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CONFERENCE INFORMATION

IC-IETM 2019 brings together leading academic scientists, researchers and figures of industry to exchange and share experiences and research results about all aspects of Industrial Engineering and Technology Management.

IC-IETM offers a burgeoning field of study as it consists of diverse scientific disciplines including, but not limited to, industrial engineering, systems engineering, technology management, and science(s). Thanks to exponential computing growth, technologies emerge so rapidly that if they are not managed effectively, public acceptance and adoptability becomes an issue. To optimize the system of emerging technologies, industrial engineering encompasses significant tools and methods. Quality control, operations research, simulation modeling, forecasting, manufacturing, production planning, and ergonomics are some key areas that industrial engineering can offer significant aid for technology managers. From a management perspective, ethics are also essential in engineering, or any business practice, and play a crucial role in managerial decisions.

Understanding the growing importance of industrial engineering and technology management, Texas A&M University–Commerce announce the 3rd International Conference on Industrial Engineering and Technology Management (IC-IETM), which will be held in San Antonio, TX on October 25-27, 2019. IC-IETM (2019) is being organized on a special theme which is “Industrial Engineering for Effective Management and Development of Emerging Technologies”

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Innovation: A Guide for Freshmen Engineering Students

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Abstract: Innovation, entrepreneurship, and leadership are critical skills for engineering students. Practical innovative projects help students develop their portable skills. Portable skills are skills that can transfer from one occupation to another, and from school to work. Companies profit and grow through the development of innovative products and designs. Engineers are often the leaders of product development teams. For product development in education, a structured plan may be used to encourage brainstorming and help enhance creativity. This paper outlines the process for teaching critical innovative skills in our class “Introduction to Engineering.” The steps taught to develop innovative products are: idea generation, market research including stakeholder analysis, evaluation, product design and development, product protection, and commercialization. Through the use of these steps and skill development, we give students the tools to develop their innovation, entrepreneurship, and leadership skills.

Keywords: Projects, Innovation, Entrepreneurship, Leadership

Constructing A Model Using The Analytic Hierarchy Process (Ahp) to Evaluate The Occupational Health And Safety Performance in Surface Mines

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Abstract: Occupational health and safety is a major concern for all industries including manufacturing, construction and service industry such as hospitals and schools. Adapting good safety management rules brings major moral, legal and economic benefits. Therefore, several organizations have been established worldwide to legislate, monitor and enforce occupational health and safety rules on organizations. One of the most dangerous industries is surface mining. It includes extracting, transporting and processing of minerals. This study constructs an occupational health and safety model using the multi-criteria decision-making tool; AHP to evaluate and compare the performance of surface mining companies in Jordan. This evaluation model serves as an auditing tool to rank companies based on best occupational health and safety rules implementation. The model criteria and sub-criteria are based on many sources, which are; the International Labor Organization (ILO) conventions and recommendations, the United Kingdom Health and Safety Executive (HSE) approved codes of practice, the safety regulations of the Jordanian labor law, and published literature from recent studies and books. The model consists of eleven criteria and thirty-six sub-criteria. The model has been evaluated by experts in the field and analyzed using computer software called Expert Choice®. The results showed that four out of eleven criteria are significant; those criteria are in descending order are the Explosives, the Mine Planning, the Safety System and the Excavation and Face Stability. Finally, a case study has been conducted on three surface mining companies based in Jordan to prove the model applicability and effectiveness. Also, a sensitivity analysis has been performed to monitor the effect of changing the criteria weights on the alternatives ranking. In conclusion, the model shows a high reliability, applicability and effectiveness in real life problems.

Keywords: Occupational Health and Safety, Surface Mining, Multi-Criteria Decision Making, AHP

Applications of Artificial Intelligence in Vehicular Networks: Review

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Abstract: It was the year 1952 when we saw the first breakthrough in artificial intelligence when Arthur Samuel developed a checkers playing computer. Since then, the advancement of artificial intelligence has been significant. From employing neural networks to play chess to detecting cancer using artificial intelligence, the advancement is indeed a quantum leap. The emerging application of artificial intelligence is in vehicular networks. This review paper discusses the various challenges in vehicular networks and how artificial intelligence can be used to overcome these challenges. The paper also outlines how artificial intelligence can assist vehicular networks to increase efficiency.

Keywords: Artificial Intelligence, Neural Networks, Quantum Leap, Vehicular Networks

Quality Assessment of Essential Oils in Indonesia: Development of National Standards

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Abstract: In this article, the issues of developing national standard for quality assessment of essential oil in Indonesia are considered. As one of the largest essential oil producing countries, Indonesia may potentially contribute in supplying the high demand of world's essential oils. Such global demand is in line with the increasing growth of global modern industries such as food and beverage, cosmetics, and pharmaceutical. However, the export process of Indonesian essential oil products is hampered by the lack of reliable standard method related to the quality assessment which unable to meet global market requirement. The purpose of this study is to evaluate Indonesian national standard for quality assessment of essential oil. The study is conducted by evaluating all existing national standards whether or not they are needed to be refined, while evaluating for a possibility for the development of new national standard is discussed. Activities on developing national standard is a collaborative process that involves stakeholders including government (regulator), producers and users from across Indonesia with expert input. The mechanism to support the use of national standard for the quality assessment of the essential oil in Indonesian is also evaluated and the results are presented.

Keywords: Essential Oils, Indonesian National Standard, Quality Assessment, International Standard Organization, Export Import.

Technological Management and Economic Diversification, An Approach to Dynamics of Techno-Economic Networks: The Case of The Medellin And Its Metropolitan Area

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Abstract: On the work of Universidad EAFIT and the research group of technologies for production from engineering school, this paper analyzes the relationship between current industrial structure and the development of new industries in the metropolitan Area of Medellin as a perspective of technology management in sectors with high performance potential. The work has dedicated to two sections. The first one as a measure of product relatedness, we used the proximity index proposed by Hidalgo et al and constructed a density measure, following Hausman and Klinger to capture the degree of relatedness between the current industrial structure and exported product. The econometric results provide evidence that some sectors tend to diversify into new products that use available capabilities from existing economic activities. Next, the performance of these sectors is studied in relation with the s” curve” of technologies as a graphic representation of the performance evolution obtained over time by the use of technology through a statistical analysis be able to identify the state of development in which it; the mathematical model involves finding the inflection points that have been presented during the life of technology through of a statistical regression. Likewise, the first and second derivative of the function, to determine the velocity and the acceleration of changes with the aim of, facilitating the formulation and implementation of clear technological strategies and timely, that add value in the innovation strategy. The results show that the development of a new product benefits from available capabilities, depends on its initial level of specialization and which aspects must be prioritized in the process of technology management to develop capabilities transfer and product diversification for the studied case.

Keywords: Economic Diversification, New Industries, Capabilities Transfer, Technological Management, Manufacturing

Optimizing Quality in Precision Additive manufacturing: A Systematic Approach

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Abstract: The drastic advancement of additive manufacturing (AM) in printing materials combining with building technologies is driving the capacity of AM to a more precise level. With material innovation of composite fiber mix, metallic powder, and biomaterials, industrial sectors including aerospace, automotive, and medical device are seeking ready adoption of precision AM. However, due to high safety concerns and regulative constraints, quality control can be a challenge in the industrial application of precision AM. The aim of this project is twofold: to review current quality control research in precision AM and to define the optimal configurations in the product development and building cycle with a systematic approach. The systematic approach encompasses examining the holistic manufacturing process from product design to post-process treatment, and final product measuring and testing.

Keywords: Precision Engineering, Additive Engineering, Quality Optimization, Systematic Approach

Artificial Intelligence Assisted Diagnosis Tool for Cognitive Decline

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Abstract: Dementia is a devastating disease that prevails in older adults. People with dementia experience loss of cognitive functioning to an extent that it interferes with one's social or occupational functions. Although the rate of progression of dementia is highly variable, it is useful to find the patterns of its progression. The aim of this study is to develop a tool based on Artificial Intelligence that is ready to use in clinical settings, that has high performance in accuracy and sensitivity. We use machine learning techniques and semi-parametric models to embed the machine-learned knowledge to a database and the reference diagnosis results can be extracted based on patient's profiles. This non-intrusive AI-assisted diagnosis tool provides valuable insights to physicians and patients.

Keywords: Cognitive Decline, Artificial Intelligence Assisted Tool, Diagnosis, Dementia

Big Data Overview, Challenges, Issues, Analysis Techniques and tools -A Review

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Abstract: Most of the 5G systems depend on Internet of Things (IoT) devices that generate huge amount of data from health monitoring, traffic sensing, fraud detection ,weather monitoring , natural disaster , commercial devices etc . Doctors, disaster relief agencies, Cities and businesses rely complete on it to make sense of it. Nowadays, recommender system is also emerging as a promising way of communication between user and massive amount of data. For this purpose, decision makers need to be able to gain valuable insights from varied and rapidly changing data, ranging from daily transactions to customer interactions, shopping websites and social network data. Such value can be provided using big data analytics. Agencies and Clients demand highly accurate, real-time analysis of data so they can respond to a disaster and make rapid business decision. Traditional technologies are failed while dealing with big data. Until now, no model exist that can handle dynamic and time-sensitive data analysis. This paper emphasize on Big data analytics overview, research challenges, issues, machine learning algorithms and emerging tools related with big Data. We are trying to figure out correct approach to retrieve valuable information from the big data for decision making. The complex issues of data analysis need usage of distributed and parallel computing-based systems and technologies. Hadoop-based tools are the most popular solutions for efficiently handling of big data analysis and clustering problems. By using Quantum computing concept in combination with the clustering method, we can improve the machine learning algorithms by evolving the clustering parameters. So a hybrid model formed by combining various machine learning algorithms using quantum computing concept on Hadoop platform may prove to be the solution to deal with big data.

Keywords: 5G,Internet of Things, Big data analytics, Decision making, Quantum Computing

Preventive Maintenance Model with Offshore and Onshore Reliability Data

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Abstract: Preventive maintenance (PM) is an arrangement of activities performed to increase the life expectancy and reliability of the equipment so that they can function with maximum productivity. It includes an exchange between the expense of conducting maintenance and the resource-saving achieved by decreasing the overall rate of failure occurrence. The main objective of this research is to develop an effective and efficient maintenance schedule to prevent failure in advance so that, eventually, it increase productivity and profitability. To develop the preventive maintenance schedule, this research uses the data of the OREDA handbook. In the 80's, the oil and gas industry faced a lot of challenges that jeopardized their profitability and threatened their overall long-term survival. The Offshore and Onshore Reliability Data (OREDA) project was established in the year 1981 to collect reliability data for offshore equipment. The primary participants for OREDA projects are BP Exploration, Neptune energy, ENI, Gassco, Petrobras, Equinor & Total. Each participant collects data by using their resource which is further coordinated by the respective project managers of each company. OREDA consists of information which can be classified into various categories, such as, the failure rate of components, their maintenance data, and operational characteristics. The data was analysed by applying statistical techniques. The failure rate is expressed as discrete data. For the ratio of the cost of failure to the cost of repair, this research examined nine different ratios and achieved the reliability calculation for each ratio. Based on these calculations, the ratio of 1000:1 was used. To calculate the optimal days for preventive maintenance, this research used statistical methods. In practice, these results should be visualized and mapped on a calendar year. The python programming language was used to accomplish this by correlating the decision-making target. General optimization of schedule was based on characteristics of the individual components. The goal was to maximize the operational readiness of individual components by identifying the failure rate and active repair time in the preventive maintenance schedule. The total duration of the scheduling was assumed to be three years. The optimal day for each component was allocated within this time period. This established the schedule for a long-term maintenance plan. The maintenance schedule was deployed as Gantt chart. This makes it visually easy to identify the conflict between tasks on same days. When scheduling preventive maintenance for items, there is a possibility that more than one item need inspection.

Due to a time and resources constraints, the preventive maintenance schedule may not be performed as promised. Some components may need to be repaired before other components. To identify these conflicts, this research developed various scenarios; Prioritization based on the flexibility of time, the failure frequency of components, the cost of components, and the ratio of costs. The outputs of this research show that the proposed method provides an effective preventive maintenance schedule, considering resource constraints. Acknowledgements: The authors would like to acknowledge the contributions of Yadav Anurag Devicharan, a graduate Industrial Engineering student at the time this research was initiated.

Keywords: Preventive maintenance, OREDA, Data analysis, Maintenance scheduling