, solution candidates with the highest potential to improve the search process in the population are obtained. In this study, a new FDBKOA is presented using the FDB selection method in order to increase the performance of the KOA, avoid local solution traps, and develop the global optimum solution. Then, improved FDBKOA is compared with KOA in solving four challenging benchmark problems such as CEC 2014, CEC 2017, CEC 2020, and CEC 2022 for different problem types and sizes. When the results obtained are evaluated, it is seen that the FDB method increases the performance of KOA, and the FDBKOA algorithm gives more effective solutions than KOA in experimental studies.

Keywords: Fitness Distance Balance (FDB), Kepler Optimization Algorithm (KOA), Meta-Heuristic Search (MHS) Algorithm., ,

Hamit Armağan, Ersin Atay

Matematiksel Modelleme Yöntemleri İle Elmada Verim ve Vejetatif Gelişimin Tahmin Edilmesi

Abstract: Bu çalışmada matematiksel modelleme yöntemleriyle elma ağaçlarında verim ve vejetatif gelişim tahmin edilmesi amaçlanmıştır. Çalışma Göller Yöresinde bulunan ticari bir elma bahçesinde 'Golden Reinders' cinsi elma ağaçlarında yapılmıştır. Bahçe tesisini takiben toplamda 15 ağaç belirlenmiş ve 7 yıl boyunca aynı ağaçların verim ve gövde çapı değerleri ölçülmüştür. Elde edilen verilerden matlab programı kullanılarak matematiksel modelleme algoritmalarıyla bahçenin ekonomik ömrünü kapsayacak şekilde verim ve vejetatif gelişim tahminleri yapılmıştır. Sonuçların karşılaştırmalı olarak değerlendirildiği çalışmada, yüksek belirleme katsayısı ($R^2 > 0.97$) gösteren bazı modeller ön plana çıkmıştır. Bu tarz modelleme çalışmalarıyla bahçe potansiyel veriminin güvenilir bir şekilde olabildiğince erken dönemde tahmin edilebilmesi, gıda arz-talep dengesinin oluşturulabilmesine katkı sağlayacaktır.

Keywords: Anahtar Kelimeler: makine öğrenmesi, Malus x domestica, regresyon, hasat verimi,

Hamit Armağan

Doğrusal Olmayan Regresyon Modellerinde Parametre Optimizasyonu ve Uygulaması

Abstract: Çalışmada; elma ağaçlarından toplanan yaprakların laboratuvar ortamında kimyasal yöntemlerle tespit edilen potasyum değerinin görüntü işlemeye dayalı doğrusal olmayan regresyon modelleri kullanılarak tahmin edilmesi amaçlanmıştır. Çalışmada kullanılan yapraklar Burdur ilinde yer alan ticari bir elma bahçesinden toplanmıştır. Yaprakların fotoğrafları kapalı ortamda sabit ışık altında çekilmiştir. RGB renk uzayı kullanılarak görüntülerin sayısallaştırılması yapılmıştır. Sayısallaştırma ve hesaplama işlemlerinde Matlab, R ve excel programları kullanılmıştır. Laboratuvar ortamında yapraklardan elde edilen potasyum ölçüm değerleri ve yaprak görüntülerinin sayısallaştırılmasından elde edilen veriler kullanılarak regresyon amaçlı modellenmiştir. Çalışmamızda k en yakın komşu (kNN), destek vektör regresyonu(svr) ve yapay sinir ağları (ysa) olmak üzere farklı modelleme algoritmaları kullanılmıştır. Modellerin en iyi potasyum değerini tahmin etmesi için modelde kullanılan parametre/parametreler üzerinde optimizasyon yapılmıştır. Kriter olarakta hata yaklaşım değerlerinin (rmse) en küçük olduğu noktalar alınmıştır. Standart parametreler ile çalışan algortimalar ile parametre optimizasyonu yapılmış algoritmalarda rmse değerinde azalma, R2 değerinde artış sağlanmıştır. Bu değerler hata miktarının azaldığını üretilen modellerin verileri temsil yeteneğinin artışını göstermektedir. Veriye dayalı olmayan yada hatalı veriye dayanan uygulamalar sonucunda kullanılan kimyasallar toprağın ve çevrenin gereksiz kirletilmesine, ekonomik olarak maliyetlerin artmasına ve iş gücü kaybına neden olmaktadır. Görüntü işleme tabanlı modeller kullanılarak bitkilerin beslenme durumunun doğru tespiti ile bahçe yönetim ve üretim etkinliğini artırılabilir.

Keywords: Anahtar Kelimeler: makine öğrenmesi, regresyon, potasyum, ,

Yasemin Şimşek Türker, Şemsettin Kılınçarslan

Prediction of Rotational Properties of Column-beam Connections Reinforced With Various Frp Polymers using Ann

Abstract: Traditional repair techniques rely on mechanical joints, which may not be effective for repairing damaged timber. Steel components used in joints are susceptible to corrosion, and aluminum plates are not heat-resistant. Material recycling also presents challenges in these methods. Notably, a significant problem arises from the mismatch in hardness between steel and wood, resulting in a weak interface. Consequently, there has been a recent emphasis on the use of non-metallic fasteners. Composites, a class of materials with enhanced properties achieved by combining different materials with compatible interfaces, have gained widespread application. Fiber Reinforced Polymers (FRP) within this category have witnessed substantial use in recent years due to their superior attributes. FRP materials bolster the resilience of the host material, resist material erosion, and facilitate cost-effective, swift on-site applications, thereby reducing long-term maintenance expenses. Consequently, researchers propose that the application of fiber-reinforced polymers to beams could offer viable solutions to these challenges. In this study, 130x130 mm column and 130x260 mm beam were used. The column-beam connection was made with Alumidi connection element. Column-beam connection areas are reinforced with carbon, glass, aramid and basalt. Then, the rotational properties of the column-beam connection areas were examined experimentally. The data obtained as a result of the experimental examination was predicted with artificial neural networks (ANN). The values obtained as a result of the rotation behaviors as a result of the prediction with artificial neural networks were estimated with high accuracy.

Keywords: Column-beam, Connection, FRP, ANN, Rotational properties

Büşra Güler, Müslim Güler, Volkan Uslan, Hüseyin Şeker, Okan Yaşar

Predıctıng, Profılıng and Analysıng Burnout of Nursery Staff

Abstract: Nursery teachers play a crucial role not only in the educational growth of young children but also in their emotional and social development. Nursery teachers often suffer from burnout due to the demanding nature of their role, as they are tasked with taking care of young children's development during a critical phase of growth. The combination of emotional labor, managing large class sizes, and the need for constant attention to the children's needs often contributes to the high level of stress and fatigue. In this study, Maslach Burnout Inventory-Educators Survey (MBI-ES) was administered to 105 nursery teachers located in the city of Istanbul, Türkiye. Any responses that were found to be incomplete or misleading were excluded from the study and various statistical and machine learning methods were performed on the remaining MBI-ES data collected (100 participants). The predictions, profiles and analysis revealed significant insights into the specific factors (emotional exhaustion, depersonalization, and personal accomplishment) contributing to burnout. Nursery teacher burnout is a very complex issue; however, the insights derived from this study provide a framework for interventions specific to nursery teachers to understand, address and support them in their profession, in the hopes of enabling supportive kindergarten teaching environment.

Keywords: Maslach Burnout Inventory-Educators Survey, Nursery Teacher Psychology, Teacher Burnout, Statistical Analysis,

Emre Alagöz, Yasin Mert Şahin, Kevser Özdem, Ahmet Orkun Gedik, M. Ali Akcayol

Log Anomaly Detectıon In Applıcatıon Servers Usıng Deep Learnıng

Abstract: ÖZET Log anomali tespiti günümüzde kullanılan büyük ölçekli ve dağıtık sistemlerin yönetiminde önemli rol oynamaktadır. Log analizinin kısa sürede ve yüksek doğruluk oranıyla yapılması gerekmektedir. Bu çalışmada, büyük ölçekli sistemlerdeki uygulama sunucularının log verileri kullanılarak anomali tespiti için derin öğrenme tabanlı bir model geliştirilmiştir. Öncelikle log verileri üzerinde ön işlemler yapılmış ardından ayrıştırma ve gruplandırma işlemleri gerçekleştirilmiştir. Elde edilen veriler iki gruba ayrılarak geliştirilen derin öğrenme modelinin eğitimi ve test işlemleri gerçekleştirilmiştir. Deneysel çalışmalardan elde edilen sonuçlarda geliştirilen modelin anomali verilerinin %93'ünü başarılı bir şekilde tespit ettiği görülmüştür. ABSTRACT Log anomaly detection is vital in managing large-scale and distributed systems used today. Log analysis must be done in a short time and with high accuracy. In this study, a deep learning-based model has been developed for anomaly detection using log data from application servers in large-scale systems. First, pre-processing was carried out on the log data, and then parsing and grouping were carried out. The obtained data were divided into two groups, and the training and testing of the deep learning model developed were carried out. The results obtained from the experimental studies showed that the developed model successfully detected 93% of the anomaly data.

Keywords: Log analysis; Anomaly detection; Log parsing; Deep learning; Recurrent Neural Network, , , ,

Yasemin Şimşek Türker, Şemsettin Kılınçarslan

Effect of the Wrapping Layers Number and Length on the Flexural Properties of Chestnut Beams Reinforced With Frp

Abstract: Traditional wooden structures often face deterioration from fungi and insects due to elevated levels of humidity and temperature. When wood beams suffer damage, the typical approach has been either replacement or reinforcement with steel. However, there remains a pressing need to fortify and restore these structures, thus averting the necessity for demolition. The strengthening and rehabilitation of such existing wooden edifices have emerged as a focal point for numerous researchers. In recent times, Fiber Reinforced Polymers (FRP) composite materials have gained widespread traction in retrofitting endeavors for buildings and bridges. This can be attributed to their commendable attributes, including resistance to corrosion, lightweight nature, ease of manipulation and installation, as well as their impressive combination of high strength, elastic modulus, and robust resistance to environmental degradation factors. A multitude of researchers have successfully employed FRP composite materials in fortifying wooden members and structures. In this study, 120x120x1800 mm chestnut beams were strengthened 1, 2, 3 layers and 150 mm, 300 mm, 600 mm length with fiber reinforced polymer fabrics. Beams reinforced with fiber reinforced polymers were subjected to bending tests. As a result of the bending test, it was determined that the flexural properties of the beam increased as the number of layers increased in reinforcement.

Keywords: Beam, Chestnut, FRP, Layers number, Length

Ali Hakan Işık, Tuncer Akbay

Academıc Performance Classıfıcatıon: Use of Supervısed Learnıng Approach In Educatıonal Data Mınıng

Abstract: Measuring academic performance is one of the important study subjects in the field of education. Using artificial intelligence methods instead of traditional methods in the measurement process will increase the quality and effectiveness of measurement. Review studies in this field will enable readers to understand the literature in more detail. This study reviews the published studies that predict student performance or classify them into performance groups relying on different types of education-related data coming from diverse sources. This review study aims to determine the types of, sources of, and size of data used in educational data mining studies. It also aims to find out the distribution of supervised machine learning models, and tools/software used in educational data mining studies. In order to achieve these goals, 139 relevant publications (i.e., academic journal articles, and conference papers) are located in the Web of Science Citation Index database for review using some including/excluding criteria. Then, each paper is reviewed. The findings suggested that classification studies in educational data mining mostly relies on conventional machine learning algorithms using students' education record and course/learning activity logs as predominant features for predicting students' performance or classifying them into performance groups. This study can be expanded in the future by evaluating performance measurements in different areas.

Keywords: student performance, supervised learning, classification, prediction, educational data mining

Okan Dağ

Oecd Ülkelerinin İhraç ve İthal Edilen Ürün Gruplarına Göre Kümelenmesi

Abstract: Dünya, iletişimin ve taşıma teknolojilerinin gelişimiyle birlikte küresel bir pazar haline gelmiştir. Pazarın küreselleşmesiyle birlikte ülkeler doğal kaynaklar, maliyet, iklim koşulları, işgücü gibi çeşitli sebeplerden dolayı üretilemeyen veya yüksek maliyet gerektiren bazı ürünleri ithal edebildiği gibi uygun koşulların sağlanması halinde ülke sınırları içerisinde ürettikleri ya da geliştirdikleri ürünlerin ithalatını da gerçekleştirebilmektedir. Ülkeler bir yandan rekabet üstünlüğü bulunan ürün gruplarını sürdürülebilir bir yapıya kavuşturmak isterken; diğer yandan da göreceli üstünlüğü bulunmayan ürün gruplarını en uygun koşullar altında temin etmek için birtakım stratejiler geliştirmektedir. Bunun yanı sıra Dünya Ticaret Örgütü'nün de geliştirmiş olduğu stratejiler ile uluslararası ticaretin serbest ve şeffaf rekabet koşulları altında gerçekleştirilmesi ve dünya refah seviyesinin artması planlanmıştır. Yapılan bu çalışmada da ülkelerin ihraç ve ithal ettikleri ürün gruplarına göre kümelenmesi amaçlanmıştır. Çalışmada 37 ülkeden meydana gelen OECD ülkelerine ait veriler ele alınırken, analiz sırasında kullanılmış olan veriler Dünya Ticaret Örgütü'nden elde edilmiştir. Çalışmanın analizi sırasında sayısal veri yapısına uygun kümeleme algoritmaları kullanılırken, OECD ülkelerinin kümelenmesi sırasında en uygun sonucu veren Beklenti Maksimizasyonu algoritmasından yararlanılmıştır. Beklenti Maksimizasyonu algoritmasına göre yapılan analiz neticesinde ülkeler ihracat ve ithalat bakımından dört kümeye ayrılmıştır. Yapılan analiz sonucunda elde edilen bulgulara bakıldığında Türkiye'nin, ihraç edilen ürün gruplarına göre yapılan kümeleme işleminin ardından Küme 2'de; ithal edilen ürün gruplarına göre yapılan kümeleme işleminin ardından ise Küme 0'da yer aldığı görülmüştür.

Keywords: İthalat, İhracat, Kümeleme, OECD, Beklenti Maksimizasyonu

Laura Lasaite

Ethical Considerations and Challenges of Aı Adoption In Project Management

Abstract: Emerging technologies have never been ethically neutral, and there is a growing public concern regarding their ethical implications. Deloitte has recognized the importance of ethical considerations in driving digital transformation. While traditional ethical principles have stood the test of time, there is a pressing need to examine their relevance in our increasingly digital world. Global leaders such as the World Economic Forum, alongside professional organizations, are actively conducting surveys to gauge the impact of ethics on corporate governance. UNESCO has issued warnings about the crucial ethical dimension associated with AI while introducing the 'Recommendation on the Ethics of Artificial Intelligence'. The ethical dimension of AI is also gaining traction in the project management environment. According to the Project Management Institute (PMI) survey, AI is reshaping project management, with 81% of professionals acknowledging its impact. Furthermore, Gartner predicts that AI will significantly reduce the project management workload by 80% by 2030. To delve deeper into the ethical considerations and challenges linked to AI adoption in project management, the author conducted a survey. However, the question remains: Is this alone sufficient to ensure a sustainable and ethical digital future? To explore this, the author conducted a survey aimed at assessing the current state of ethics in the digital realm, the extent of AI usage in project environments, and the ethical considerations accompanying its implementation. Drawing insights from the feedback of 66 survey participants, this paper outlines key findings and hints at potential avenues for further research. The robust representation of respondents (55% out of 66) with backgrounds in project environments significantly bolsters the survey's reliability and credibility. Beyond highlighting the ongoing relevance of ethical concerns, the survey underscores the pressing need for heightened ethical awareness. It also underscores the necessity of addressing ethical dilemmas associated with AI usage, emphasizing the pivotal role of project leaders in adopting AI in their projects. Additionally, the survey sheds light on a specific group of respondents, predominantly females, who exhibit limited knowledge or interest in project management, ethics, or AI. This observation prompts an exploration of gender-related factors and underscores the importance of tailored educational campaigns aimed at increasing awareness and fostering female inclusion in project management, AI, and ethics-related discussions.

Beibit Abdikenov, Merey Orazaly, Akzhurek Askarbek, Serik Omirbayev, Andrii Biloshchytskyi, Abay Aryn, Sapar Toxanov

Design and Development of a System for Wagon Uıc Numbers Recognition.

Abstract: In recent years, with the augmentation of various industries, such as transportation and logistics, the significance of recognising UIC (Union Internationale des Chemins de fer) numbers on wagons has grown. Accurately identifying and tracking these numbers is crucial for managing and maintaining a railway fleet. It can be difficult to achieve high recognition results due to several factors such as varying lighting conditions, blurrying, and image distortion. To address these challenges, we propose a two-stage approach using You Only Look Once v5, a cutting-edge object detection algorithm and Vision Transformer Network for object recognition. In the first stage, the detector locates the region containing the wagon number, and the image is then cropped based on the predicted bounding box. In the second stage, another detector recognizes the digits that make up the wagon number in the cropped image. This two-stage approach helps to simplify the recognition problem and improves the accuracy of wagon number recognition. The proposed system was tested on a collected dataset and achieved a recognition accuracy of over 91%, demonstrating its potential for use in real-world railway applications. The results of the research suggest that the proposed system can be a valuable tool for improving the efficiency and safety of railway operations.

Keywords: Wagon numbers recognition, YOLOv5, Object detection, Deep Learning, Vision Transformer Network.

Mustafa Burak Ürün, Prof.Dr. Yusuf Sönmez

Saldırı Tespit Sistemleri için Topluluk Makine Öğrenmesi Yaklaşımları

Abstract: Teknolojinin yaygın kullanımı ve internetin gelişimi, ilerlemenin yanı sıra yeni güvenlik risklerini de beraberinde getirmiştir. Siber saldırıları tespit etmek ve önlemek giderek zorlaşmakta, bu da siber güvenlik hizmetlerinin devamlılığına zarar verebilmektedir. Başarılı bir saldırı, kuruluşlar için veri ihlalleri, itibar kaybı ve operasyonlarda aksamalar gibi ciddi sonuçlara neden olabilir. Saldırı Tespit Sistemleri (STS) ağları güvende tutmak için verileri analiz eden algoritmalar kullanmaktadır. Makine öğrenmesi modelleri bir güvenlik ihlaline işaret edebilecek olağandışı etkinlikleri ve kalıpları tespit edebilme yetenekleri nedeniyle saldırı tespit sistemlerinde sıklıkla kullanılmaktadır. Bu modeller, olası tehditleri tespit etmeye yardımcı olmak için ağ günlükleri, paket trafiği ve kullanıcı davranışı gibi kaynaklardan gelen verileri analiz edebilir. Topluluk öğrenme modelleri, karmaşık gerçek dünya problemlerini kavrayıp çözebildikleri için sıklıkla kullanılmaktadır. Bu tür konulardaki etkinlikleri göz önüne alınarak daha iyi tespit sistemleri oluşturmak için topluluk modellerinin uygulanması akademisyenler tarafından araştırılmıştır. Topluluk öğrenmesi, varyansı azaltmak için torbalama, yanlılığı azaltmak için güçlendirme veya tahminleri geliştirmek için yığma gibi yöntemler kullanarak birkaç makine öğrenmesi modelini tek bir tahmin modelinde birleştirmektedir. Bu teknik, saldırıları tanımlama doğruluğunu artırma, yanlış alarm oranlarını düşürme ve bireysel sınıflandırıcılara kıyasla genel performansı artırma gibi birçok avantaj sağlamaktadır. Saldırı tespit sistemleri kapsamında, topluluk öğrenme yöntemleri tekil sınıflandırıcılara kıyasla üstün performans göstermektedir. Bu makale, yaygın topluluk makine öğrenmesi tekniklerini gözden geçirmeyi ve saldırı tespit sistemlerinde kullanılan farklı topluluk makine öğrenmesi algoritmalarını karşılaştırmayı amaçlamaktadır.

Keywords: saldırı tespit sistemleri, topluluk makine öğrenmesi, güçlendirme, torbalama, yığma

Hilal Kartal, Mevlüt Ersoy,

Ses Verilerinin Metin Verilerine Dönüştürülmesinde Kullanılan Teknolojilerin İncelenmesi

Abstract: Konuşmanın hayatımızdaki, insan iletişimindeki yeri yadsınamayacak düzeyde önemlidir. Gelişen teknoloji ile birlikte konuşma artık yüz yüze düzeyden çıkmış, elektronik ortamda da önemli bir yer edinmiştir. Konuşma düzeyinde kalmak ile yetinmeyip ses verisini metin verisine dönüştürerek veya tam tersi metin verisini ses verisine dönüştürerek ilk kullanımdan bugüne kadar olan bu süreçte konuşma tanıma alanında birçok teknolojik gelişme gerçekleşmiştir. Bu gelişme insan bilgisayar etkileşimi açısından önemli bir yere sahiptir. Konuşma Tanıma veya Otomatik Konuşma Tanıma olarak isimlendirilen bu teknoloji ses dalgalarını metin verisine dönüştürmeyi sağlamaktadır. Günümüzde konuşma tanıma, sesli komutlarla çalışan elektronik sistemlerde, konuşmaya bağlı olarak işlem yapabilme özelliğine sahip uygulamalarda, konuşma verisine göre yapılan sınıflandırmalarda ve çözümlemelerde büyük ölçüde kullanılmaktadır. Akıllı bileklikler ve saatler üzerinden yaptığımız işlemler, sesli komut verdiğimiz otonom sistemler bu teknolojilerin günlük yaşamda en çok karşımıza çıkan örneklerinden birkaçıdır. Konuşmadan metne çevirmede ücretli ve ücretsiz açık kaynak kodlu birçok teknoloji bulunmaktadır. İhtiyaca göre bunların kullanımı, en uygun olanın hangisi olduğunu belirlemek önemli bir husustur. Otomatik Konuşma Tanıma (Automatic Speech Recognition (ASR)) Sistemleri, IBM Watson, Google Cloud Speech to Text, Mozilla Deep Speech gibi teknolojiler ile konuşma tanıma büyük ölçüde sağlanmaktadır. Bu çalışmada ses verisini metin verisine dönüştürmek için kullanılan teknolojilere ve bu teknolojilerin karşılaştırması yapılarak insan bilgisayar etkileşiminde ses verisini metne dönüştürmede en uygun olanının belirlenmesi amaçlanmıştır.

Keywords: ASR Systems, Automatic Speech Recognition, IBM Watson, Speech to Text, Mozilla Deep Speech

Ismail Serkan Üncü, Nabi Ibadov, Mehmet Kayakuş, Celal Alp Yavru, ,

Technologıcal Managements and Artıfıcıal Intellıgence Applıcatıons of the Applıcatıon of Constructıon Sıte Development Elements

Abstract: Artificial intelligence can be applied in many areas in the construction industry, such as data analysis, forecasting, autonomous systems and decision support tools. This increases throughput, reduces costs, increases throughput and contributes to sustainability. The construction industry closely follows the development of technological innovations and artificial intelligence programs. The potential of improvements at the construction site, provided by technological use and artificial intelligence, has the potential to increase the efficiency of construction, reduce costs and store work. The technological progress of construction site development factors and their outputs regarding artificial intelligence can be directly renewed with the sub-topics of big data and Analytics, project management and planning, building design and simulation, occupational safety and monitoring, automation and robotics, material and resource management and quality control and maintenance. Big Data and Analytics: The construction industry has huge amounts of data at work. This data can be used to evaluate the effectiveness of construction projects, manage resources and optimize processes. Artificial intelligence improves decision-making processes by analyzing this data. Project Management and Planning: Project management software is used to develop project planning and timelines. Artificial intelligence can turn these software into tools that can make better predictions and quick adjustments. Building Design and Simulation: Artificial intelligence and computer-aided design (CAD) can help optimize the building's design and increase energy efficiency. At the same time, building simulations provide information on energy consumption and sustainability. Occupational Safety and Monitoring: Wearable technologies for occupational safety are used to increase workers' safety and reduce risks. These technologies can detect dangerous situations using built-in sensors and artificial intelligence. Automation and Robotics: In construction processes, automation and robotic technologies can perform repetitive tasks and heavy work without relying on human power. Artificial intelligence can be used to better control these machines and increase efficiency. Material and Resource Management: Technologies such as RFID (Radio Frequency Identification), image processing and Qr code are used for supply chain management and material tracking. Artificial intelligence can be used to optimize inventory management and material sourcing. Quality Control and Maintenance: Artificial intelligence can be used to increase the sustainability of buildings and improve maintenance processes. For example, thanks to sensors, the condition of structures is monitored and maintenance needs are predicted.

Keywords: BİG DATA, Quality Control, efficiency of constructio, ,

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Determination of Gamma Radiation Levels of Dried Fruit and Vegetables

Abstract: Humans need food consumption to survive. Today, the effects of the fruits and vegetables we eat on our body are being investigated biologically. However, the radiation exposure taken from these foods to our body is not well known. Therefore, the radiation levels of these dried fruits and vegetables were determined with a special detector for approximately eight months in order to determine the level of gamma radiation from dried fruits and vegetables. Since our measurements are at hourly level, when we change 0.25 mSv/year hourly, the reference value is taken as $2.85 \times 10-5$ mSv/h. The dried fruits and vegetables in the experimental study are greenhouse tomato, organic tomato, rose petal, rose bud, lavender, apple, Jerusalem artichoke, bell pepper, bean, green pepper, cherry stalk, eggplant. Apart from these fruits and vegetables, gamma radiation levels were determined in the samples of sav soil and yalvaç soil. The data obtained from the measurements were examined graphically and it was determined that the highest gamma radiation was in Jerusalem artichoke and the lowest level was in organic tomatoes. The result obtained here is that the gamma radiation in fruits and vegetables grown in soil and underground is high. Thus, this study is important because the radiation taken into our body through food can cause various diseases and hereditary disorders. The absence of a previous similar study in this field in our country will serve as a reference for similar studies to be conducted in the future.

Keywords: Wheat, photosynthesis, decision tree, gini index,

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the Relevance of Artificial Intelligence In Project Management

Abstract: Artificial Intelligence (AI) and its underlying methodologies, such as genetic algorithms, fuzzy logic and neural networks have taken a prominent place in the transformation of organizational practices, thus also becoming indispensable components in projects and project-oriented organizations by enabling automation of repetitive tasks, accelerating productivity and ensuring strategic direction in achievement of project goals and enhancing overall project performance. To examine the extent of application and relevance of Artificial Intelligence in project management, the authors conducted a comprehensive literature review on 105 academic articles published between 1994 and 2023 and indexed in the Web of Science database. Bibliometric analysis based on keywords co-occurrence along with visual representation of interconnected data was used. The obtained results indicate key research trends in the field, which include project management and technologies within AI, optimization of project performance, application of neural networks, and forecasting project success with the help of AI. Additionally, the results point to new directions and highlight that project managers should focus on addressing barriers to AI adoption, managing complex adaptive systems, interpreting data provided by the system, making decisions and managing change, establishing comprehensive AI training programs, and facilitating progress together with promoting open strategies to encourage technology assimilation among employees.

Keywords: ARTIFICIAL INTELLIGENCE, PROJECT MANAGEMENT, BIBLIOMETRICS, LITERATURE REVIEW, FUTURE TRENDS

Mehmet Kayakuş, Mustafa Terzioğlu, Ayten Yağmur, Dilşad Erdoğan

Türkiye'deki Hafif Ticari Araç Satışlarının Makine Öğrenmesi Yöntemleriyle Tahmin Edilmesi

Abstract: Kamyonet, pikap, panelvan, minibüs gibi hafif ticari araçlar, özellikle ticaret ve hizmet sektörlerinde büyük miktarlarda kullanılan bir araç sınıfıdır. Bu araç sınıfına yönelik talepteki değişimler, ülkelerin ekonomik canlılığının da bir göstergesi olarak algılanmaktadır. Ayrıca Türkiye gibi gelişmekte olan ülkelerin hızlı büyüme oranları bu sınıf araçlara olan talebi artırmakta ve bu durum artan ithalatla birlikte dış ödemeler dengesini olumsuz etkilemektedir. Hafif ticari araç pazarı, binek otomobil pazarından farklı olarak satışların toplu alımlar şeklinde de gerçekleştiği bir pazardır. Dolayısıyla bu pazarda faaliyet gösteren firmaların etkin stok planlamaları yapmaları gerekmektedir. Bu çalışmada, makroekonomik bir gösterge olarak kabul edilen hafif ticari araç satış ve ithalatının tahmin edilmesinin, genel ekonomik göstergelerin değerlendirilmesine katkı sağlayacağı ve bu pazarda faaliyet gösteren otomotiv firmaları için mikro bakış açısıyla etkin kurumsal kaynak planlaması ve kaynakların verimli kullanılması açısından faydalı olacağı düşünülmektedir. Bu çalışmada tasarlanan satış tahmin modeli, literatürdeki önceki çalışmaların analiz edilmesi ve hafif ticari araç satışlarını etkileyebileceği düşünülen makroekonomik değişkenlerin modele dahil edilmesi ile oluşturulmuştur. Bu çalışmada tasarlanan satış tahmin modeli, literatürdeki önceki çalışmalar analiz edilerek ve hafif ticari araç satışlarını etkileyebileceği düşünülen makroekonomik değişkenler modele dahil edilerek oluşturulmuştur. Modelin tahmin başarısını ölçmek için yapay sinir ağı (YSA), çoklu doğrusal regresyon (MLR) ve karar ağacı regresyonu (DTR) olmak üzere üç makine öğrenmesi yöntemi kullanıldı. Çalışma sonucunda R2 değeri YSA için %94,6, ÇDR için %64,1 ve DTR için %82,2 olarak bulunmuştur. Elde edilen sonuçlara göre, Türkiye'deki hafif ticari araç satışlarının tahmini için tasarlanan modelin YSA yöntemi ile oldukça başarılı tahminler gerçekleştirdiği sonucuna varılmıştır.

Keywords: , , , ,

Mustafa Erol Keskin, Zaki Kareem Ahmed Abu Salam

Estımatıon of Meteorologıcal Parameters Usıng Data Drıven Methods

Abstract: In this study, 3 different methods were analyzed on time series analysis for the forecasting of temperature and precipitation data. Support Vector Machines (SVR), Random Forest, Long Short Term Memory Network, a specialized deep neural network model used for algorithm and time series analysis, from the maximum, minimum, average temperature and average precipitation data collected for 14 different provinces in the Eastern Anatolia Region of Turkey was used. Although the data used for the study differ for each province, it covers an average of 60 years of data. The successes of the algorithms used on the data sets were compared in the modeling made after the data preprocessing stages. The results obtained as a result of the analyzes showed that the studies on temperature estimation gave more positive results due to the large number of data. In the average precipitation data used in precipitation analysis, it was observed that the success of the models used was lower due to the low number of data. However, while it is seen that 3 models produce results close to each other in temperature data, Support Vector Machines come to the fore in general; In precipitation analysis, the LSTM model produced the most successful results.

Keywords: Time Series Analysis, Temperature Forecasting, Precipitation Forecasting, LSTM, Machine Learning

VladimirObradović, SaraStojiljković, Marija Todorović

The impact of emotional intelligence on students with extracurricular activities and regular students

Abstract: This paper examines the relationship between extracurricular activities among students and the emotional intelligence that influences them. It starts from the premise that students who engage in extracurricular activities also develop motivation, social skills, and empathy, whereas regular students may lack these competencies or have them to a lesser extent. The methodology used in the study involves a questionnaire consisting of generic questions such as gender, years of study, employment status, and a set of questions that assess emotional intelligence, including self-awareness, self-regulation, motivation, empathy, and social skills. The hypothesis posited is that students who participate in extracurricular activities during their studies, particularly those involving project management, develop well-rounded competencies related to social skills, empathy, and motivation, consequently leading to enhanced emotional intelligence. By analyzing the collected responses, it was observed that these competencies are more pronounced and prevalent among the first group of students compared to regular students. The expected contribution of this study is to motivate students to engage in extracurricular activities during their studies, thereby enhancing their emotional intelligence competencies. Findings could be usefull to HR managers and HR departments for recruiting and development of young talents. Additionally, it serves as a foundation for further research in this field.

Keywords: Emotional intelligence, Competencies, Research, Students, Project

Tuncay Yiğit, Şerafettin Atmaca, Remzi Gürfidan, Recep Çolak

Hyper Parameter Analysis in Recognition of Handwritten Digits Using Convolutional Neural Network

Abstract: Handwritten digit recognition is used in many machine learning, deep learning and computer vision applications, it has recently gained importance and attracted the attention of many scholars. Hyper-parameter optimisation involves the specification of a set of values that aim to improve accuracy in both classification and prediction. It also aims to optimise performance in feature selection by fine-tuning the parameters selected by the algorithms more accurately. In this study, a convolutional neural network was used to recognise handwritten digits using the MNIST dataset. There are many open-source hyperparameter libraries that deep learning developers can use for hyperparameterisation. In the developed model, Optuna, HyperOpt and Scikit-optimise libraries were used to implement hyper parameter optimisation techniques. Optimisation times for hyper-parameter libraries and the change in the success rate of handwritten digit recognition were analysed. The model trained with randomly given parameters achieved 78.45%, 97.13%, 75.62%, 76.95%, 97.46% and 97.27% accuracy, while the model trained with optimised hyperparameters achieved 99.26% accuracy.

Keywords: Convolutional Neural Network, Hyperparameter Tuning, Deep Learning