PROCEEDING OF

INTERNATIONAL CONFERENCE-2024

HYBRID EVENT

17th - 18th May 2024

Organized By

Co-organized by

Publisher: Institute for Technical and Academic Research (ITAR)

Editorial

We are delighted to extend a warm welcome to all participants attending the International Conference 2024 on 17th - 18th May 2024. This conference provides a vital platform for researchers, students, academicians, and industry professionals from all over the world to share their latest research results and development activities in multidisciplinary fields. It offers delegates an opportunity to exchange new ideas and experiences, establish business or research relationships, and explore global collaborations.

The proceedings for International Conference 2024 contain the most up-to-date, comprehensive, and globally relevant knowledge across various disciplines. All submitted papers underwent rigorous peer-reviewing by 2-4 expert referees, and the papers included in these proceedings were selected for their quality and relevance to the conference. We are confident that these proceedings will not only provide readers with a broad overview of the latest research results but also serve as a valuable summary and reference for further studies.

We are grateful for the support of many universities and research institutes, whose contributions were vital to the success of this conference. We extend our sincerest gratitude and highest respect to the professors who played an important role in the review process, providing valuable feedback and suggestions to authors to improve their work. We also appreciate the efforts of the technical program committee, reviewers, and authors for their dedication.

Since March 2024, the Organizing Committee has received more than 60 manuscript papers, covering various aspects of multidisciplinary research. After review, approximately 20 papers were selected for inclusion in the proceedings of International Conference 2024.

We thank all participants for their significant contribution to the success of the conference. Our gratitude extends to the keynote speakers, individual speakers, technical program committee, reviewers, and the organizing committee for their efforts in making this conference a reality.

Acknowledgement

The International Conference 2024, was successfully held in 17th - 18th May 2024. We extend our heartfelt gratitude to our colleagues, staff, professors, reviewers, and members of the organizing committee for their unwavering support in making this conference a success.

We would also like to thank all the participants who traveled far and wide to attend this conference and those who attended the event virtually, making it a truly global event. This conference provided a platform for students, professionals, researchers, and scientists to share their latest research and developments in various disciplines.

The aim of the conference was to promote research and development activities and to encourage scientific information exchange between researchers, developers, professionals, students, and practitioners from all around the world. Once again, we thank everyone who contributed to making this conference a resounding success.

Dr. Albert Munroe
President
Institute for Technical and Academic Research (ITAR)

Contents:

Abstract

Youth Unemployment: Reasons and Impacts from the Perspective of Youth

Uğur Çalışkan
Muğla Sıtkı Koçman University, Faculty of Tourism, Türkiye

Işıl Arıkan Saltık
Muğla Sıtkı Koçman University, Fethiye Faculty of Business Administration, Türkiye

Umut Avcı
Muğla Sıtkı Koçman University, Faculty of Economics and Administrative Sciences, Türkiye

Beytullah Ceylan
Menteşe Municipality, Muğla / Türkiye

Kerem Ekinci
Muğla Metropolitan Municipality, Türkiye

Elvan Kocagöz
Muğla Chamber of Commerce and Industry, Türkiye

Esra Çolak Yıldız
Muğla Chamber of Commerce and Industry, Türkiye

Abstract:

Traditionally, participation in business life, after an education period, is perceived as an important part of the life cycle, in personal lives but also for societal structures. However, the unemployment rate among young people is now one of the top priority problems in both developing and developed countries, and the number of studies on the problems and expectations of young people, not in employment, education or training (NEETs), is augmenting. This study was carried out to examine the problems of participation in the workforce from young people's perspective, and analyses the in-depth interviews with 32 NEET. The results indicate that the participants think that the reason for unemployment among young people is mainly young people themselves, and that the young generation are not very keen on working and tend to find easy ways to make money. Moreover, they emphasized that the limited job opportunities suitable for young people's expectations and qualifications, difficult working conditions and low salaries, are the other most important problems. The study reveals out that unemployment makes the young people dependent on others (especially the family) to meet their needs and makes them feel themselves as burden, which brings many psychological problems such as loneliness, unhappiness, aggression, loss of self-confidence and of life purpose. Participants stated that they want to have job since a job would mainly bring feeling of "success" and "self-confidence", and social respect. The second most frequently emphasized factor was to achieve economic freedom, and to meet needs without relying on others. In this context, considering that young people's exclusion from the labour market also has negative communal socio-economic impacts, addition to negative impacts on individuals, the study results underline that

increasing job opportunities meeting the expectations of young people, and that formulating policies and practices to transform the market and increase the desire of young people to work is crucial and necessary.

Untangling the Energy-Growth Nexus: A Multifaceted Approach to Unify Policy and Sustainability

Abdelhadi Benghalem
Associate Professor at Oran Graduate School of Economics, and ERF Research Associate.
MECAS laboratory, Abou Bekr Belkaid Tlemcen University

Zakaria Guellil
PhD Student, European Institute on Management and Technology, Switzerland

Mohamed Benbouziane
Professor of finance at the faculty of economics and management Tlemcen, Director of the CREAD Unit Tlemcen

Abstract:

Background: The intricate relationship between energy and economic growth has been the subject of extensive research, with studies rigorously examining the causal dynamics between real income and energy use. The significance of this exploration lies in its direct impact on the formulation of energy policies and the prediction of their economic consequences. It is imperative to discern not only the correlation but also the direction of causality within the energy-income nexus. If empirical evidence indicates that energy consumption fosters economic growth, policymakers may need to reevaluate the imposition of stringent energy conservation measures, which could inadvertently impede economic advancement (Xie et al., 2023)

Despite the powerful tools offered by advanced econometric methods to analyze the energy-economic growth relationship, a major barrier to formulating reliable policy recommendations remains. These tools, while sophisticated, often produce conflicting, even contradictory results, leaving energy and environmental policymakers unsure how best to proceed.

The quest to understand the intricate relationship between energy consumption and economic growth is driven by the urgent need to balance economic development with sustainable energy use. As global energy demands continue to rise, the implications for economic stability, environmental sustainability, and policy-making become increasingly significant. This study is motivated by the desire to contribute to a clearer, more nuanced understanding of this relationship, which is pivotal for crafting informed and effective energy policies that support both economic growth and sustainability.

Objectives: Synthesize Existing Research: To compile and synthesize the findings from various empirical studies that have explored the energy-growth nexus, providing a comprehensive overview of the current state of knowledge.

- To Analyze Diverse Econometric Models: To critically analyze the diverse econometric models used in the literature, assessing their strengths and weaknesses in capturing the relationship between energy consumption and economic growth.

- To Identify Consistencies and Discrepancies: To identify consistencies and discrepancies in the results of previous studies, and to understand the factors contributing to these differences.
- To Explore the Role of Advanced Econometric Methods: To explore the potential of advanced econometric methods, including machine learning and panel approaches, in providing more robust and insightful analyses of the energy-growth relationship.
- To Recommend Directions for Future Research: To recommend promising directions for future research that can address the gaps identified in the literature and provide more definitive insights for policy-makers.

Methodology: This study adopts a multifaceted methodology to unravel the causal link between energy consumption and economic growth, a topic that has garnered widespread empirical attention. The investigation is structured around four prevailing hypotheses:

Growth Hypothesis: Proposes a unidirectional causality from energy consumption to economic growth. Conservation Hypothesis: Suggests unidirectional causality from economic growth to energy consumption.

Neutrality Hypothesis: Indicates no causal relationship between energy consumption and economic growth.

Feedback Hypothesis: Highlights a bidirectional, interdependent causality between energy consumption and economic growth.

A chronological review of empirical research will be presented, detailing the evolution of the discourse and the methodologies employed across different studies. This review will be encapsulated in a table which will serve as a reference for the analysis.

The countries under study will be categorized based on their OECD membership status, providing a comparative lens through which the energy-growth nexus can be examined. This classification will allow for a nuanced understanding of how economic frameworks and energy policies influence the causal dynamics.

A bibliometric analysis will be conducted to map the landscape of research in this domain, identifying key trends, influential studies, and gaps in the literature. This analysis will leverage data from comprehensive databases, ensuring a robust and representative sample of the field's body of work.

Following the bibliometric review, a critical analysis of different econometric methods applied across various countries will be undertaken. This will involve comparing the results obtained from these methods, highlighting consistencies and discrepancies that have emerged in the literature.

Finally, the study will explore new directions for future research, particularly focusing on the long-term relationship and causality between energy consumption and economic growth. This will include considering the potential of emerging technologies and methodologies, such as artificial intelligence, to provide fresh insights into this enduring research topic.

The discussion highlights the complexity of the energy-growth nexus and the need for robust empirical research to inform policy-making. The recommendations for further research emphasize the use of advanced econometric methods and the consideration of additional

variables that may influence the relationship between energy consumption and GDP. These include:

Multivariate Causality: Investigating the multivariate causality between energy consumption and GDP could provide a more comprehensive understanding of their interdependencies.

Extended Data Sets: Utilizing longer time series and additional control variables such as labor and capital can help in capturing the true dynamics of the energy-growth relationship.

Demographic Factors: Including data on total population can reflect the demographic demands for energy and its impact on economic growth.

Government Expenditures: Examining the role of public investments in energy infrastructure can reveal its influence on energy production/consumption and economic growth.

Financial Development: Assessing the condition of financial institutions and markets is crucial as they play a significant role in the development of the energy sector.

CO2 Emissions: Integrating CO2 emissions data in the causality analysis can help identify the interactions between energy production/consumption and economic growth.

Economic Crisis: Using a dummy variable to reflect the impact of economic crises can provide insights into their effects on the energy-growth nexus.

Main Results: The suggested econometric methods for future research include:

Nonlinear Threshold Regression Model: This model can determine the levels at which energy consumption affects GDP, aiding in the formulation of appropriate economic and energy policies.

Leveraged Bootstrap Technique: Suitable for small sample sizes, this technique can improve the accuracy of statistical inferences.

Panel Approach: Combining time series with cross-sectional data can enhance the efficiency of econometric estimates and provide more informative data.

Machine Learning Algorithms: These can handle large datasets and uncover complex nonlinear relationships that traditional econometric models might miss. Techniques like random forests, neural networks, and support vector machines can provide valuable insights.

Time-Varying Parameter (TVP) Models: These models allow parameters to change over time, capturing potential shifts in the energy-growth relationship due to technological advancements or policy changes.

Conclusion: The conclusion underscores the importance of producing sound, robust, and consistent empirical results that can guide policymakers in implementing effective policies. It also suggests that researchers should focus on innovative approaches rather than relying on traditional methods that may not contribute significantly to the existing literature.

Keywords:

Energy Consumption, Economic Growth, Econometric Models, Policy Implications, Sustainable Development

Mapping of Cybersecurity Competence Assessment and Human Factors in Cybersecurity Exercises

Karina Čiurlienė
Department of Information Systems, Vilnius Gediminas, Technical University Saulėtekio al. 11, Vilnius Lithuania

Abstract:

The cyber attacks are becoming more sophisticated therefore higher competence of the cybersecurity professionals is required to protect IT systems. Knowledge and competencies are the key factors allowing one to recognize potential threats, understand the importance of security protocols, and adopt best practices, therefore education plays a crucial role in increasing the experience of cybersecurity professionals. Cybersecurity is an interdisciplinary field that includes aspects of information technology, forensics, and cognitive aspects of human behavior and thinking, so decision-making during cyber attacks or security incidents depends not only on technical knowledge but also on human factors such as personal data including experience, education, habits as well as social-psychological aspects such as emotional environment, self-control, motivation, etc. Therefore, a competence assessment of cybersecurity professionals must be performed including the aforementioned parameters. Also, it must be pointed out that data about the dominant characteristics and risks of cybersecurity professionals makes it easier to select appropriate competence assessment methods.

The goal of this research was to analyze cybersecurity competence assessment methods based on data collected using surveys during the cybersecurity defense exercise "AMBER MIST 2023" and the biggest hackathon of cyber defense and security innovations in the Baltic States – "FIRE SHIELD 2023" that was organized in Lithuania. Competence assessment data as well as human factors were included in the analysis. Also, the cybersecurity competence assessment method was proposed based on the following data such as user profile, experience in cybersecurity, teamwork, stress, emotion, and motivation. Moreover, Bloom's taxonomy was used for mapping cybersecurity competence and assessment methods. The results of this research allow us to understand the relationship between the competence model and assessments as well as complement cybersecurity training programs.

Pre-Employment Cards and Limited Printed Money on Indonesia's Economic Growth

O'neal Sandros Reflino

Research is fully supported and funded by the Education Fund Management Agency (LPDP) of the Republic of Indonesia

Abstract:

Card Pre-employment and currency edition limited, or Quantitative Easing (QE) is two step applied economics _ Indonesian government as response to crisis economy consequence COVID-19 pandemic. Card Pre-employment is a purposeful training and education program for increasing skills and productivity of employees. Quantitative Easing is policy monetary purpose _ For increase liquidity and encourage growth economy. Study This aim for analyze effectiveness Card Pre-Employment and Quantitative Easing towards growth economy in Indonesia. Study This using quantitative data from Bank Indonesia and the Central Statistics Agency (BPS). The data includes growth data economy, inflation, National Income, National Consumption, and Currency Circulation. Study shows that Card Pre-employment impact positive to growth economy in Indonesia. Card Pre-employment prove capable of increasing skills and productivity power work in the end increase production and income national. On the other hand, Quantitative Easing No give significant impact _ to growth Indonesian economy. Quantitative Easing proven No capable increase liquidity and encouraged investment. Based on results study Accordingly, it is recommended that the Indonesian government continue the card program pre-Work. This program proven effective in increase skills and productivity employee so that can push growth Indonesian economy.

Keywords:

Card Pre-Employment, Limited Money Printing, Quantitative Easing, Economic Growth.

Dyeing Cotton Fibre with Reactive Dyes in Sustainable Way

Chi-wai Kan
Professor and Associate, School of Fashion and Textiles, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong

Abstract:

In this study, we developed a sustainable dyeing system for cotton fibre, using reactive dye, based on the use of reverse micelles. The following dyeing parameters are considered: (i) surfactant to water mole ratio); (ii) surfactant to co-surfactant mole ratio); (iii) solvent to cotton weight ratio; (iv) dyeing and fixation temperature; (v) dyeing time; (vi) fixation time; (vii) water-pool volume for dye; and (viii) water-pool volume for soda ash. We optimized the dyeing parameters so that the best colour yield was achieved in this sustainable dyeing system. In addition, this sustainable dyeing system can produce a better colour yield than conventional water-based dyeing system with the use of electrolytes. The experimental results would be discussed. SEM images show the surface morphology of the cotton fibre has a tough fibre surface in this sustainable dyeing system.

Keywords:

Cotton, Reactive Dye, Sustainable Dyeing, Water Dyeing, Fibre.

Determination of Variability of Total Polyphenol During Storage in Georgian Grape Varieties

Iveta Megrelishvili
Georgian Technical University, Biotechnology Center, Kostava st 77, 0171, Tbilisi, Georgia

Tamar Chipashvili
Georgian Technical University, Biotechnology Center, Kostava st 77, 0171, Tbilisi, Georgia

Maia Kukhaleishvili
Georgian Technical University, Biotechnology Center, Kostava st 77, 0171, Tbilisi, Georgia

Tamar Shamatava
Georgian Technical University, Biotechnology Center, Kostava st 77, 0171, Tbilisi, Georgia

Gvanca Komladze
Georgian Technical University, Biotechnology Center, Kostava st 77, 0171, Tbilisi, Georgia

Abstract:

Phenolic compounds have a significant impact on physiological and biochemical processes during both the vegetation period and storage. The phenolic compounds of grape varieties and the impact of their changes during the storage of table grape varieties have not yet been studied in Georgia.

The study aimed the determination of variability of total polyphenol during storage in Georgian grape varieties “Vardzia” and “Kolkhuri” during 2022-2023 years. Grape were placed in cold storage conditions (SO2 treatments periodically, temperature- 0 °C, and humidity-85-90%) during 90 days.

The determination of total phenolic content was performed using Folin & Ciocalteu's phenol reagent (Folin-C reagent), the resulting colorimetric reaction is measured at 765 nm using UV-5100B UV/VIS (M&A Instruments INC) Spectrophotometer with a standard curve generated with gallic acid standard solutions (10-50 μg/ml).

According to the results of the research, it was determined that at the beginning of storage, the phenolic content of both varieties of grapes “Vardzia” and “Kolkhuri” was similar respectively 183,0 mg/100g and 173, 6 mg/100g frehs weight;

At the end of storage (90 days), the total content of phenolic compounds decreased in both varieties, the lowest phenolic amount was revealed in “Vardzia" variety (52.6 mg/100 g) and comparatively high rate of phenolic compaunds was preserved in "Kolkhuri"(93.39 /100 g).

Despite the decrease of content of phenolic compounds, the commodity properties of both grapevine varieties were preserved which is due to the selected cold storage conditions and usage of SO2 (the metabolic processes are slowed down including the rate of oxidation of phenolic compounds) while large amount of phenols causes an undesirable color change in the fruit and decline of the commodity properties.

Keywords:

Grapevine, storage, Phenolic compounds, storage condition.

The Influence of the Maturity Level on the Storability of the Grape Variety "Iveria" According to Biochemical Parameters

Maia Kukhaleishvili*
Georgian Technical University, Biotechnology Center, Kosatava st 77, 0171, Tbilisi, Georgia

Ekaterine Bulauri
Georgian Technical University, Biotechnology Center, Kosatava st 77, 0171, Tbilisi, Georgia

Iveta Megrelishvili
Georgian Technical University, Biotechnology Center, Kosatava st 77, 0171, Tbilisi, Georgia

Merab Jgenti
Georgian Technical University, Biotechnology Center, Kosatava st 77, 0171, Tbilisi, Georgia

Abstract:

Grape storage is a set of technological processes aimed at keeping the product for a long period with a minor change in its quality. In recent years, table varieties of grapes has a great interest in Georgia, due to their taste qualities, but their storage ability has not yet been studied.

The study was aimed to determine the influence of the maturity level on the storability of the grape variety "Iveria" according to biochemical parameters: Total sugar, Ascorbic acid, free organic acid and amino acid.

The Samples were collected in the vineyards of Jighaura village in Mtskheta Municipality at the two stage of maturity in September 2022-2023 years with an interval of 14 days. Grape were placed in cold storage conditions (10 and 15 g/ 10kg potassium metabisulfite treatments periodically, temperature- 0 °C, and humidity-85-90%) during 90 days.

The total sugar were determined using Bertrand titration method, electro generation of hydroxide ions was carried out for determination of total organic acids, ascorbic acid (mg / 100 ml) by redox titration of 10 ml of I2 in grape juice and total amino acid using the Spectrophotometer UV-5100B UV/VIS (M&A Instruments INC) the resulting colorimetric reaction is measured at 570 nm with a standard curve generated with Ninhydrin standard solutions.

Based of the obtained results, it was revealed that at the end of the second period harvested grapevine variety "Iveria" storage there was a slight decrease in total sugars, (0.9%) titratable acidity, (0.02%) vitamin C (1.8%) and total amino acids, (0.091kg/ml) compared to the harvest in the first period, at the same time, there was a significant increase in fructose in the grapes harvested in the second period. The commodity properties grape variety "Iveria" was also preserved, there was no loss of grain, darkening of the grain, hardening of the stalk.

Therefore, the grape variety "Iveria" should be harvested in the phase of technical maturity, when the grape seed contains at least 20% sugar, since it has less loss during storage than table grapes with a lower sugar content.

Keywords:

Grapevine, storage, amino acid, sugar, ascorbic acid.

The Effect of Data Partitioning in Developing Data-Driven Models Using ECG Signals for Arrhythmia Diagnosis

William George
Mechanical Engineering Department, University of Texas at Austin

Wei Li
Mechanical Engineering Department, University of Texas at Austin

Dongmei Chen
Mechanical Engineering Department, University of Texas at Austin

Abstract:

Electrocardiogram (ECG) signals have been extensively explored for arrhythmia diagnosis, resulting in the development of numerous data-driven models for automatic classification. With the introduction of advanced algorithms such as the Wavelet Scattering Transform (WST), classification accuracies have improved significantly. However, achieving highly accurate results in clinical settings requires careful consideration of the partitioning of training and testing data in the model development process. This paper studies the effect of data partitioning methods, specifically the inter-patient and intra-patient methods, and compares their accuracies in classifying ECG heartbeat signals from the MITBIH and PTB databases. The inter-patient method places each patient separately in either the training or testing dataset, while the intra-patient method randomly selects heartbeat signals from all patients for both training and testing. Substantial discrepancies have been observed in the prediction accuracy between these two approaches, demonstrating the importance of proper data partitioning in developing data-driven models based on ECG signals.

Keywords:

Arrythmia, Electrocardiogram, Myocardial Infarction, Wavelet Scattering Transform.

A Comparative Analysis of Conventional LSTM Networks Versus Innovative Patchtst in Predictive Modeling of Asset Prices

Tetiana Lemishko
Balanced Research

Alexandre Landi
Balanced Research

Abstract:

With the growth of technology, especially global digitalization, predicting the stock market has become more advanced, transforming traditional trading models. Predictive modeling in financial markets is a dynamic field driven by advancements in machine learning (ML) and neural network algorithms. For instance, the integration of these techniques with traditional portfolio construction methodologies has led to the development of hybrid approaches aimed at enhancing the accuracy and adaptability of portfolio allocations. LSTM networks, known for their ability to handle time-series data, have been used in predicting stock market behavior for the last decade. However, their performance varies across different timeseries, demonstrating strengths in certain areas while facing challenges in others. In contrast, PatchTST, a novel Transformer-based model tailored for multivariate time series forecasting, exhibits consistently strong predictive performance across various types of timeseries. Its proficiency in capturing complex patterns suggests a potential superiority over LSTM models in predicting asset prices.

Using historical data and relevant features, the study evaluates the predictive abilities of both LSTM and PatchTST models in forecasting monthly adjusted closing prices of key financial assets. Through rigorous evaluation and comparison, the article aims to provide insights into the relative strengths and weaknesses of each approach. The results indicate that PatchTST outperforms LSTM in terms of accuracy and reliability, offering promising prospects for asset price forecasting in real-world financial contexts. Overall, this research contributes to the advancement of predictive modeling techniques in financial markets, facilitating more informed decision-making for investors and financial practitioners.

Keywords:

Asset prices, forecasting, machine learning.

Identification of Specific Circulating Mirnas Involved in Wilms' Tumor Metastasis

Fatma S. Mohamed
Biochemistry Department, Faculty of Science, Minia University, El-Minia, Egypt - Biotechnology, Institute of Basic and Applied Science, Egypt-Japan University of Science and Technology, New Borg El-Arab City, Egypt

Samir F. El-Mashtoly
Biotechnology, Institute of Basic and Applied Science, Egypt-Japan University of Science and Technology, New Borg El-Arab City, Egypt - Department of Biophysics, Ruhr-University Bochum, Bochum, Germany

Wael Z. Khaled
Department of Pediatric Oncology, Children's Cancer Hospital Egypt, Cairo, Egypt - Department of Pediatric Oncology, National Cancer Institute, Cairo University, Cairo, Egypt

Ahmed A. Sayed
Genomics and Epigenomics Program, Department of Basic Research, Children's Cancer Hospital Egypt, Cairo, Egypt - Department of Biochemistry, Faculty of Science, Ain Shams University, Cairo, Egypt

Mohamed A Ghazy
Biotechnology, Institute of Basic and Applied Science, Egypt-Japan University of Science and Technology, New Borg El-Arab City, Egypt - Department of Biochemistry, Faculty of Science, Ain Shams University, Cairo, Egypt

Abstract:

Background: Wilms' tumor (WT), a pediatric cancer linked to lung metastasis, requires early detection for effective treatment. MicroRNAs (miRNAs) are involved in WT pathogenesis, but their role in metastatic disease is underexplored. Our goal is to identify metastasis-related microRNAs.

Methods: The study analyzed miRNA expressions in the serum of 10 healthy individuals, 9 primary tumors with pulmonary metastasis, and 10 without metastasis using Next-generation sequencing. MiRWalk predicted target genes of metastasis-associated miRNAs, and the Enrichr platform identified potential pathways regulated by these miRNAs.

Results: Compared to the control group, metastatic patients showed a specific pattern of 26 miRNAs, with three upregulated and 23 downregulated, while non-metastatic cases showed lowered expressions of 40 miRNAs and overexpression of hsa-miR-483-5p. Six miRNAs (hsa-miR-99b-5p, hsa-miR-1301-3p, hsa-miR-432-5p, hsa-miR-17-5p, hsa-miR-10a-5p and hsa-miR-10b-5p) showed differential expressions only in metastatic WT tumors compared to controls, suggesting their potential regulatory role in WT metastasis. Reactome pathway analysis revealed that dysregulated miRNAs in metastatic tumors were enriched in MECP2 expression and activity, WNT signaling, PIP3/AKT signaling, RUNX3/CDKN1A transcription

regulation, and post-transcriptional silencing. The PANTHER pathway revealed involvement in PDGF, EGF receptor, JAK/STAT, and CCKR signaling pathways.

Conclusion: Dysregulated miRNAs in WT metastatic cases could be crucial regulators in various pathways mediating metastasis and invasion processes.

Keywords:

Wilms tumor, metastasis, miRNAs dysregulation, Next-generation Sequencing.

Modelling a Low Head Seawater Pumped Hydro Storage System for Energy Production Within a Small Island Developing State

Prashant Birbal*
Research Assistant, Civil and Environmental Engineering Department, University of the West Indies – St. Augustine Campus, Trinidad

Hazi Azamathulla
Professor, Civil and Environmental Engineering Department, University of the West Indies – St. Augustine Campus, Trinidad

Abstract:

International policies are driving the increased penetration of Variable Renewable Energy sources (VREs) in Small Island Developing States (SIDS). However, these VREs such as wind and solar are unpredictable and bring instabilities in the electric power system if not buffered by a storage system. The proposed Seawater Pumped Hydro Storage (SPHS) is one such option for providing energy storage that will surely be required in the future. Given the fact that most SIDS are isolated and surrounded by large bodies of water, the medium of seawater becomes an infinite supply. However, SIDS are also low-lying and therefore only low heads will be available at high flows to maximize the energy efficiency of the system. Taking the SIDS of Trinidad and Tobago and its surrounding environment into consideration, the Computational Fluid Dynamics (CFD) model, Fluent, was used to simulate this SPHS at low heads and high flows. Similarly, the CFD model, STAR CCM+ was also used to model this SPHS at low heads and high flows under real environmental conditions to enhance the reliability of the results. The main components investigated were the transient hydraulic characteristics of the draft tube and the pump turbine.

Keywords:

CFD, Fluent, Pumped Hydro Storage, Seawater, SIDS.

An Overview of Factors Impacting Usage of Wearable Internet of Things for Health Care Monitoring

Ayse B. Ersoy
Cape Breton University

Philip Eappen
Cape Breton University

Abidemi Fasanmi
Cape Breton University

Abstract:

Canada's healthcare system, renowned worldwide for its commitment to universal medical access, confronts numerous enduring and emerging challenges. These issues stem primarily from an aging population, a shortage of healthcare professionals, and the prevalence of chronic diseases such as diabetes, cardiovascular diseases, dementia, and hypertension. The integration of IoT technology into healthcare has shown significant progress, offering powerful tools for real-time data collection. This review commences with exploring various Wearable Internet of Things (WIoT) available in the market, juxtaposed with Canada's healthcare system. It delves into how these wearables contribute to addressing the nation's healthcare challenges, accompanied by a statistical examination of market growth and influence. This qualitative study aims to understand the factors impacting the use of wearable Internet of Things in health care management in Canada. Online observations of WIoT devices scrutinize various intelligent wearable products, their predominant usage patterns, and the challenges faced by the users. This preliminary investigation into Canada's healthcare WIoT market endeavors to enhance our understanding and guide further research to fulfill pertinent marketing requirements in a quantitative study.

Keywords:

Wearable Internet of Things, Healthcare, Technology Adoption.

Computational Development of Materials Genome of Novel Materials for Green Energy Generation

Wojciech Gierlotka
Department of Materials Science and Engineering, National Dong Hwa University, Hualien, Taiwan

Abstract:

A contemporary society grapples with a significant challenge associated with the consumption of fossil fuels for energy generation. Furthermore, this conventional method of energy production is intricately linked to undesirable environmental pollution. Novel materials have emerged as a promising solution, enabling the generation of energy from wasted heat, solar light, and facilitating the storage of hydrogen as an environmentally friendly fuel. Regrettably, the development of these materials proves to be both costly and time-consuming.

The adoption of a computational approach to material development not only accelerates and streamlines the expansion of materials for green energy applications but also promotes a more environmentally friendly methodology. This presentation highlights an exemplary case of developing a materials genome for potential hydrogen storage materials. Two primary computational methodologies, namely ab initio and Calphad, have been employed to establish the foundation for future endeavors and applications in the realm of the material.

"It Service Process Quality Perspectives of the Internal User in the Firm"

Dr. Framarz Byramjee
Professor - Department of Marketing, Eberly College of Business (AACSB accredited) Indiana University of Pennsylvania, USA

Abstract:

This research evaluates facets of the critical role of IT (Information Technology) services imparted by the firm's IT personnel, as a business process function within the firm's intra-organizational network, to internal users who avail of these services for operating purposes in their respective business facilities' scape.

The client and service-provider dyad manifesting within the operational confines of the firm, wherein the internal IT user as recipient of the IT services provided by the firm's IT personnel, bears transactional and relational expectations of those service quality deliverables defining their internal service scape. To that accord, many organizations have been practicing IT Service Management (ITSM) which comprises of processes and activities used to design, deliver, manage, and improve the quality of IT services which include hardware, software, networks, and other IT infrastructure, as well as the people who support and use these systems. Concurrent with ITSM as the service channel works the IT Infrastructure Library (ITIL) framework to define procedural knowhow on function technicalities; both mechanisms' modes operandi focused on IT's customer service elements for robust utilization to optimize user's value and relationship assimilation of the delivered IT functions amidst those internal IT users.

This research explicates key elements of IT service management and IT service quality frameworks bridged along operating dynamics of the internal IT user's perspectives. The yielded nomology positions the firm's IT services entity as a functionally aligned quality-centric service-provider to the internal IT users as its intra-organizational client body in the value-chain. It offers a resultant research model based on the nomological conjectures among the constructs emergent from varied rationales on several facets and technicalities of intrafirm IT service quality and user prerogatives in conjunction with our connected schema of reasoning on those pertinent service process parameters. Herein the key thematic objective of firm's internal IT user satisfaction with IT services manifests as our main explanandum posited as being impacted by our explanans pertaining to technology affiliated factors defining the pertinent IT services scape in conjunction with user associated determinants driving individual IT utility attitude and behavioral confines.

A significant potential practical implication for the information technology services functions in the enterprise structure and governance system aligned with this endeavor embeds in our key research objective of internal IT user's satisfaction with IT services compounding as a resultant of technology affiliated factors defining the pertinent IT services scape in tandem with user associated conjectures driving individual IT utility attitude and behavioral confines. Thereby, internal user satisfaction with IT services provided is determined as a comprehensive function of

the efficiencies and agilities in IT services delivered by the respective personnel in the firm's locus of control toward defining value for the internal user and by the technology handling capabilities and efficacies for IT utilization proclivities innate to the user body as recipient of those convened IT services within the work environment.

Tea Saponin Attenuates 5-Fluorouracil-Induced Ferroptotic Cell Death in Hacat Cell

Tanrada Likitsatian
Department of Biochemistry, Faculty of Medicine, Chiang Mai University

Pimpisid Koonyosying
Department of Biochemistry, Faculty of Medicine, Chiang Mai University

Sittiruk Roytrakul
National Science and Technology Development Agency (NSTDA)

Chareareh Pourzand
Department of Pharmacy and Pharmacology, University of Bath, Bath, United Kingdom

Somdet Srichairatanakool*
Department of Biochemistry, Faculty of Medicine, Chiang Mai University

Abstract:

The induction of ferroptosis, an iron-dependent cell death mechanism marked by lipid peroxidation, significantly contributes to mucositis caused by the chemotherapeutic drug 5-Fluorouracil (5-FU) in epithelial tissues. This investigation assesses how tea saponin (TS), known for its antioxidant capabilities, counters 5-FU-triggered ferroptosis in HaCaT keratinocytes. Employing assays for cell viability (MTT), reactive oxygen species (DCFDA), lipid peroxidation (Liperfluo), cytoplasmic iron (Cy6), glutathione levels, and GPX4 activity, we explored TS's impact on redox balance and iron homeostasis. The study also measured TS's influence on inflammatory cytokines (IL-6, IL-1β, TNF-α) and wound healing, evaluating its overall protective effect against 5-FU's adverse outcomes. Results demonstrated TS's efficacy in reducing oxidative stress, lipid peroxidation, and iron buildup, effectively impeding ferroptosis. TS also mitigated inflammation and facilitated epithelial recovery, positioning it as a promising option for managing chemotherapy-related mucositis. This research supports tea saponin's application in safeguarding against 5-FU-induced cell death, offering a new strategy to alleviate mucositis in cancer treatments.

Keywords:

5-Fluorouracil, Ferroptosis, Tea Saponin, Oxidative Stress, and Inflammation.

Onion Skin Extract Derivatives: An Emerging Product for Chemical Industries

Sampson Kyei
Department of Chemical Engineering, Kumasi Technical University

Abstract:

Food waste has become a valuable resource in the modern day since it contains a variety of bioactive components. Phytochemicals from onion skin may be extracted and employed as a raw material in the production of a variety of products, which is in line with the increasing interest in the circular economy and the sustainable use of resources to lessen negative environmental effects. This review aims to evaluate the potential uses of various extraction methods for obtaining bioactive chemicals from onion skin and to highlight their potential as industrial raw materials for sustainable development. Contemporary eco-friendly extraction techniques strive to reduce the energy-intensive procedure and the utilisation of detrimental solvents. The methods employed for the extraction of bioactive phytochemicals from onion skin encompass ultrasound, microwave, supercritical fluid extraction, pulsed electric field extraction, pressurised liquid extraction, and subcritical water extraction. These approaches have demonstrated significant effectiveness in the recovery process. A thorough explanation of the principles of valorisation and the underlying process is provided. In addition, this review examines a multidisciplinary method for valorising onion skin as a possible resource for various industrial applications viz., functional foods, textiles, adsorbents, corrosion inhibitors, surface coatings, adhesives, varnishes, and other health-related applications for sustainable development. The review will advance studies on onion skins, an important field of study for natural products, and improve industrial uses. By establishing a connection between laboratory outcomes and applications in industry, this review will aid in the advancement of more efficient techniques for food waste valorisation.

Keywords:

Onion skin, extraction methods, valorisation, green sorbents, corrosion inhibitors, industrial dyes, bio-based oilfield chemicals

A Personal Tutoring Bot with VR/AR Tools

Andy Wang
Northern Arizona University, US

Abstract:

Personalized learning refers to an educational approach that tailors instruction to meet the unique needs, interests, and abilities of each learner. This method of learning aims at providing students with a customized learning experience that is more engaging, interactive, and relevant to their personal lives. With generative pre-trained transformers technology, an AI-based learning environment PTB (Personal Tutoring Bot) has been built with support for personalized learning. The author used PTB in his EE 499 Microelectronics Metrology class in the fall semester of 2023 with positive feedback from students. This paper provides an overview of the PTB design and its experiment in classroom, followed by a discussion of integrating VR/AR capabilities into PTB for metrology education. Finally, the author briefly touches the potential applications of PTB and similar AI-based tools targeting academic advising and career mentoring for college students.

Keywords:

Hands-off vs hands-on learning, metrology, online education, personalized learning, VR/AR tools.

A Study on the Improvement of Segmentation Performance Based on Non-OOI Object Separation in Olive Flounder Images

Ho Seung Kang
Digital Analytics, Yonsei University

Suyeon Wang
Industrial Engineering, Yonsei University

Donghwan Lee
Industrial Engineering, Yonsei University

Wooju Kim
Industrial Engineering, Yonsei Universit

Abstract:

In fish farming, early detection of fish diseases is crucial to prevent mass mortality and significant economic losses. To address this challenge, research on smart aquaculture technology using artificial intelligence is being actively conducted. However, fish segmentation has the problem of decreasing performance due to the repetition of the fish pattern when fishes are overlapped. This paper proposes a new deep learning-based method that separates objects of interest (OOI) and non-OOI for fish segmentation. By separating OOI and non-OOI object information, the model enables more accurate inference of the OOI object contour even when multiple fish are occluded. The experiment was conducted on a dataset of farmed olive flounder collected by Gmission Corp. The proposed method achieves about a 3% improvement in fish region segmentation accuracy compared to existing methods such as Segment Anything and Mask R-CNN. Finally, our proposed method addresses the challenge of accurate segmentation in fish farming environments. We expect that the improved performance of fish segmentation will facilitate precise observation of fish in aquaculture, thereby advancing smart aquaculture technologies.

Keywords:

Deep Learning, Computer Vision, Segmentation, Smart Aqua-Farming.

The Impact of Generative AI: Innovation in Film Creation Work Models

Wen Zeng
Xiamen University Tan Kah Kee College, China

Abstract:

Innovation in film and television in the new era: The rise of AI has brought opportunities and challenges to the creative process in the film and television industry. ChatGPT is not just a tool that can create and chat with robots. It is already a replicator that can replicate the human brain for machine learning. It can already replace the work of screenwriters, actors, and even directors, so much so that the screenwriters organized by the Hollywood union last year and the actors went on strike in protest. AI artificial intelligence production tools can produce pictures that are very realistic or even fake, such as apps such as Midjourney and Stable Diffusion. In addition, AI can produce multi-modal video content, and can be trained based on pictures to dynamically unify all (image, sound) modal movies, such as: Germini, ChatGPT4, and Sorn released by Google, allowing the machine to generate text, just like the brain. Content in the form of audio, image, video, code, multi-modality, etc. In addition to playing a key role in film production, generative AI can also be applied to workflow optimization. and other expertise-oriented, covering also covers professional knowledge and skills in visual design, film creation and aesthetics. Cross-field integration meets the film industry's needs for diversified talents, promotes exchanges between different subject areas, and promotes the development of film and television technology and common innovations.

Keywords:

Artificial Intelligence, Generative AI, Cinematic Production.

Traffic Forecasting Using Modified Unified Spatio-Temporal Graph Convolutional Network for Developing City: Dhaka, Bangladesh (A Case Study)

Mahmud Un Nabi
Independent University, Bangladesh

M Ashraful Amin
Independent University, Bangladesh

Amin Ahsan Ali
Independent University, Bangladesh

AKM Mahbubur Rahman
Independent University, Bangladesh

Abstract:

Deep learning models for traffic forecasting gained a lot of success in recent years. Important application in traffic domain is to predict traffic congestion after certain time window based on historical data. While most of the deep learning models are evaluated using well-known traffic dataset containing vehicle speed collected using loop detectors, those model performances were not being tested on the generated traffic dataset from google maps containing traffic density information. We demonstrate the effectiveness of Unified Spatio-temporal Graph Convolutional Network in forecasting traffic congestion based on the traffic data of a developing countries like Bangladesh which is collected from google maps. We have quantified the traffic fluctuation pattern of any road of Dhaka dataset by introducing a single metric (coefficient of variation of traffic density fluctuation) which can explain the traffic congestion fluctuation pattern within a certain time window. We have also analyzed the whole traffic network of Dhaka using centrality measures (betweenness centrality) of Graph Theory. Based on the coefficient of variation of traffic density fluctuation and betweenness centrality of each road, we built clusters of roads. Based on those clusters, we proposed modification of USTGCN for generating better prediction. Finally, the prediction results are compared with the base USTGCN framework and we have explained the factor behind model performance degradation in terms of sparsity of the datasets with which the USTGCN models are trained on.

Keywords:

Traffic Forecasting for developing countries, Unified Spatio-Temporal Graph Convolutional Network, Machine Learning