



4th International Conference on Access to Recent Advances in Engineering and Digitalization

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ABSTRACT BOOK

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Conference Program

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	Estimating One-Dimensional Barcode Image Orientation by Using 2D Fourier Transform: A CPU-Based Approach	Can Ali Gülyurt	27.05.2024	10:30-10:45
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Studies About Fast Charging Technology and Results

Halil İbrahim Kartal, Ramiz Erdem Aykaç

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Abstract

Fast charging technology is a technology that allows the battery of an electronic product to be charged much faster than standard. As technology progresses day by day, major improvements have been made regarding the need for fast charging. While low voltage is used in known chargers, it is possible to use much higher voltages with fast charging technology. Any charge of 10 Watts and above is considered fast charging. The first fast charging adapters with 5V and 2A values were presented to users with the first fast charging technology experience with 10 W power.

Through to the research and development studies carried out by the brands during the process, first fast charging technology with voltage levels up to 5-20V and current up to 6A, and then 120W ultra-fast charging technology, were introduced to end users. When we tested 5000 mAh battery with the standard adapter, we found that it was charged to 100% in 1 hour and 50 minutes. With fast charging technology, that is 65 W, when we tested 5000 mAh battery with the fast charging adapter, we found that it was charged to 100% in just 36 minutes. With ultra-fast charging technology, that is, 120W, 5000mAh battery is charged to 100% in just 17 minutes.

In addition, with the developing technology, there have been serious improvements in the capacities of batteries compatible with 120W charging. As a result, it will provide a significant improvement in electronic devices by increasing battery capacity and significantly reducing charging times. With these developments in fast charging technology, the interest in smart mobile phones has continued to maintain its place among the top products that remain popular in globally.

Keywords: Adapter , Fast Charging Technology, PD Charging, Smart Phone.

Sonlu Elemanlar Yöntemi Kullanılarak Soğuk Dövme Prosesi İçin Sürtünme Katsayısının Eldesi

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Özet

Soğuk dövme ya da soğuk şekillendirme prosesi, plastik şekil verme yöntemlerinden bir tanesidir. Soğuk dövme yöntemi yüzey pürüzsüzlüğü, yığın üretime yatkınlığı, hacim sabitliği ve cüruf bırakmadan üretim imkanı sunduğu için en çok tercih edilen metotlardan biridir. Bu çalışmada, sonlu elemanlar yöntemi ile üretim öncesinde yapılan analizlerin gerçeğe en yakın sonucu verebilmesi için en önemli etkenin sürtünme katsayısı (Coulomb) olduğu belirlenmiştir. Sürtünme katsayısının bilinmesi mühendislikte ve soğuk şekillendirme yöntemiyle bağlantı elemanı üretimi çalışmalarında büyük önem taşımaktadır. Sürtünme katsayısı (Coulomb) gerçeğe ne kadar yakın seçilirse üretimde karşımıza çıkabilecek sorunların önceden tespit edilmesine katkı sağlayacağı düşünülmüştür. Bununla birlikte, cıvata üretiminde yaygın olarak kullanılan 20MnB4 malzemesi (EN ISO 10264-1 ve EN ISO 10264-3) seçilerek deney yapılması planlanmıştır. Malzeme seçimi yapıldıktan sonra aynı çapta boya altı fosfat kaplamalı ve kaplamasız 3 farklı boyda 10'ar adet saplama (20mm,25mm,30mm) alınarak ZWICH Z250KN makinesinde redüksiyon kalıpları içerisinde basma yönünde 0.5mm/sn hızla şekillendirilerek kuvvet grafikleri alınmıştır. Deney çalışmalarından elde edilen veriler ile simülasyon yazılımından gelecek sonuçların karşılaştırılması için yapılan araştırmalar sonucunda 0,05 ile 0,1 Coulomb değerleri arasında 5 farklı simülasyon çalışması yapılmıştır. Yapılan simülasyon çalışmaları neticesinde alınan veriler ile ZWICH Z250KN makinesinde yapılan redüksiyon kalıbı içerisinde basma yönünde alınan F-mm grafikleri karşılaştırılmıştır. Yapılan karşılaştırmalarda 0,06 Coulomb sürtünme katsayısının gerçek üretime en yakın sonucu verdiği, sonrasında yapılacak sonlu elemanlar çalışmalarından alınacak verilerin doğruluklarının arttırılacağı tespit edilmiştir.



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Anahtar: Soğuk Dövme, Sonlu Elemanlar Yöntemi, Bağlantı Elemanı, Sürtünme Katsayısı

Using Finite Element Method Obtaining the Friction Coefficient for the Process of Cold Forming

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Abstract

The cold forging or cold forming process is a prominent plastic forming method known for its favorable attributes such as surface roughness, suitability for mass production, volume stability, and slag-free production. In this study, it was determined that the coefficient of friction (Coulomb) is the most important factor for the analyses performed before production with the finite element method to give the closest result to the reality. Knowledge of the coefficient of friction holds significant importance in engineering and the manufacture of fasteners through cold forming processes. Selecting a coefficient of friction (Coulomb) that closely aligns with reality is considered to enhance the ability to detect potential production issues at an early stage. Additionally, experiments were planned using 20MnB4 material (in accordance with EN ISO 10264-1 and EN ISO 10264-3), a commonly utilized material in bolt manufacturing. Following material selection, 10 studs of the same diameter (20mm, 25mm, 30mm) were selected, with half phosphate-coated and the other half uncoated, each in three different lengths. These studs were then formed using reduction dies in the ZWICH Z250KN machine, applying a compression force at a speed of 0.5mm/sec, and force graphs were subsequently generated. As a result of the research conducted to compare data obtained from experimental studies with results from simulation software, five different simulation studies were conducted, varying between 0.05 and 0.1 Coulomb values. The data obtained from these simulation studies were then compared with the F-mm graphs obtained during compression in the reduction die made on the ZWICH Z250KN machine. In the comparisons made, it was found that a friction coefficient of 0.06 Coulombs yielded results closest to actual



production. It has been concluded that utilizing this coefficient will enhance the accuracy of the data obtained from subsequent finite element studies.

Keywords: Cold Forming, Finite Element Method, Fastener, Friction Coefficient

Solving Regional Heating Problems in Smartphones with Thermal Management Technologies

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Abstract

As with many technological products, smartphones are renewing themselves and becoming more complex every day. The increase in desired features in smartphones, where many parts work together, brings with it some problems. One of these is the phone's heating problem. Heated phones reduce the user experience and create an undesirable situation. Assuming that the human body has an average temperature of 37 °C, it is inevitable that a phone that reaches a temperature above 50 °C during application will disturb the user. At the same time, it may damage the compact structure inside the device and cause damage to the parts used.

Many new technologies are being developed to keep the heat problem at an optimum level in high-performance devices. One of them; are liquid cooling systems. Liquid cooling systems are a cooling method used in electronic devices such as smartphones. It helps the cooling liquid between the two conductive plates to distribute the heat inside the device to the surface in a cycle. These systems use a number of components to distribute and control heat inside the device. These components are basically; metal plate such as copper or aluminum with high conductivity, refrigerant, radiator and fan.

As OMIX, we tested this new technology on our own phones. The results show that; The liquid-cooled phone operates at approximately 9 degrees lower temperature than our normal phones in intensive use. It was observed that the liquid-cooled device operated at approximately 45 °C during peak use. The device without a liquid cooling system saw temperatures of approximately 54 °C.

As with many technological developments, this system also has its own advantages and disadvantages. Examples of its advantages: Temperature control is provided in a more stable manner, offers a quieter operating system and provides more effective temperature control. The disadvantages are; In some cases it may be more expensive, require more complex installation, and may require more frequent maintenance.



In this research, the liquid cooling system used in upper segment smartphones is discussed. According to research, the temperature control of phones using liquid cooling systems is more stable and the heat bothers the user less in many scenarios.

Keywords: Smartphone Cooling, Vapour Cooling, Liquid Cooling, Thermal

Artificial Intelligence Image Processing and Reflection Removal

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Abstract

Light refractions and reflection pollution in the photographs taken have become one of the biggest problems in photographs. Objects such as glass, screen, glasses and mirrors cause these problems. Artificial intelligence produces useful solutions to these problems. If there is light refraction, reflection error or image pollution in a photo, artificial intelligence automatically detects this and corrects this error. AI also allows users to fix these errors manually. Users can get help from artificial intelligence not only to correct errors but also to edit photos. Increasing pixel quality and increasing resolution are among these regulations. Artificial intelligence not only corrects errors in photos, but also offers users the opportunity to create unique photos with the limits of their imagination. The artificial intelligence models we use in debugging or editing photos are night mode, face beautification, virtual 108MP camera, background editing and landscape mode. Our artificial intelligence development models include artificial intelligence models such as moon photography and anti-reflection. We plan to offer users the opportunity to create much higher quality and unique photos with these artificial intelligence models.

Keywords: Camera AI, Light Refractions , Photo Editing, Photo Quality

Dış Akımlı Katodik Korumanın Betonarme Yapılardaki Dayanıma Etkisi

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Özet

Başta önlem olarak engellemesi kolay bir sorun olan korozyon olayı, günümüzde hızla önem kazanmıştır. Korozyon nedenli hasarların ciddi boyutlarda olduğu anlaşılmış, Amerika Birleşik Devletlerinde yıllık bazda ki korozyon hasarının, BCL raporlarında yer alan bilgiye göre 82 milyar dolar , NSB raporlarında da 70 milyar dolar civarında hesaplanmıştır. Ülkemizde korozyon hasarlarını tespit etmek amacıyla yapılan bazı çalışmalarda ve saha araştırmalarında yıllık bazda ki korozyon zararlarının ülke gelirinin % 4 - % 5 'i civarlarında hesaplandığı ve bu korozyonların neredeyse %30 - % 35'inin engellenebilir durumda olduğu tespit edilmiştir.

Bu araştırmada korozyonu önleyici yöntemlerden biri olan dış akım kaynaklı katodik koruma yönteminin, betonarme yapılar üzerindeki etkisi araştırılmış, betonarme yapılardaki dayanım kaybı farkının belirlenmesi amaçlanmıştır. Deneysel ve gözlemsel bir süreç içeren bu çalışmalar yapılırken; farklı ortamlara maruz kalan numunelerde aynı tip betonla, aynı çapta nervürlü çelik kullanılmış, çelikte oluşacak korozyonun boyutu ve korozyonun beton dayanımı üzerinde ki etkisi gözlemlenmiştir. Katodik koruma uygulanan ve uygulanmayan numuneler bazı dayanım testleri ile incelenmiş, sonuçlar tablo haline getirilerek, alınan değerler arasında kıyaslama yapılmıştır. 28 gün süreyle incelenen numunelerde oluşan korozyonun betonarme dayanıklılığı üzerinde ki etkileri ve payı hesaplanarak, bu sürede ki katodik koruma etkisinin beton ve çelik türüne göre değiştiği gözlemlenmiştir.

İncelemeler sonucu deney sürecinin yeterliliği, bu süreçte beton ve çelikte ne gibi değişimlerin olduğu, bu değişimlerin beton kalitesini ve dayanımlarını ne ölçüde etkilediği sayısal ve görsel sonuçlarla ortaya konulmuştur. Böylece bu koruma yönteminin kısa süreli uygulamasında betonarme yapılar üzerinde ki değişim etkisi yüzdelik değerlere çevrilerek, bu değişimin %0,3-%2,4 arasında olduğu hesaplanmıştır.

Anahtar Kelimeler: Katodik koruma, korozyon, aderans kaybı, betonarme koruma

The Effect of External Flow Cathodic Protection on Strength in Reinforced Concrete Structures

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Abstract

Corrosion, initially perceived as a problem readily mitigated through proactive measures, has garnered increasing importance in contemporary discourse. Aevidenced by annual corrosion-related losses estimated at approximately \$82 billion according to BCL reports and around \$70 billion according to NSB reports in the United States. In certain investigations and field surveys aimed at identifying corrosion damage in our country, it has been ascertained that the annual corrosion losses constitute approximately 4% - 5% of the national income. Moreover, it has been revealed that nearly 30% - 35% of these corrosion occurrences are preventable.

This research examines the impact of the external current-driven cathodic protection method, a corrosion prevention technique, on reinforced concrete structures, with the specific aim of identifying variations in bond loss within such structures. Throughout the experimental and observational phases of these investigations, samples subjected to diverse environmental conditions were fabricated employing identical concrete compositions and steel reinforcements with uniform diameters and rib patterns. The magnitude of corrosion on the steel and its consequent influence on the compressive strength of concrete were meticulously monitored. The specimens, both those subjected to cathodic protection and those left untreated, underwent a series of strength tests, with the resulting data tabulated for comparative analysis. The study assessed the effects and contributions of corrosion developed within the specimens over a 28-day period on the durability of reinforced concrete. Additionally, observations revealed variations in the efficacy of cathodic protection over the same duration, contingent upon the specific characteristics of the concrete and steel utilized.

In this process, what kind of changes occur in concrete and steel, and to what extent these changes affect concrete quality and strength have been revealed with numerical and



visual results. The effect of change on reinforced concrete structures was converted to percentage values and this change was calculated to be between 0.3% and 2.4%.

Keywords: Cathodic protection, corrosion, loss of adherence, reinforced concrete protection

Sıralı Yağmur Suyu Örneklerinde Organik Kirleticilerin Kompozisyonu

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Özet

Yağmur suyu, atmosferik aerosollerin ve kirletici gazların uzaklaştırılmasında önemli bir rol oynamaktadır. Yağmur olayları önemli iki mekanizma ile kirleticileri atmosferden uzaklaştırmaktadır. Bunlardan birincisi damlacık içerisinde var olan kirletici, bulut oluşumu sırasında ve damlacığın uzun mesafelere taşınımı sırasında içerisine yeni eklenen kirleticiler mekanizması, ikincisi ise bulut altı yıkama mekanizmasıdır. Dolayısı ile alıcı ortamda toplanan yağmur örnekleri hem bulut içerisindeki kirleticileri ve hem de bulut altında yağmur damlacıklarının yıkayarak çökelmelerine neden olduğu kirleticiler barındırabilir. Atmosferik taşıma, Polisiklik Aromatik Hidrokarbonlar (PAH) gibi kalıcı organik kirleticilerin küresel dağıtımı için önemli bir yoldur. Her yerde bulunan yarı uçucu organik bileşiklerden oluşan bir grup olan PAH'lar, büyük çevresel kaygılara yol açmaktadır. On altı doymamış PAH'ın yedisi olası insan sağlığı açısından kanserojendir ve US-EPA tarafından öncelikli kirleticiler olarak belirlenmiştir. 01 Ocak- 31 Kasım 2023 tarihleri arasında 30 farklı günde yağın 52 adet yağmur suyu otomatik yağmur suyu örnekleyici cihazı kullanılarak sıralı olarak örneklenmiştir. Çalışmada, geri yörünge hesaplamaları yapmak ve örneklenen yağmur olaylarının atmosferik taşıma bölgelerini belirlemek için HYSPLIT (Hibrit Tek Parçacık Lagrangian Entegre Yörünge) modelleme yazılımı kullanılmıştır. PAH'lar çevresel matrislerde eser miktarda mevcut olduğundan uygun ve hassas bir ekstraksiyon yöntemine ihtiyaç duyulmaktadır. Bu nedenle, katı faz mikro ekstraksiyonu (FMS-TTP-SPE) cihazı kullanılmıştır. Yağmur sularında bulunmasından şüphe duyulan ve literatür kaynaklarına dayanılarak analizi yapılan PAH 'lar sırası ile naftalin, asenaftilen, asenaften, floren, fenantren, antrasen, floranten, piren, benzo[a]antrasen, krizen, benzo[b]floranten, benzo[k]floranten, benzo[a]piren, indeno(1,2,3-cd)piren, dibenz[a,h]antrasen, benzo[g,h,i]perilen olarak belirlenmiştir. GCMS Cihazı kullanılarak numunelerde naftalin, asenaftilen, enantren, antrasen, krizen ve indeno(1,2,3-cd) pirenin tespit edildi.

Anahtar: Metot validasyonu, yağmur suyu, organik kirleticiler



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Composition of Organic Pollutants in Sequential Rain Samples

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Abstract

Rainwater plays a significant role in the removal of atmospheric aerosols and polluting gases. It is evident that precipitation events play a pivotal role in the removal of pollutants from the atmosphere. This is achieved through two distinct mechanisms. The first of these is the mechanism of pollutants existing in the droplet, the newly added pollutants during cloud formation and long-distance transportation of the droplet, and the second is the under-cloud washing mechanism. Consequently, rain samples collected in the receiving environment may contain both pollutants present in the cloud and pollutants washed by rain droplets under the cloud, resulting in precipitation. The atmospheric transport of persistent organic pollutants, such as polycyclic aromatic hydrocarbons (PAHs), represents a significant pathway for their global distribution. Polycyclic aromatic hydrocarbons (PAHs), a ubiquitous group of semi-volatile organic compounds, present a significant environmental concern. Seven of the sixteen unsaturated PAHs have been classified as probable human carcinogens and have been designated as priority pollutants by the US-EPA. A total of 52 samples of rainwater were collected on 30 different days between 1 January -31 November 2023. The samples were collected sequentially using an automatic rainwater sampler device. The study employed HYSPLIT (Hybrid Single Particle Lagrangian Integrated Trajectory) modelling software to perform back trajectory calculations and identify atmospheric transport regions of the sampled rain events. Given that polycyclic aromatic hydrocarbons (PAHs) are present in trace amounts in environmental matrices, it is necessary to employ a suitable and sensitive extraction method. Therefore, a solid-phase microextraction (FMS-TTP-SPE) device was employed. The suspected presence of PAHs in rainwater was analysed based on literature sources, with the following results: naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, benzo[a]anthracene, chrysene, benzo[b]fluoranthene, benzo[k] respectively. The compound was identified as fluoranthene, benzo[a]pyrene, and indeno(1,2,3-



cd)pyrene. In the results obtained using the GCMS Device, naphthalene, acenaphthylene, enanthrene, anthracene, chrysene and indeno(1,2,3-cd) pyrene were detected in the samples.

Keywords: Method validation, rainwater, organic pollutants

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An Application of the HHL Algorithm and Its Test on IBM Quantum Composer

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Abstract

Quantum computers are devices that process information using the principles of quantum mechanics. Unlike traditional computers, quantum computers operate using units called quantum bits or qubits. Quantum computers offers superior advantages over classical computers in terms of processing speed and capacity due to the ability of qubits to exist in superposition and entangled states. Quantum Machine Learning (QML) is an interdisciplinary research area exploring the idea from the combination of quantum computing and machine learning. Quantum Phase Estimation (QPE) and Quantum Fourier Transform (QFT) are used as a subroutine algorithm in some QML algorithms such as the Harrow-Hassidim-Lloyd (HHL) algorithm. The HHL algorithm is used to solve a system of linear equations. The HHL algorithm accelerates the solution of linear equation systems using quantum computers. In this study, first, general description of the HHL algorithm is presented. Then, the HHL algorithm is applied for an example and the expected results are obtained. The test of the HHL algorithm for this example is also performed by using IBM Quantum composer.

Keywords: Quantum Computing, Quantum Machine Learning, The HHL algorithm.

Eş Zamanlı Mühendislikte Üretime Ve Montaja Uygun Tasarım ve Bir Uygulama

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Özet

Günümüz iş ortamında, projelerin karmaşık hale gelmesi, rekabetin ve proje maliyetlerinin artması sebebiyle firmalar ürün üretme süreçlerini yönetirken yeni yollar aramaktadır. Eş zamanlı mühendislik kavramı bu alanda başarıya ulaşmak için uygulanan sistematik bir yaklaşımdır. Bu çalışmada, yeni bir ürün üretim sürecinde eş zamanlı mühendislik metodolojisine ait tasarım süreçlerinden olan Üretime ve Montaja Uygun Tasarım (DFMA) yaklaşım kuralları uygulanarak bir uygulama yapılmıştır. Uygulamanın amacı, geleneksel sıralı mühendislik yaklaşımı uygulanarak üretilen bir ürün ile eş zamanlı mühendislik yaklaşımı uygulanarak ve bu yaklaşımda kullanılan DFMA tekniği kullanılarak oluşturulan tasarım sonucu üretilen ürünü toplam parça sayısı, ürün ağırlığı, üretim maliyeti, montaj süresi, montaj maliyeti, montaj verimliliği, toplam maliyet, teknik istelere uygunluk ve dayanım olarak karşılaştırmaktır. Uygulama olarak tek dingilli römorklar gibi faydalı yük taşıyan ve manevra kabiliyeti olmayan yapıların taşınmalarını sağlayacak bir araca ait iki farklı tasarım yapılmıştır. İlk tasarımda sıralı mühendislik yaklaşımı ile geleneksel tasarım süreçlerine uyularak bir tasarım gerçekleştirilmiştir. Daha sonra eş zamanlı mühendislik yaklaşımı uygulanarak ve bu yaklaşım süreçlerinden olan DFMA kurallarına göre ikinci bir tasarım yapılmıştır. Bu iki farklı tasarım sonuçları Boothroyd & Dewhurst DFMA analizine göre değerlendirilmiş ve ANSYS Workbench üzerinden sonlu elemanlar analizi yöntemiyle dayanım olarak kıyaslanmıştır. Sonuç olarak, eş zamanlı mühendislik yaklaşımı uygulanarak oluşturulan ikinci tasarım sonucu üretilen araca ait parça sayısının 89'dan 73'e, montaj süresinin 366 saniyeden 225 saniyeye, toplam maliyetin 4829 TL'den 3442 TL'ye, toplam ağırlığın 40.8 kg'dan 19.2 kg'a gerilediği görülürken montaj verimliliğinin %4.9'dan %8'e yükseldiği görülmüştür. Yapılan yapısal analiz sonucu iki tasarımda teknik isteleri karşılayan benzer dayanımlara sahip olduğu görülmüştür.



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Anahtar: Eş zamanlı mühendislik, Sıralı Mühendislik, Üretime ve Montaja Uygun Tasarım
(DFMA)

Design For Manufacturing and Assembly in Concurrent Engineering and a Case Study

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Abstract

In today's business environment, companies are looking for new ways to manage their product production processes due to the complexity of projects, increasing competition and project costs. Concurrent engineering concept is a systematic approach to achieve success in this field. In this study, an application is made by applying Design for Manufacture and Assembly (DFMA) approach rules, which is one of the design processes of concurrent engineering methodology, in a new product manufacturing process. The aim of the application is to compare a product that will be produced by applying the traditional sequential engineering approach and the product produced as a result of the design created by applying the concurrent engineering approach and using the DFMA technique used in this approach in terms of total number of parts, product weight, production cost, assembly time, assembly cost, assembly efficiency, total cost, compliance with technical requirements and strength. As an application, two different designs have been made for a vehicle that will carry payloads such as single axle trailers and will enable the transport of non-maneuverable structures. In the first design, a design was performed by following the traditional design processes with a sequential engineering approach. Then, a second design was made by applying the concurrent engineering approach and following the DFMA rules, which is one of the processes of this approach. The results of these two different designs were evaluated according to Boothroyd & Dewhurst DFMA analysis and compared in terms of strength by finite element analysis method via ANSYS Workbench. As a result, it was observed that the number of parts of the vehicle produced as a result of the second design created by applying the simultaneous engineering approach decreased from 89 to 73, assembly time decreased



from 366 seconds to 225 seconds, total cost decreased from 4829 TL to 3442 TL, total weight decreased from 40.8 kg to 19.2 kg, and assembly efficiency increased from 4.9% to 8%. As a result of the structural analysis, it is seen that both designs have similar strengths that meet the technical requirements.

Keywords: Concurrent Engineering, Sequential Engineering, Design for Manufacturing and Assembly (DFMA)

Dış Mekanda Kullanılması İçin Fonksiyonel Pişirme Ünitesi Tasarlanması

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Özet

Dış mekânda vakit geçirmenin insanlar üzerinde; fiziksel sağlık, zihinsel sağlık ve bağışıklık sistemi güçlendirme gibi birçok fayda sağladığı bilinmektedir. Bu etkinlikler; kamp, açık hava etkinliği ve piknik olarak sıralanabilmektedir. Belirtilen etkinliklerde kullanılması amacıyla kullanımı efektif olan bir pişirme ünitesi tasarlanması amaçlanmıştır. Bu tür tasarımların sahip olması gereken özellikler, taşınabilirlik, dayanıklılık, güvenlik, kullanım kolaylığı, çevre dostu olması ve çeşitli pişirme seçenekleridir. Bu amaçla çalışmada, dış mekân pişirme gurubunda pişirici kaplarda ızgara kullanımının eksikliği ihtiyaç olarak belirlenmiştir. Kamp ve pikniklerde kullanılacak olan tava, tencere ve ızgara formatını birleştirmek amacıyla tasarlanmıştır. Kapsül formatında tasarlanmış taşımayı kolaylaştıran kulp sayesinde her ortama uygun kullanım sunmak istenmiş olup, üç faklı pişirme modunda kullanım sunan kapsül, kapalı formattayken tava, tencere ve ızgara formatını tek bir gövdede birleştirerek kapsül formatına dönüştürülmüştür. Açıldığında ise dış mekân pişirimlerine uygun tava, tencere ve ızgara olarak kullanıcılara pişirme seçenekleri sunarak ihtiyaca göre kullanım kolaylığı oluşturulmuştur. Tava veya tencere modunda kullanırken güvenli ve pratik bir kullanım için takıp çıkartılabilen, ısıya dayanıklı bir kulp tasarlanmıştır. Tava ve tencere gövdesine uyumlu kulp sayesinde kullanıcılar ateş üzerindeki kapları almaları kolaylaştırılmıştır. Kulp içerisindeki boşluğa yerleştirilebilen kaşık ve çatal gibi ekipmanlar kullanıma hazır olarak kulp çerisinde yer kaplamadan taşınabilmektedir. Bu kullanım kolaylığının yanı sıra ekipmanların kayıp olmasının veya kamp ortamında unutulmasının önüne geçilmesi amaçlanmıştır. Tava ve tencere gövdelerinin üretimi için çelik veya alüminyum kullanılabilir her iki hammadde içinde uygun olarak tasarlanmıştır. Gerek duyulduğunda gövde tasarımları ısıya dayanıklı boyar maddelerle boyanabilir veya kaplama yapılabilir.

Anahtar Kelimeler: Kapsül, Tava, Tencere, Izgara



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Karo Üretimindeki Değirmen Çevrim Süresinin Makine Öğrenmesi Yöntemi İle Önerilmesi

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Özet

Karo üretim süreci, farklı kalite ve çeşitlerdeki hammaddelerin hangi oranlarda kullanılacağını belirleyen reçetelerin hazırlanmasıyla başlar. Bu reçetelere uygun olarak seçilen hammaddeler, belirlenen oranlarda su ve özel katkı maddeleri ile karıştırılarak bir karışım elde edilir. Sürecin devamında öğütme işlemi yer alır. Bu işlemin amacı, hammaddenin homojen bir yapıya kavuşturulması ve istenen elek bakiye değerlerine ulaşılmasıdır. Karo sektöründe hammaddeyi karıştırma ve öğütme amacıyla tasarlanmış özel ekipmanlara değirmen adı verilir. Firmada kullanılan bilyeli değirmenler, seramik bilyelerin silindirik bir tambur içinde dönmesi ile hammaddenin öğütülmesini sağlar. Bu işlemin sonucunda hammadde çamur halini alarak sonraki aşamalara hazır hale getirilir. Değirmen sürecinde oluşan çamurun üretilecek karonun tipine göre belirli elek bakiye değer aralığında olması gerekmektedir. Hedeflenen elek bakiye değerine sahip olmayan çamurlar; değirmen sürecinden sonraki sprej, pres ve fırınlama işlemleri sırasında kalite ve enerji tüketimi sorunlarına yol açmakla birlikte, nihai üründe mukavemet sorunlarına da neden olmaktadır. Bu nedenle, değirmenlerdeki ilk çevrimlerin sonucunda ideal elek bakiye değerine ulaşılmazsa, ikinci bir çevrime ihtiyaç duyulmaktadır. Bu çalışma kapsamında XGBoost algoritması kullanılarak ikinci çevrim için süre önerisi yapan bir makine öğrenmesi modeli geliştirilmiştir. İkinci çevrim sonucunda ideal elek bakiye değerine ulaşılması hedeflenmektedir. İkinci çevrim süresinin tahminlenmesi için model; birinci çevrim süresi, reçete içeriği, değirmen tipi, değirmen içindeki bilye boşluk mesafesi ve bilye yaşı verileri kullanılarak eğitilmiştir. Model sonucunda Root Mean Squared Error (RMSE) ve R² değerleri sırasıyla 2132 ve 0,74 olarak elde edilmiştir. Son 3 ayda modelin önerdiği çevrim sürelerinin %70'i operatörler tarafından uygulanmış olup, bu önerilerin sonucunda elde edilen elek bakiye değerleri %94 oranında hedeflenen değere ulaşmıştır. Bu çalışma neticesinde, değirmen süreci verilerle takip edilebilir hale getirilmiş ve saha operatörlerinde meydana gelebilecek tecrübe kaybının önüne geçilmiştir. Bu çalışma, sektördeki süreç optimizasyonu ve kalite kontrol süreçlerine katkı sunmaktadır



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Anahtar: Karo üretim süreci, Makine öğrenmesi, değirmen çevrim süresi önerisi, elek bakiye değeri

LPWAN Teknolojisi ve İnsansız Hava Araçları ile Yapay Zekâ Tabanlı Orman Yangınları Erken Tespiti

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⁴ Fatih Sultan Mehmet Vakif University, 0009-0002-4214-5083, aliensedgn@gmail.com Abstract

Özet

İnsanın doğaya müdahalesi ve iklim değişiminin etkisinin her alanda etkisi olduğu gibi orman yangınlarının artmasında da olmuştur. Bu durum yetkilileri, doğayı korumak için orman yangını yönetimi çalışmalarına yeni yöntem arayışına itmiştir. Yeterli önlem almayan yetkililer yangını sona erdirmek için yüksek maliyetli çözümleri kullanmak zorunda kalmışlardır. Araştırmacılar bu hususta önemli çalışmalar yapmış konuyla ilgili çeşitli çözüm önerileri sunmuşlardır. Bu gelişim sürecini takip etmek ve süreci daha iyi yönetmek için birden çok değerlendirmeye ihtiyaç duyulmuştur. Sözü edilen yöntemlerin en optimum tarafları seçilip üzerine çeşitli eklemeler ile yeni sentez yöntemler orman yangınlarının yönetimini oldukça kolaylaştıracağı düşünülmektedir.

Orman yangınlarını karbon monoksit ve ısı sıcaklık sensörü ile algılayıp uzun menzilli veri gönderim kabiliyeti olan LPWAN (Low-power-wide-area network) teknolojisiyle verileri ana bilgisayara gönderilir. Gönderilen veriler eşik değerine ulaştığında otonom olarak insansız hava aracı bölgeye giderek fotoğraflar çeker. Çekilen fotoğraflar görüntü işleme ile anlamlandırılıp orman yangını olup olmadığı konusunda gereken birimlere haber verir. Yapay zekâ ve makine öğrenmesi kullanılarak veriler anlamlı hale getirilir, yağışlı günlerde sistem güç tasarrufu moduna girer.

Kullanılması gereken materyaller edinildikten sonra sistemin simüle edilmesi hedeflenmektedir. İki ağaç, ana bilgisayar ve insansız hava aracı kullanılacaktır. Başarıya ulaşılan sistemin ise bütün ormanlarda kullanılabileceği sonucu ortaya çıkması beklenmektedir.

Uzun vadede edinilen veriler bölgenin orman yangını potansiyeli hakkında bilimsel kaynak oluşturacaktır. Aynı zamanda sistem tüm alternatif sistemlere ek kaynak olduğu için kendi büyürken alternatiflerini de geliştirecektir. Bu programda edilen tüm veriler otonom sistemin daha verimli çalışması için yapay zekâ ile anlamlı hale getirilecektir. Türkiye'nin orman yangını



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ile mücadelede dünyaya örnek olması amaçlanmaktadır. Keywords: Tile production process,
Machine learning, mill cycle time recommendation, grain size



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Recommendation of Mill Cycle Time in Tile Production Using Machine Learning Method

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Abstract

The tile production process begins with the preparation of recipes that determine the proportions of raw materials of different qualities and types to be used. Raw materials selected in accordance with these recipes are mixed with water and special additives in specified proportions to obtain a mixture. The next part of the process is grinding. The purpose of this process is to obtain a homogeneous structure of the raw material and to reach the desired sieve balance values. Special equipment designed for mixing and grinding raw materials in the tile industry is called mill. The ball mills used in the company enable the grinding of raw materials by rotating ceramic balls in a cylindrical drum. As a result of this process, the raw material turns into mud and is made ready for the next stages. The sludge formed as a result of the milling process must be within a certain sieve balance value range depending on the type of tile to be produced. Sludges that do not have the targeted sieve balance value; While it causes quality and energy consumption problems during the spray, pressing and baking processes after the milling process, it also causes strength problems in the final product. Therefore, if the ideal sieve balance value is not reached as a result of the first cycles in the mills, a second cycle is needed. Within the scope of this study, a machine learning model that recommends time for the second cycle was developed using the XGBoost algorithm. It is aimed to reach the ideal sieve balance value as a result of the second cycle. Model for estimating the second cycle time; It was trained using first cycle time, recipe content, mill type, ball gap distance within the mill and ball age data. As a result of the model, Root Mean Squared Error (RMSE) and R^2 values were obtained as 2132 and 0.74, respectively. In the last 3 months, 70% of the cycle times recommended by the model have been implemented by operators, and the sieve balance values obtained as a result of these recommendations have reached the targeted value by 94%. As a result of this study, the mill process was made traceable with data and loss of experience in field operators was prevented. This study contributes to process optimization and quality control processes in the sector.

Keywords: Tile production process, Machine learning, mill cycle time recommendation, grain size

Yapay Sulak Alanlar ile Atıksu Arıtılması

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Özet

Atıksuların, diğer alternatiflerine göre daha ekonomik ve eşdeğer arıtım performansına sahip olan yapay sulakalanlarla arıtılabilirliği sağlanacaktır. Ülkemizde atıksuların, alıcı ortama direkt deşarj edilerek doğal dengenin bozulması yerine diğer yöntemlere göre daha doğal ve ekonomik bir metot olan sulakalanlarla, ekolojik dengeye katkıda bulunarak arıtılabileceği ortaya konulacaktır.

Çevredeki doğal malzemeler kullanılarak ihtiyaç büyüklüğünde hazırlanan sistemlerde, atıksuyun bitkiler tarafından filtre edilerek suyun arıtılması esasına dayanan bu sistemler, doğal yapının simüle edilmiş halidir. Yapay sulakalan sistemleri, doğal sulakalanların sahip olduğu arıtma kapasitesine bütünü ile benzerlik göstermektedir.

Sulakalanlar, güneş enerjisini kullanarak kendi kendini yenileyebilmektedir. Organik ve inorganik kirleticileri, askıda katı maddeyi, toksik maddeleri, ağır metalleri ve zararlı mikroorganizmaları yüksek miktarda giderim sağlamaktadır. Sulakalanlar doğal kaynak tüketiminin olmaması ile çevre dostu faaliyetlere katkıda bulunmaktadır.

Yapay sulak alan çalışmalarında elde edilen sonuçlara göre kullanılan bitkiler arasında en iyi sonuç alınan türlerin Canina Indica ve Sazlık bitkileri olduğu belirlenmiş olup ortalama kirlilik giderim verimliliklerinin % 75-90 arasında olduğu bulunmuştur. Bu çalışma sonucunda laboratuvar ortamında, yapay sulak alanların, endüstriyel ve evsel atıksuların kirlilik düzeyinin azaltılmasında önemli bir rol oynadığı belirlenmiştir.

Anahtar: Atıksu, Arıtma, Yapay Sulak Alan, Canina Indica

Wastewater Treatment with Artificial Wetlands

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Abstract

It will be ensured that wastewaters can be treated with artificial wetlands, which are more economical and have equivalent treatment performance compared to other alternatives. It will be demonstrated that wastewaters in our country can be treated by contributing to the ecological balance with wetlands, which is a more natural and economical method compared to other methods, instead of disrupting the natural balance by direct discharge to the receiving environment.

These systems, which are based on the principle of water treatment by filtering wastewater by plants in systems prepared in the size of need using natural materials in the environment, are simulated natural structures. Artificial wetland systems are completely similar to the treatment capacity of natural wetlands.

Wetlands are self-renewing by using solar energy. It provides high removal of organic and inorganic pollutants, suspended solids, toxic substances, heavy metals and harmful microorganisms. Wetlands contribute to environmentally friendly activities by not consuming natural resources.

According to the results obtained in artificial wetland studies, it was determined that the best results were obtained from *Canina indica* and reed plants and the average pollution removal efficiency was found to be between 75-90%. As a result of this study, it was determined that artificial wetlands play an important role in reducing the pollution level of industrial and domestic wastewater in the laboratory environment.

Keywords: Wastewater, Treatment, Artificial Wetland, *Canina Indica*

Yeşil Sentez Yoluyla Nanopartikül Sentezi ve Tekstil Yüzeylerine Aplikasyonu

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Özet

Metalik nanopartiküller sahip oldukları eşsiz özellikler ile geniş bir alanda uygulama imkânı bulmaktadır. Fonksiyonel Tekstil yapılarının üretiminde kullanılan metalik nanopartiküller ile anti-bakteriyel, kir-su itici, UV koruma ve kendi kendine temizlenme gibi birçok özellik tekstil yapılarına kazandırılmaktadır. Metalik nanopartiküller kimyasal, fiziksel ve biyolojik olmak üzere 3 farklı yöntem ile üretilebilmektedir. Kimyasal ve fiziksel nanopartikül üretim yöntemlerinde kullanılan toksik kimyasallar, karmaşık ve hassas işlem basamakları ve maliyetin yüksek olması uygulamada karşılaşılan önemli problemlerdendir. Biyolojik yöntemler ile nanopartikül sentezi ise kolay, çevreci ve ucuz olmaları nedeniyle son dönemlerde ilgi çeken çalışma alanlarından biri olmuştur. Bu çalışmada yeşil sentez metoduyla bitkisel ekstraktlar kullanılarak gümüş nanopartikül sentezi yapılmıştır. Gümüş nanopartiküller in-situ olarak pamuk ve polyester kumaşlara applike edilmiştir.

Anahtar: Nanopartikül, yeşil sentez, fonksiyonel tekstil

Green synthesis of nanoparticles and their application to textile surfaces.

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Abstract

Metallic nanoparticles have unique properties and a wide range of applications. Metallic nanoparticles used in the manufacture of functional textile structures, as well as anti-bacterial, dirt and water proofing, UV protection, and self-cleaning. Three different methods can produce metal nanoparticles: chemical, physical, and biological. Toxic chemicals used in chemical and physical nanoparticle manufacturing methods are among the major problems encountered in the application, with complex and precise processing stages and high costs. Biological methods and nanoparticle synthesis have been one of the most recent areas of interest because they are easy, environmentally friendly, and inexpensive. In this study, we synthesized silver nanoparticles using green synthesis and herbal extracts. We applied silver nanoparticles in situ to cotton and polyester fabrics.

Keywords: Nanoparticle, green synthesis, functional textile

Poliester Kumaşlarda Atkı Eğriliği Değerlerinin Standartlaştırılması

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Özet

Hazır giyim sektöründe moda akımlarına bağlı olarak farklı kalitelere ve desenlere olan ilgi gün geçtikçe artmaktadır. Bu artışa bağlı olarak da %100 poliester kaliteler giyim sektöründe oldukça tercih edilebilir bir konuma ulaşmış olup işletmelerde bazı problemleri beraberinde getirmiştir. Bu problemlerden biri ise atkı eğriliği (çaprazlık)'tır. Atkı eğriliği, dokuma kumaşlarda birbirine paralel olarak konumlanan çözgü ve atkı ipliklerinin kesişme noktalarında 90° olması gereken açının sapma yapması dolayısıyla meydana gelmektedir. Meydana gelen bu hata ise pastalın düzgün serilememesi, kesim esnasında kayma nedeniyle fire oluşması, desenlerin dikiş yerlerinde örtüşmemesi gibi birçok probleme sebep olmaktadır. İşletmelerde ki bu problemin çözümlenmesini kapsayan bu çalışmada ise 5 farklı poliester kalite seçilerek 'ASTM D 3882- Bow and Skew in Woven and Knitted Fabrics' s' standardına uygun şekilde atkı eğriliği değerleri ölçümlenecektir. Ölçümü tamamlanan kumaşlar ram makinelerinden geçirildikten sonra ölçümler aynı şekilde tekrarlanacaktır. Elde edilen veriler karşılaştırılarak her bir kalite için ram makinelerinde bulunan atkı ipliklerinin kontrolünü sağlayan sensörlerin toleransları hesaplanacaktır. Bununla birlikte standarda uygun olarak ölçülerek elde edilen değerler ile birlikte atkı eğriliğinin derecesinin genel-geçer kabulünün sağlanabilmesi için standartlaşma çalışması yapılacaktır.

Anahtar: Atkı Eğriliği, Poliester, Standartlaştırma

Denge Saęlayan Kumaş Tasarımı

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Özet

Günümüzün hızlı deęişen iş dünyasında, yorgunluk ve denge kaybı giderek artan bir endişe kaynağı haline gelmektedir. Denge kaybı probleminin en önemli nedenlerinden biri, vücut tarafından kaybedilen uzak kızılötesi radyasyonudur. İnsan vücudu sürekli olarak orta ve uzak kızılötesi radyasyonu yaymakta ve bu durum enerji kaybına neden olmaktadır. Çalışma kapsamında geliştirilen yöntemle, kumaş yüzeyine uygulanan biyo-seramikler, vücuttan yayılan uzak kızılötesi radyasyonu absorbe ederek kaybedilen enerjinin vücuda geri yansıtılmasını sağlamaktadır. Bu sayede enerji kaybı önlenerek vücut dengesi iyileştirilmektedir. Rotasyon baskı tekniğı ile yüzeyine biyo-seramik içerikli pat kombinasyonu uygulanan %50 pamuk %50 polyester içerięe sahip örme kumaş GB/T 30127-2013 test standardında deęerlendirilmiştir. Elde edilen sonuçlar, kumaşın uygulama sonrası %93 kızılötesi yayılım özelliğine sahip olduğunu göstermektedir.

Anahtar: Uzak kızılötesi radyasyonu, denge kaybı, kızılötesi yayılım, biyo-seramikler

Design of Balance-Providing Fabric

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Abstract

In today's fast-changing business world, fatigue and loss of balance are becoming increasingly concerning issues. One of the primary causes of balance loss is the far-infrared radiation lost by the body. The human body continuously emits mid and far-infrared radiation, leading to energy loss. Through the method developed in this study, bio-ceramics applied to the fabric surface absorb the far-infrared radiation emitted by the body and reflect the lost energy back to the body. In this way, energy loss is prevented, and body balance is improved. A knitted fabric composed of 50% cotton and 50% polyester, treated with a bio-ceramic containing paste combination using the rotary screen printing technique, was evaluated according to the GB/T 30127-2013 test standard. The results obtained indicate that the fabric possesses 93% infrared emission capability after application.

Keywords: Far-infrared radiation, loss of balance, infrared emission, bio-ceramics

Enerji Dağıtım Sistemi Optimizasyonu

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Özet

Lamine Busbar sistemleri, binlerce amperin dağıtıldığı günümüzün modern elektrik ve elektronik sistemleri için müşteriye özel tasarlanan üstün bir enerji dağıtım sistemidir. Lamine Busbar, yalıtım malzemeler ile ayrılmış paralel iletken plakaların tek bir yapıda lamine edilmesiyle oluşur. Lamine Busbarlar özelleştirilebilir yapısı, kompakt tasarımı ile montaj kolaylığı ve dayanıklı bir yapı sunar. Bu yapısı sayesinde birçok alanda ihtiyaç duyduğunuz güvenilir ve modüler çözümler getirir. Geleneksel kablolama yöntemlerinde oluşabilecek kısmi deşarj ve dielektrik sorunlarını ortadan kaldırır.

Tamamlanması gereken tüm farklı özel prosesler nedeniyle Lamine Busbar protatipinin oluşturulması uzun zaman alır. Büyük geometrilerin üretim sonrası yapısını ve ortaya çıkabilecek sorunları ön görebilmek için zorlayıcı çevre koşullarında test platformuna yerleştirilmesi ve test edilmesi özellikle yüksek sıcaklıkta ve karmaşık zorlu elektrik koşullarında oldukça zordur. Bu nedenle doğrulama testlerinin uygulanması pahalı olabilir ve önemli miktarda hazırlık süresi gerektirebilir. Ancak protatipleme öncesi farklı simülasyon platformlarında karışık geometriler elektriksel uyarılar, sınır koşulları ve zorlayıcı çevre koşullarını tanımlamak oldukça kolaydır. Ayrıca, farklı analiz yazılımları olası elektriksel arızaların ve güvenlik risklerinin önceden tespit edilmesine, maliyetlerin ve risklerin azaltılmasına katkıda bulunur. Sonuç olarak Lamine Busbar elektrik simülasyonları, optimum tasarım için büyük bir rol oynar.

Bu çalışmada, Comsol Multiphysics yazılımı kullanılarak Lamine Busbar'ın çeşitli elektriksel analizleri gerçekleştirilmiştir. Optimizasyon çalışmaları yapılarak en uygun tasarım belirlenmiştir. Kısa devre anında Lamine Busbar'da oluşan maksimum sıcaklık ve termal etkisi, farklı izolasyon ve iletken türlerinde baranın davranışı, elektrik alan yoğunluğu, akım yoğunluğu ve farklı frekans aralıklarında manyetik alan etkisi gibi çeşitli simülasyonlar gerçekleştirilmiştir.



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Ayrıca, kısmi deşarj ve dielektrik testi gibi analizler de yapılarak optimize edilmiş nihai tasarım elde edilmiştir.

Anahtar Kelimeler: Comsol Multiphysics, Simülasyon, Optimizasyon, Elektrik Analiz

The Optimization of Energy Distribution Systems

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Abstract

Laminated Busbar systems are superior energy distribution systems custom-designed for today's modern electrical and electronic systems, where thousands of amperes are distributed. Laminated Busbar is formed by laminating parallel conductor plates separated by insulation materials into a single structure. Laminated Busbars offer a customizable structure, compact design for easy installation, and durable construction. Thanks to this structure, they provide reliable and modular solutions for various applications. They eliminate partial discharge and dielectric issues that may occur with traditional wiring methods.

Due to the various specialized processes involved, creating a prototype for Laminated Busbars takes a considerable amount of time. To anticipate the structure and potential issues post-production of large geometries, placing them in a challenging environmental test platform and testing, especially under high temperatures and complex electrical conditions, is quite challenging. Therefore, implementing validation tests can be expensive and require significant preparation time. However, before prototyping, defining complex geometries, electrical stimuli, boundary conditions, and challenging environmental conditions on different simulation platforms is relatively easy. Additionally, various analysis software contributes to the early detection of possible electrical faults and safety risks, thereby reducing costs and risks. As a result, Laminated Busbar electrical simulations play a significant role in achieving an optimal design.

In this study, various electrical analyses of Laminated Busbars were conducted using the Comsol Multiphysics software. Optimization studies were carried out to determine the most suitable design. Different simulations were performed, including the maximum temperature and thermal effects during short circuits in Laminated Busbars, behavior of the busbar with different insulation and conductor types, electric field intensity, current density, and magnetic field effects



at different frequency ranges. Additionally, analyses such as partial discharge and dielectric tests were conducted to obtain the optimized final design.

Keywords: Comsol Multiphysics, Simulation, Optimization, Electrical Analysis



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ABSTRACTS

Cryptographic Enhancement of Named Pipes for Secure Process Communication

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Abstract

This study aims to enhance cryptographic security within the "named pipe" Inter-Process Communication (IPC) method utilized in Unix and Unix-like systems. Addressing security vulnerabilities inherent in the named pipe structure, this research endeavors to augment IPC security by integrating a cryptographic layer using the Advanced Encryption Standard (AES) encryption algorithm with 128-bit length key. The named pipe structure allows all processes specified by the owner or group to access data within the pipe. This implies the potential for processes generated by malicious software to access this data. By integrating a cryptographic secure communication structure into this bidirectional, readily applicable method, this study seeks to fortify the protocol. Technical objectives of this research involve encrypting messages with the AES-128 algorithm, enabling meaningful decryption of messages written with the same algorithm, and preventing interpretation of messages within the pipe by third-party processes lacking this cryptographic structure. Experimental findings showcase that when monitored by a process lacking this cryptographic structure, encrypted and incomprehensible messages are displayed, indicating the resistance of the encrypted structure against external interventions. In conclusion, this study introduces a new method to enhance security in IPC by adding a cryptographic security layer to the named pipe. This research may have implications for IPC security in Unix systems and could be applicable to other IPC methods facing similar security vulnerabilities.

Modelling of Forklift Drivetrain and Running the Fuel Consumption Cycle

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Abstract

At the very beginning of the design phase of a forklift truck, it must be determined which drive systems will be used. Then, with these drive systems and the target weight, it must be calculated how many litres of fuel the truck burns according to VDI 2198. In this study, a forklift truck will be modelled in Mat-Lab environment with all its sub-systems and run in a cycle in accordance with VDI 2198. One of the biggest outputs of this study will be to know the fuel consumption of this forklift during the forklift design phase.

Enhancing Workflow Efficiency in Yocto Project: A Build Tool for Fetch Error Detection and Fixing

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Abstract

Yocto Project is conceived as an initiative to provide developers with a flexible and efficient environment for preparing customized embedded Linux distributions. However, while bestowing upon developers the flexibility to create bespoke embedded Linux distributions, this project introduces various challenges. These challenges transcend mere technical proficiency, influencing critical barriers that impact the successful completion of the project. These difficulties encompass the steep learning curve of the Yocto Project, the intricacies of complex configuration files, and the management of dependencies. Developers are compelled to navigate through these intricacies within the project, concurrently encountering fetch errors arising from the continuous evolution of external sources. These fetch errors not only disrupt the flow of the project but also exhibit sensitivity to alterations in access to external resources and network-related issues. Consequently, developers find themselves expending time and effort in grappling with these challenges. The fetching process within the Yocto Project plays a pivotal role in the creation of bespoke distributions, retrieving essential external source code crucial for the development process. Fetch errors can stem from various sources, including alterations in upstream repositories and network issues, potentially hindering the progression of the project if not promptly resolved. However, the unpredictable nature of fetch errors necessitates a comprehensive solution for a seamless workflow. In this context, as a solution to these challenges, an innovative tool has been developed within the scope of this project. This tool aims to automatically detect and resolve fetch errors encountered during the preparation of custom embedded Linux distributions with the Yocto Project. The tool proficiently detects real-time

internet interruptions during fetch processes and automatically initiates reattempt procedures in case of transient outages. This feature ensures the continuous progression of the project. Additionally, the tool scrutinizes complex recipe errors within the Yocto Project, automatically rectifying issues encountered during fetch operations. This streamlined approach expedites error resolution without necessitating manual intervention from developers. The tool systematically analyzes the health of URLs employed in fetch processes, identifying potential errors in the utilized URLs. Furthermore, it evaluates internet connectivity issues arising during fetch operations within the Yocto Project. By detecting various scenarios such as DNS problems, connection timeouts, and packet loss, the tool provides developers with comprehensive reports, enabling swift diagnosis of internet connectivity issues. As a result, this tool successfully overcomes the existing challenges in resolving fetch errors within the Yocto Project. Furthermore, the tool can be extended to automatically correct not only fetch errors but also general Yocto errors. These enhancements contribute to the tool providing a more effective and versatile solution. In addition, incorporating CI/CD integration into the tool can significantly improve the quality of work. CI/CD enables automated testing and deployment of code changes, ensuring software reliability and optimizing deployment processes.

Design and manufacturing of rotating bending fatigue test machine

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Abstract

Fatigue strength is an important criterion for all materials used. In the past years, it has been observed that materials cannot carry the loads they carry statically under service conditions. This situation is explained by the phenomenon of "cyclic loading" in the literature. Cyclic loadings cause damage by creating a crack in the surface of the material or by exploiting an existing discontinuity. There are many test methods and devices for determining fatigue strength. All of these are based on the repetition of a certain load in different ways. Among the tests applied, the least costly and simplest method is the rotating bending fatigue test.

In this study, a rotating bending fatigue test device was designed and manufactured. Fatigue life of AA 6063 aluminum alloys, which were prepared according to the fatigue test sample standards and with specific properties, were subjected to fatigue test and calculated.

Developing a Web Framework Based on Inversion of Control

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Abstract

Increasing the reusability and manageability of software units is one of the most fundamental issues in the field of software engineering. To increase these parameters, which are important factors that determine the quality of the software, it is necessary to develop the units that make up the software in a way that minimizes their dependency on each other. This basic requirement exists in web applications, as in other types of software. Inversion of Control – IoC is a design pattern used to manage the components of a software application and combine them by reducing inter dependencies. This study focuses on the development of a web framework that includes IoC containers and HTTP services, which have an important role in the development of modern web applications. The developed framework has the abilities to automatically analyze dependencies and integrate components flexibly by creating its own IoC container. Thanks to these features, an infrastructure has been created where developers can modularize their codes and easily create sustainable software development projects. In addition, HTTP services developed within this framework provide the basic communication mechanisms that web applications need. These services contain the necessary functions to process and route HTTP requests and present the results. The framework aims to provide a solid foundation for future web projects by offering an innovative and original approach.

AI-Enhanced Automotive Navigation: Enriching Driving Experiences through Intelligent Contextual Information Delivery

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Abstract

Improving in-car features and increasing the driving experience has become one of the main goals in the automotive industry. Driver-specific adjustments, automatic operations, increased functionality of infotainment systems and the development of automotive navigation systems, as discussed in this article, have been factors that improve driving quality. This paper presents a novel approach to navigation system development tailored for automotive use, aiming to enrich the driving experience through the integration of artificial intelligence (AI) technologies. The proposed system operates by leveraging AI algorithms to gather pertinent information about historical destination landmarks with temporal significance once a driver selects it via the navigation interface. Moreover, the system not only provides information about the selected destination, but also provides information about all historically important locations on the route, depending on the location over GPS. Subsequently, this information is intelligently synthesized and conveyed to the driver in a voice-assisted manner, enriching their journey with insightful details and enhancing situational awareness. By seamlessly integrating AI-driven contextual information delivery into the navigation paradigm, this system aims to not only facilitate smoother navigation but also elevate the overall driving experience. Through a synthesis of AI, natural language processing, and location-based services, this innovation represents a significant step towards more intuitive and enriching automotive navigation systems.

Artificial Intelligence in Banking Internal Demand Management Systems: The Example of Vakıf Participation Bank

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Abstract

The development of artificial intelligence and technology has accelerated the transformation of internal processes in the banking sector. In particular, Natural Language Processing (NLP) technology provides time and cost savings by automating processes such as data entry, querying, and reporting. While NLP-based systems increase customer satisfaction by understanding customer demands and providing appropriate responses quickly, they also increase operational efficiency. Classification algorithms, which are frequently used together with NLP technology, analyze text data and assign them to certain categories or classes, creating a powerful combination for the processing and analysis of text-based data. Vakıf Participation Demand Management System R&D Project has developed an NLP and classification model to be used in its internal processes. With the developed model, it was aimed to eliminate the problems encountered in workflow processes and increase efficiency by developing a language understanding model using the records of requests (demand management system) kept within Vakıf Participation and frequently used in operational processes. During this study, existing data containing in-house requests were subjected to pre-processing, and model training studies were carried out with these data. As a result of the developments, a model with 75% accuracy was developed and improvement efforts on the model continue. Thanks to the developed model, aims to shorten the response time for requests in the demand management system, reduce operational burdens, and increase internal customer satisfaction. It is planned to use the developed model in other banking internal processes as well.

Analyzing of the Single Pique and Double Pique Fabrics with Different Contents and Dyeing Effects

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Abstract

In apparel production, various fabrics are used. Among these fabrics, knitted fabrics are preferred due to their touch properties, high breathability, flexibility and comfort. Single-pique and double-pique fabrics are among the knitted fabrics preferred in the production of clothes generally worn in formal places such as business life. For this reason, although it is intended to give a formal attitude, physical and performance properties are important in pique fabrics. In this study, fabric developments were made to analyze the physical and mechanical performance properties of single-pique and double-pique fabrics. Dimensional change, color fastness to washing, color fastness to rubbing, color fastness to water, color fastness to perspiration, pilling, and bursting strength tests were performed on the developed fabrics, and the effect of fabric content and dyeing properties were investigated. According to the results, the general properties of cotton-polyester blended fabrics were found to be better. In addition, fabrics dyed in light colours were found to be more suitable for all properties except pilling. When the knitting type was analysed, it was determined that the physical properties of single pique fabric were more favourable.

Sorption properties of Remazol Navy RGB 150 from an aqueous solution onto activated carbon prepared from *Posidonia oceanica* seagrass

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Abstract

In this study, adsorption parameters were examined to remove RN- RGB 150 ions from aqueous solutions by using activated carbon obtained from *Posidonia Oceanica*, which is known as seagrass. The structure of activated carbon derived from *Posidonia Oceanica* seagrass was characterized by FTIR, SEM, and BET analysis methods. The significance of parameters such as temperature, solution concentration, adsorbent dosage, and the influence of time on the adsorption performance of RN-RGB 150 ions has been comprehensively investigated. The adsorption of RN-RGB 150 ions onto PO-AC demonstrated exceptional agreement with the Langmuir isotherm model, achieving a remarkable maximum adsorption capacity of 60.97 mg.g⁻¹ and an adsorbate density of 0.1519 L m.g⁻¹. This significant finding highlights the potential of PO-AC as a highly effective adsorbent for RN-RGB 150 ions, suggesting its suitability for applications such as wastewater treatment.

Development of Smart Software Program for Production and Order Tracking in the Textile Industry

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Abstract

As a result of growth and development in the industry, difficulties in managing increasingly complex information flows, international competitive conditions, and rapid change in technology have led the business world to seek different solutions. At this point, computer-aided order tracking systems stand out as tools that provide advantages to businesses. In this way, it becomes possible to be successful in competition in an environment of constant change, to be able to predict changing business conditions and to respond quickly to them. Companies use ERP (Enterprise Resource Planning) applications that ensure the efficient use of resources such as labor, machinery and materials required for the production of goods and services in their businesses. However, since these applications cover large areas, they cannot always provide a full solution to the specific operations of companies. Many business transactions in businesses are tracked through Excel tables. Within the scope of the study, it is aimed to develop an automation application that will allow companies to apply it without changing their operations, prevent errors and data loss with fixed formulas, and greatly increase efficiency with warning, order tracking and report structures.

Investigation of Mechanical and Liquid Transmission Properties of Hydroentangled Nonwovens
Containing Segmented Pie Bicomponent Fibers

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Abstract

The aim of this study is to investigate the performance properties (tensile strength, elongation, liquid strike through time, wetback and liquid absorption capacity) of hydroentangled nonwovens containing segmented pie bicomponent fibers. Within the scope of the study, different water jet pressures were used to investigate the effect of performance properties of nonwovens containing 8 segmented pie bicomponent (PET/PA) fibers on process variables such as water jet pressure. On the other hand, three different basis weights (30 g/m², 45 g/m², 60 g/m²) were produced on the same (apertured) pattern. The test results show that the water jet pressure affects the mechanical and liquid transmission properties of nonwovens containing 8 segmented pie bicomponent fibers. For products with the same basis weight and different water jet pressures, it was found that the tensile strength and elongation values increased as the water jet pressure increased. In addition, the liquid strike through time decreased as the jet pressure increased, while the liquid absorption capacity and wetback values increased. For the samples with the different basis weights, it was found that the liquid strike through time and liquid absorption capacity values decreased, and wetback values increased. In terms of mechanical



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properties, it was concluded that the tensile strength increased as the fiber content per unit area increased.

An Innovative Approach for Determination of Fuel Type Using Gasoline and Diesel Vapor -
SNIFFEX

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Abstract

It is known that the methods that have been used for many years to prevent large amounts of vehicle equipment consumption and environmental damage caused by incorrect fuel fillings (cross-fillings) do not work accurately.

In order to further minimize the damages incurred, it is aimed to develop a sensor device with a multi-disciplinary structure covering chemistry, physics and electronic methods.

Estimating One-Dimensional Barcode Image Orientation by Using 2D Fourier Transform: A CPU-Based Approach

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Abstract

Barcode detection and decoding are critical tasks in numerous industrial sectors, including inventory management, logistics, and retail. Despite the advancements in Artificial Intelligence (AI) and Machine Learning (ML), many existing barcode detection methods rely heavily on GPU-accelerated techniques or are confined by specific angle requirements, limiting their versatility and computational efficiency. In this paper, a novel approach for stabilizing barcode image orientations using the 2D Fourier Transform was developed, with an emphasis on CPU-based implementation.

A Research Study on Pigment Paste and Paint Contributing Energy Saving by Absorbing Energy from Light Sources and Emitting Light in the Dark

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Abstract

Glow in the dark (also called as photoluminescent) paints have the ability to absorb light from natural and artificial light sources and glow in dark medium. They can be easily charged since they have the ability to use ambient light (sun light, led lamps, fluorescent lamps etc.) as energy source. In case of emergency such as power outages occurred related to earthquakes and other natural disasters, the paint uses the energy absorbed and glows in the dark by emitting this energy in light form. Hence, it ensures safety by making emergency exits, stairs and information/safety signs visible for a while and prevent the accidents happen due to lack of lighting. Photoluminescent paints can also be applied onto light switches, baseboards, kitchen cupboard and decorative accessories. Besides, by the application of photoluminescent paint in tunnels and highways with intense vehicle traffic, the amount of energy used in both tunnel lighting and highways can be reduced by utilizing the light absorbed by the paint. Within the scope of this study, waterborne photoluminescent pigment paste formulation was created and the pastes were produced primarily. Afterward yellow-green colored pigment paste was selected (from a group of pigments that has different colors) to be used as colorant in waterborne road marking paint, bike lane paint, tennis court paint and hobby paint groups. The paint produced



were applied onto test panels and luminance values and luminance time of the panels were measured.

Brachytherapy Method Using Individualized Applicators to Increase Efficiency in Skin Tumors Treatment

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Abstract

Brachytherapy method using individualized applicators to increase efficiency in skin tumors treatment is presented. Skin tumors are one of the most common types of cancer in the world. Nonmelanoma skin basal cell and squamous cell skin carcinomas, known as NMSCs, are the most common cancers. The main purpose of this work is to comprehend basic treatment methods of skin tumors. The other purpose is to emphasize advantages and impact of the brachytherapy method using individualized applicators. Earlier skin tumor treatment methods are surgery and external (electron beam) radiotherapy. However, the brachytherapy method not widely used in skin tumor treatment process provides more efficient results due to the usage of individualized applicators specially produced for patients. Conclusively, individualized applicators provides more benefits and the fact that these applicators are improved much facilitates treatment process.

Automatic Measurement System (AMS) for Parcels

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Abstract

The demand for efficiency, accuracy, and cost-effectiveness has never been higher in the rapidly evolving delivery and cargo industry. This work presents a novel system designed to automatically measure the size and volume of rigid objects, addressing key challenges faced by logistics, retail, and transportation companies. Leveraging Computer Vision techniques the proposed system ensures precise and consistent measurements, optimizing space utilization and reducing operational costs. It can be integrated seamlessly with inventory management systems.

Multidimensional Next-Generation Time and Transition-Aware Product Recommendation System

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Abstract

In the dynamic landscape of e-commerce, the proliferation of products has immensely complicated the process of effective product discovery. With over 14 million items listed on platforms such as Pazarama.com, consumers often struggle to navigate through extensive catalogs to find products that genuinely meet their evolving needs. This challenge is exacerbated in categories requiring sequential consumption, such as baby products, where the progression from one product stage to another is not only inevitable but critical.

Traditional recommendation systems primarily rely on static historical data. While these systems provide baseline suggestions based on past purchases or general popularity, they often fail to capture the nuanced and immediate requirements of consumers. For instance, a parent purchasing size one diapers will soon need to transition to size two, and a static system might continue to recommend size one, ignoring the child's growth. Moreover, these systems are not equipped to handle anomalies or data inconsistencies, often stemming from privacy regulations like the General Data Protection Regulation (GDPR), which can skew the effectiveness of the recommendations provided.

This paper proposes a novel approach that integrates Recurrent Neural Networks (RNNs) and Long Short-Term Memory (LSTM) networks to develop a multidimensional, next-generation product recommendation system. This system accommodates time-sensitive needs and transitions in consumer product stages, predicting future product requirements based on evolving consumer stages while handling anomalies and data inconsistencies due to privacy concerns. Furthermore, it offers real-time updates and integrates seamlessly with social media and online platforms to enhance user engagement and satisfaction.

By employing time series analysis and advanced AI techniques, this model aims to improve the accuracy of personalized recommendations, support the introduction and marketing of new or



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rare products, and ultimately enhance the overall user experience on platforms like Pazarama.com. Through this approach, the paper demonstrates the potential for advanced recommendation systems to transform online retail environments by increasing sales, enhancing customer interaction, and expanding the technological repertoire of e-commerce platforms.

An Application of Self-Healing Clear Coat

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Abstract

The self-healing concept for an acrylic polymer was investigated. In the study, the self-healing performance of the developed varnish was examined. Varnish used; It is a two-component, solvent-based, hydroxylated acrylic resin-based varnish. An isocyanate-based hardener was used as the second component. To demonstrate self-healing performance; Varnish mixed with hardener and thinner in appropriate mixing ratio was applied to the surface with a spray gun. Deformation was created on the varnish, which was cured at 80°C for 30 minutes, and the self-healing performance of this deformation was monitored by gloss measurements. At the end of the study, it was determined that the varnish developed could self-heal at a rate of 90%.

Using and Comparison of Artificial Intelligence Techniques to Detect Misinformation and Disinformation on Twitter

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Abstract

This research investigates diverse artificial intelligence (AI) techniques for detecting misinformation on Twitter, addressing the pervasive concern of misinformation and fake news affecting public discourse. Employing models such as Long Short-Term Memory (LSTM), Support Vector Machine (SVM), Random Forest Classifier, Multinomial Naive Bayes and Gradient Boosting Classifier, we discern deceptive content from reliable information. Utilizing a dataset of 23,481 false tweets and approximately 21,417 real tweets, our analysis leverages Natural Language Processing (NLP), Deep Learning (DL) and Machine Learning (ML) techniques, showcasing the effectiveness of each model in identifying misinformation patterns. Our investigation rigorously assesses the strengths and limitations of AI techniques, focusing on accuracy, efficiency and scalability. Notably, the best results are achieved by models such as LSTM (98.84% accuracy, 98.79% F1 score), SVM (99.44% accuracy, 99.44% F1 score) and XGBoost Classifier (99.82% accuracy, 99.81% F1 score). The findings provide valuable insights into the performance of key models and serve as a resource for academics and researchers in the fields of artificial intelligence and social media analysis. Additionally, they provide practical guidance for supporting information integrity on Twitter, contributing to ongoing efforts to combat misinformation and enhance information credibility.