The 23rd International Conference on Informatics in Economy (IE 2024)

Education, Research & Business Technologies

Conference Program

Timisoara, Romania
May 23rd-24th, 2024

Conference Organizers

Bucharest University of
Economic Studies

Faculty of Economics and
Business Administration
West University of Timișoara

Department of Economic
Informatics
and Cybernetics

INFOREC Association

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Preface

This year, the ***23rd International Conference on INFORMATICS in ECONOMY (IE 2024)***, Education, Research & Business Technologies, has been held in a hybrid format in Timișoara, Romania, on 23rd – 24th May 2024. The Conference promotes research results in Business Informatics and related Computer Science topics:

- *Machine learning theory and applications*
- *Big data management, processing and analytics*
- *Smart cities and sustainable communities*
- *IoT, Mobile and Multimedia Solutions*
- *Cloud, distributed and parallel computing*
- *Cybersecurity and Critical Infrastructures*
- *Quantitative Economics*
- *Digital Business and e-Transformation*
- *IT Deployment in Cultural Institutions*

The Conference has represented a meeting point for participants from all over the world, both from academia and from industry.

The conference was first organized in 1993 in collaboration with researchers from Institut National des Sciences Appliquées de Lyon (INSA de Lion), France. From 1993 to 2011, the conference has been organized once every two years, publishing in ten editions high quality papers and bringing together specialists from around the world. Starting with 2012, the conference takes place annually, the 11th, 12th, 14th, 15th, 16th and 21st edition volumes have been indexed by ISI Thomson Reuters/Clarivate Analytics in its ISI Proceedings directory. Also, the 20th, 21st and 22nd editions have been indexed in Scopus and published in Springer.

The International Conference on Informatics in Economy is one of the first scientific events on this subject in Romania and during the last ten years has gained an international scientific recognition. At national level, remains one of the most important scientific events that gather the entire Romanian Economic Informatics community.

The conference has made partnerships with international journals like *Economic Computation and Economic Cybernetics Studies and Research, Informatica Economică, Economy Informatics, Database Systems Journal, Journal of Logistics, Informatics and Service Science, Journal of System and Management Sciences* to publish an extended format of the conference best papers.

A Conference such as this can only succeed as a team effort, so the Editors want to thank the International Scientific Committee and the Reviewers for their excellent work in reviewing the papers as well as their invaluable input and advice.

The Conference Team

Conference Important Events

Thursday, May 23rd, 2024		
Time	Event	Hall name
09:30 – 10:00	**Registration & Coffee break**	**Entry hall room** *Amf. Dumitru Mareș* **(FEAA building)**
10:00 – 10:30	**IE 2024 Opening Ceremony** Prof. Claudiu **BOTOC**, PhD Dean of the Faculty of Economics and Business Administration West University of Timișoara Prof. Claudiu **BRÂNDAȘ**, PhD Head of the Department of Business Information Systems West University of Timișoara Prof. Cristian **CIUREA**, PhD Head of the Department of Economic Informatics and Cybernetics, Bucharest University of Economic Studies	**Room** *Amf. Dumitru Mareș* **(FEAA building)**
10:30 – 11:00	Prof. Jan W. **OWSIŃSKI**, PhD System Research Institute, Polish Academy of Sciences, Poland *"Modeling Socio-Economic Phenomena: Some Critical Thoughts and a Positive Example"*	**Room** *Amf. Dumitru Mareș* **(FEAA building)**
11:00 – 11:30	Prof. Ulrich **NORBISRATH**, PhD University of Tartu, Estonia *"Empowering Sustainability: Upcycling Smartphones as the Future of IoT and Edge Computing in Emerging Economies"*	**Room** *Amf. Dumitru Mareș* **(FEAA building)**
12:00 – 14:00	**Lunch break**	**FEAA restaurant**

14:30 – 18:00	**Paper presentations**	**Rooms available on each section**
18:30	**Dinner IE 2024**	**"Vineri 15" restaurant** *Bulevardul Vasile Pârvan 9, Timişoara*

CONFERENCE PROGRAM

– SECTION 1 –
**Big Data Management, Processing and Analytics
Smart Cities and Sustainable Communities**

Thursday, 23rd May, 14:30 – 18:00, Room: 202
Chairman: Vlad Diaconiţa, Secretary: Florin Daniel Militaru

1. **DATA INTEGRATION TECHNIQUES FOR BUILDING A COMPREHENSIVE AIR QUALITY DATASET** – Andreea-Mihaela Niculae, Adela Bâra

2. **THE PERCEIVED ECONOMIC IMPACT OF DATA SCIENCE SOLUTIONS ON BUSINESS PERFORMANCE** – Marian Pompiliu Cristescu, Raluca Andreea Nerişanu, Dumitru Alexandru Mara, Lia-Cornelia Culda

3. **PERFORMANCE EVALUATION OF DATA VAULT AND DIMENSIONAL MODELING: INSIGHTS FROM TPC-DS DATASET ANALYSIS** – Andreea Vineș

4. **CAN ARTIFICIAL INTELLIGENCE ACCELERATE THE TRANSITION TO A CIRCULAR ECONOMY?** – Perihan Hazel Kya

5. **REVOLUTIONIZING HEALTHCARE: HARNESSING NATURAL LANGUAGE PROCESSING AND BIG DATA FOR PREDICTIVE DISEASE DIAGNOSIS** – Diana Andreea Căuniac, Andreea Alexandra Cîrnaru

6. **GAINING INSIGHT INTO ROMANIAN MANAGERS' PERCEPTIONS OF BUSINESS INTELLIGENCE AND ANALYTICS CAPABILITIES** – Florin Daniel Militaru, Luminiţa Hurbean, Doina Dănăiaţă

7. **ENHANCING THE INVOLVMENT LEVEL OF VOLUNTEER STUDENTS IN THE ACADEMIC COMMUNITY: EFFICIENT USAGE OF DIGITAL RESOURCES** – Laurenţiu-Gabriel Dincă, Vlad Diaconiţa

8. **INTELLIGENT MODELS IN POWER DELIVERY MANAGEMENT FOR ECONOMIC DAMAGE COMPUTATION –** Mariana Dumitrescu

9. **ELECTRIC NETWORK MONITORING SYSTEM – INTELLIGENT MODELLING FOR ECONOMIC DAMAGE ANALYSIS –** Mariana Dumitrescu

10. **SMART CITY PARKING APPLICATIONS IN ROMANIA: AN ANALYSIS AND CONCLUSIONS –** Răzvan Daniel Zota, Mihai Adrian Lungu

11. **MEASUREMENT AND VERIFICATION SOLUTION FOR ENERGY PERFORMANCE CONTRACTING IN THE BUILDING SECTOR -** George Suciu, Lucian-Alexandru Necula, Cosmina Stalidi, Mădălin Silion

12. **A SPATIAL PANEL STIRPAT MODEL FOR EXAMINING THE IMPACT OF DIGITAL ECONOMY ON ECOLOGICAL ENVIRONMENT OF BEIJING-TIANJIN-HEBEI CITY CLUSTER –** Xinyan Mao, Jinzhu Zhang, Yuan Tian, Minong Tang

– SECTION 2 –
Digital Business and e-Transformation
Cloud, Distributed and Parallel Computing
IT Deployment in Cultural Institutions

1. **CRAFTING A COMPETENCE PORTFOLIO FOR REMOTE EDUCATORS, TRAINERS AND WORKERS** – Mihaela Muntean, Gabriela Mircea, Mihaela Neamtu, Martina Holenko Dlab, Tomislav Rozman

2. **ANALYZING THE ANTECEDENTS OF DECEIVED BUYING AND DISINFORMATION RISK** – Luigia-Gabriela Sterie, Daniel Mican

3. **DRIVING FACTORS OF SOCIAL COMMERCE INTENTION: THE ROLE OF SOCIAL COMMERCE CONSTRUCTS, SOCIAL INFLUENCE AND TRUST** – Diana-Ștefania Ghenie, Virgil-Vasile Soncutean, Dan-Andrei Sitar-Taut

4. **STRATEGIC COLLABORATION IN INTERNATIONAL UNIVERSITY NETWORKS - CASE STUDY** – Margarita Bogdanova, Evelina Parashkevova-Velikova, Yuriy Kuznetsov

5. **ELECTRONIC DOCUMENT MANAGEMENT IN THE PUBLIC AUTHORITY** – Alexandra Beldiga, Gheorghe Căpățână, Maria Beldiga

6. **COMPARATIVE ANALYSIS OF NATURAL LANGUAGE QUERY RESPONSES ON BPMN MODEL SERIALIZATIONS: RDF GRAPHS VS. BPMN XML** – Damaris-Naomi Dolha, Robert Andrei Buchmann

7. **A HYBRID RETRIEVAL-AUGMENTED GENERATION APPROACH FOR HETEROGENEOUS KNOWLEDGE BASES** – Andrei Chis and Ana-Maria Ghiran

8. **OPENEDGECOMPUTEFRAMEWORK, A FRAMEWORK FOR SEAMLESS EDGE-CLOUD COMPUTING** – Andrei Robert Cazacu

9. **TECHNOLOGICAL INTEGRATION IN HIGHER EDUCATION** – Cristina Iancu, Simona-Vasilica Oprea, Cristian-Eugen Ciurea

– SECTION 3 –
IoT, Mobile and Multimedia Solutions
Cybersecurity and Critical Infrastructures

Thursday, 23rd May, 14:30 – 18:00, Room: 204
Chairman: Paul Pocatilu, Secretary: Alin Zamfiroiu

1. **AN EXPLORATION OF NFTS AND BLOCKCHAIN IN ECOLOGICAL ECONOMIES AND ENVIRONMENTAL MANAGEMENT** – Claudiu Brândaş, Otniel Didraga, Gabriela Mariutac, Ovidiu Megan

2. **AN OVERLOOK OF IOT FINANCE AND PRE-EXISTING SECURITY CHALLENGES IN FINANCIAL TRANSACTIONS VIA IOT DEVICES ON BLOCKCHAIN NETWORKS** – Alisa Harkai

3. **MODELS FOR NETWORK TRAFFIC BEHAVIORAL ANALYSIS IN IOT SYSTEMS** – Alin Zamfiroiu, Iustin Floroiu, Daniel Savu, Lorena Bătăgan, Anupriya Sharma Ghai

4. **IMPLEMENTING ETHEREUM ACCOUNT ABSTRACTION FOR ENHANCED REPORTING** – Silviu Ojog, Alina Miron

5. **AUGMENTED REALITY IN EDUCATION – PROTOTYPE FOR THE UNDERGRADUATE SYSTEM IN ROMANIA –** Andreea Stroe

6. **EMPOWERING SUSTAINABILITY: UPCYCLING SMARTPHONES AS THE FUTURE OF IOT AND EDGE COMPUTING IN EMERGING ECONOMIES** – Ulrich Norbisrath, Perseverance Munga Ngoy, Renato Perotto Machado, Huber Flores, Mohan Liyanage

7. **HOW GENERATIVE AI IS TRANSFORMING THE EDUCATION?** – Felician Alecu, Paul Pocatilu, Sergiu Capisizu

8. **AUTOMATING ATTACK AND DEFENSE STRATEGIES IN CYBERSECURITY** – Ionuț Lateş, Cătălin Boja, Mădălina Zurini, Bogdan Iancu

9. **CYBERSECURITY IN INDUSTRIAL APPLICATIONS** – Iulian Florin Ștefan, Luminița Duță

10. **QUANTUM COMPUTING AND CYBERSECURITY: THREAT OR OPPORTUNITY? –** Alexandru Butoi

11. **BLOCKCHAIN-BASED VALIDATION OF SYNTHETIC MEDIA TO COUNTER DISINFORMATION** – George-Andrei Telehoi

12. **NEW REAL-TIME ENCRYPTION MECHANISM FOR FINANCIAL TRANSACTIONS** – Ionuț Eduard Matei, Costin Radu Boldea, Bogdan Ion Boldea

13. **CLOUD FOG COMPUTING SECURE PLATFORM FOR CPU, GPU, AND QPU PROCESSING INTEGRATING AI LLM –** Cristian Toma, Marius Popa, Mihai Doinea, Teodor Cervinski

14. **MANAGEMENT OF IT AND CYBER SECURITY PROJECTS, AT THE GOVERNMENT LEVEL –** Ștefan Marius

15. **ENHANCED BLOCKCHAIN-BASED E-VOTING SYSTEM USING ZERO-KNOWLEDGE PROOFS –** Marcela Lupu, Iulian Aciobăniței

– SECTION 4 –
Quantitative Economics

1. **THE ENVIRONMENTAL KUZNETS CURVE FOR DEFORESTATION FOR ROMANIA: AN ARDL-BASED EVALUATION** - Irina Georgescu, Ionuț Nica, Nora Chiriță

2. **MODELING FINANCIAL CONTAGION: EXPLORING INTERCONNECTEDNESS AND SYSTEMIC RISK THROUGH AGENT-BASED SIMULATION** – Ștefan Ionescu, George Tătaru, Gabriel Dumitrescu, Bianca Nicole Stănică, Liviu-Adrian Cotfas

3. **EXAMINING THE INFLUENCE OF ENERGY PRICE AND ENERGY CONSUMPTION FOR MINING ON BITCOIN PRICE** – Crina Anina Bejan, Dominic Bucerzan

4. **MODELING SOCIO-ECONOMIC PHENOMENA: SOME CRITICAL THOUGHTS AND A POSITIVE EXAMPLE** – Jan W. Owsiński, Jarosław Stańczak, Przemysław Śleszyński, Rafał Wiśniewski

5. **ENHANCING SOCIAL ACCEPTANCE IN MICROGRID IMPLEMENTATION: A SHARE-OF-CHOICE OPTIMIZATION APPROACH** – Emmanuel Fragniere, Francesco Moresino, Sarah Sandoz, Nabil Abdennadher

6. **GREENING THE WORKPLACE FOR HAPPINESS: EXPLORING CSR'S AND SUSTAINABLE PRACTICE'S EFFECTS ON EMPLOYEES WELLBEING** – Alexandra-Nicoleta Ciucu-Durnoi, Adina-Iuliana Jigani, Bianca Cibu, Andra Sandu, Camelia Delcea

7. **DIGITAL SKILLS AND LABOR MARKET PROSPECTS: A CONJOINT EXPERIMENT ON STUDENTS' PREFERENCES** – Monica Mihaela Maer Matei, Cristina Mocanu, Ana Maria Zamfir, Anamaria Nastase

8. **ESTIMATING PROBABILITY OF DEFAULT. A NEW QUALITATIVE PERSPECTIVE** – Florin Dragu

9. **BRAND ASSOCIATIONS BIBLIOMETRIC ANALYSIS** – Alexandra Raluca Jelea, Adriana Manolică, Teodora Roman, Patricea Elena Bertea

10. **COMMUNITY DETECTION ON AN EUROPEAN AIRPORTS NETWORK** – Mioara Băncescu, Adina Gabriela Iliuță

11. **THE IMPACT OF MINIMUM WAGE ON EMPLOYMENT. THE CASE OF ROMANIA** – Georgiana Stănciulescu, Mădălina Ecaterina Popescu

– *SECTION 5* –
Machine Learning Theory and Applications

Thursday, 23ʳᵈ May, 14:30 – 18:00, Room: 211
Chairman: Gheorghe Cosmin Silaghi, Secretary: Andrei Albu

1. **DEVELOPING A GENERATIVE AI-DRIVEN VIRTUAL ASSISTANT FOR ENHANCING LEARNING SUPPORT** – Denisa Elena Bălă, Stelian Stancu

2. **THE ANALYSIS OF THE REAL ESTATE MARKET USING THE K-NEAREST NEIGHBORS ALGORITHM** – Ion-Florin Răducu, Stelian Stancu, Andreea Pernici

3. **PREDICTION AND CLASSIFICATION OF SPECIFIC TYPES OF RESEARCH METHODS IN PROJECT MANAGEMENT USING MACHINE LEARNING** – Andrei Albu, Diogen Babuc, Viorel Negruț, Ovidiu Dobrican

4. **VIABILITY OF OPEN SOURCE ASSISTANTS FOR ADAPTIVE LEARNING SYSTEMS** – Andrei Bobocea, Corina Marina Mirea

5. **SYNERGIZING IOT, BIG DATA AND ML FOR SUSTAINABLE AGRICULTURE** – Andreea Cojocaru, Ștefan Cojocaru

6. **DIFFERENT ENTROPY MEASUREMENTS IN MACHINE LEARNING** – Dror Ben-Ami

7. **ALGORITHMIC TRADING BOTS USING ARTIFICIAL INTELLIGENCE** – Florentin Șerban, Bogdan-Petru Vrînceanu

8. **MULTINOMIAL NAÏVE BAYES CLASSIFIER FOR ROMANIAN NEWS IN THE CONTEXT OF A TELEVISION STATION** – Adrian Vintilă, Constanta-Nicoleta Bodea

9. **TEXT SUMMARIZATION AND SENTIMENT ANALYSIS PIPELINES USING LARGE LANGUAGE MODELS FOR FINANCIAL NEWS** – Alin-Gabriel Văduva, Anca-Ioana Andreescu

10. **GENERAL CHARACTERISTICS OF THE NEW LEARNING PARADIGM** – Mădălina Pană

11. **DEVELOP A SENTIMENT ANALYSIS FOR TEACHING PERFORMANCE USING A MACHINE LEARNING PIPELINE** – Daniel Plăcintă

12. **ARE LLMS HALLUCINATING WHEN ANSWERING SPECIFIC QUESTIONS? EXPERIMENTS WITH A RAG PIPELINE** – Isabela Iacob, Gheorghe Cosmin Silaghi

13. **GO PLAYING AGENTS ON STANDARD COMPUTING RESOURCES: EVALUATING SEVERAL REINFORCEMENT LEARNING STRATEGIES** – Daria Maria Meseșan

ABSTRACTS

Big Data Management, Processing and Analytics
Smart Cities and Sustainable Communities

DATA INTEGRATION TECHNIQUES FOR BUILDING A COMPREHENSIVE AIR QUALITY DATASET

Andreea-Mihaela **NICULAE**
Bucharest University of Economic Studies, Romania
Adela **BÂRA**
Bucharest University of Economic Studies, Romania

Abstract: *In today's data-rich world, merging diverse datasets is essential for thorough analysis. This article delves into integrating air quality data, focusing on the challenges and methods involved. It presents a framework covering preprocessing steps like data cleaning, reduction, transformation, and relevance determination, leading to the fusion of varied datasets into a unified format. Using a case study of integrating static datasets from the United States, this paper offers practical insights into the process. Key considerations include data organization, consistency, spatial-temporal analysis, and metadata access. Challenges like format variations and data discrepancies are addressed systematically. The case study underscores understanding metadata, spotting redundant information, and making informed decisions for data consistency and spatial analysis. Highlighting the importance of integrated air quality datasets in research and decision-making, the article provides a comprehensive guide for researchers and practitioners involved in air quality data integration and analysis.*
Keywords: Air Quality, Data Preprocessing, Data Integration

THE PERCEIVED ECONOMIC IMPACT OF DATA SCIENCE SOLUTIONS ON BUSINESS PERFORMANCE

Marian Pompiliu **CRISTESCU**
Lucian Blaga University of Sibiu, Romania
Raluca Andreea **NERIȘANU**
Lucian Blaga University of Sibiu, Romania
Dumitru Alexandru **MARA**
Lucian Blaga University of Sibiu, Romania
Lia-Cornelia **CULDA**
Lucian Blaga University of Sibiu, Romania

Abstract: *The advent of digital transformation has ushered in an era in which data science solutions are critical to organizational success, particularly in terms of improving economic outcomes for businesses. In a landscape characterized by intense competition and rapid technological advancements, this study seeks to dissect the economic implications of implementing data analytics within corporate structures, with a focus on creating business value and augmenting organizational capabilities. This study, based on a comprehensive review of the literature and empirical data analysis, investigates the role of data analytics in fostering value generation and strengthening companies' analytics capabilities. The methodology includes a systematic literature review to identify the critical resources and factors that contribute to the development of data analytics proficiency within organizations. Furthermore, a survey approach examines the effects of data analytics on company performance and strategic resource allocation. The findings reveal a significant link between strong data analytics capabilities and improved economic performance, emphasizing the importance of tangible, human, and intangible resources in developing these capabilities. Furthermore, the study emphasizes data analytics' transformative potential in operational optimization, strategic decision-making, and market positioning, which will ultimately contribute to long-term economic growth. This paper aims to provide an in-depth understanding of the economic impact of data science solutions on businesses by combining theoretical insights with empirical evidence, making it a valuable resource for academics, industry practitioners, and decision-makers with an interest in using the power of data analytics for economic advancement.*

Keywords: Data Analytics, Organizational Capabilities, Value Creation

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PERFORMANCE EVALUATION OF DATA VAULT AND DIMENSIONAL MODELING: INSIGHTS FROM TPC-DS DATASET ANALYSIS

Andreea **VINEŞ**
Bucharest University of Economic Studies, Romania

Abstract: *The current paper presents a comparison study between the Data Vault and the Dimensional Modeling and focuses on their performance in data loading and storage efficiency using the TPC-DS data set. Data Vault, known for its adaptability and scale, is analyzed against a star schema Dimensional Model, known for its simplicity and query optimization. Through empirical evaluations covering data load speed, storage utilization, query execution and scalability metrics, the author investigates the strengths and weaknesses of each modeling technique. It leverages real scenarios represented by the TPC-DS data set, exploring various data volumes, complexities, and schema evolution scenarios. By analyzing the compromises between complexity and performance, the research aims to provide valuable insights for organizations that seek to optimize*

their data storage strategy. The findings presented in this paper aim to guide researchers and practitioners in choosing a data modeling technique according to their needs.

Keywords: Data Vault, Dimensional Modeling, Data Warehousing

CAN ARTIFICIAL INTELLIGENCE ACCELERATE THE TRANSITION TO A CIRCULAR ECONOMY?

Perihan Hazel **KAYA**
Selçuk University, Turley

Abstract: *The world's current model of economic development is unsustainable. It promotes the inappropriate use of limited natural resources, encourages consumption and waste, causing serious damage to the environment and generating large amounts of waste. The circular economy, an economic model in which resources are recycled and reused as much as possible by following a circular path rather than a linear path during consumption, has been gaining popularity around the world in recent years. Artificial intelligence, one of the most important developments of our time, can also play an important role in the realization of the circular economy. AI can complement and extend the skills of humans. It helps people learn faster, deal with complexities more effectively and better understand the abundance of data. AI can facilitate new circular business models within the circular economy and help design sustainable and robust products. The aim of this study is to seek answers to questions such as how artificial intelligence contributes to the transition to a circular economy and whether artificial intelligence can accelerate the transition to a circular economy. While seeking answers to these questions, we argue that artificial intelligence has a significant potential in the transition to a circular economy and will play an important role in the transition to a circular economy.*

Keywords: Sustainability, Circular Economy, Artificial Intelligence

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REVOLUTIONIZING HEALTHCARE: HARNESSING NATURAL LANGUAGE PROCESSING AND BIG DATA FOR PREDICTIVE DISEASE DIAGNOSIS

Diana Andreea **CĂUNIAC**
Bucharest University of Economic Studies, Romania
Andreea Alexandra **CÎRNARU**
Bucharest University of Economic Studies, Romania

Abstract: *The current context of health systems is characterized by a rapid evolution of technology and an increasing demand for health services. There is an increasing emphasis on preventive care and the use of data and technology to*

improve the efficiency and effectiveness of healthcare delivery. Currently, there is an evolution of digital transformation and the integration of natural language processing and big data analysis has become very important to revolutionize various fields, including the field of health. This article explores the synergies between NLP and Big Data in the context of predictive disease diagnosis, aiming to elucidate how these technologies can improve early dis-ease detection, treatment and management. By exploring different NLP techniques, such as sentiment analysis and text classification, combined with Big Data analysis methodologies, the article presents how predictive models can be developed to anticipate the onset and progression of diseases. Through this paper, you will find the potential of combining natural language processing with big data to diagnose patients' diseases more quickly, offers a path to personalized medicine and ultimately to a healthier society. Through this paper, various NLP and Big Data techniques are presented with brief descriptions. The dataset is described and preprocessed for analysis. Word-cloud visualization highlights prevalent disease symptoms, while La-tent Dirichlet Allocation categorizes symptoms by disease. Additionally, TF-IDF vectorization and KMeans clustering are employed for symptom clustering. The Silhouette score, calculated at 0.7567, underscores the quality of the analysis.

Keywords: Big Data, NLP, Healthcare, Tokenization, Analyzing

GAINING INSIGHT INTO ROMANIAN MANAGERS' PERCEPTIONS OF BUSINESS INTELLIGENCE AND ANALYTICS CAPABILITIES

Florin Daniel **MILITARU**
West University of Timisoara, Romania
Luminita **HURBEAN**
West University of Timisoara, Romania
Doina **DANAIATA**
West University of Timisoara, Romania

Abstract: *Taking into account the data-driven culture spreading out, Business Intelligence and Analytics (BI&A) has become progressively more valuable for managers to discover useful insights for the decision-making process and ultimately for improving their work performance. We have operated a survey that analyzed the correlations between data-driven culture and BI&A adoption, between BI&A adoption and decision-making effectiveness, respectively managerial work performance. Using the gathered data, in this paper we focus on the specific categories and capabilities of BI&A that are adopted in Romanian companies and aim to determine if there are significant differences given the industry, the company size, the work experience and the managerial position of the survey's respondents. The findings demonstrate that BI&A capabilities are of importance for companies of all sizes, while there are differences with respect to their relevance in relation to factors like the company*

size and the managerial level. We think that the paper provides relevant insights for the managers by determining how different BI&A technologies and their categories (descriptive, predictive and prescriptive) are relevant for different managerial levels and organization types.

Keywords: Business Intelligence, Business Analytics, Managerial Level, Organization size

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ENHANCING THE INVOLVEMENT LEVEL OF VOLUNTEER STUDENTS IN THE ACADEMIC COMMUNITY: EFFICIENT USAGE OF DIGITAL RESOURCES

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Abstract: *This study analyzes the attitudes and behaviors of student volunteers within the academic community, focusing on the impact of the COVID-19 pandemic. Employing quantitative methods, including Chi-squared and t-tests, we explored how volunteer involvement correlates with academic progression and varies by gender with respect to the use of digital tools. We found that students' expectations for post-pandemic volunteering are significantly positive, indicating a strong commitment to continuing their volunteer activities. Satisfaction with remote volunteering during the pandemic was also positively linked to the continued use of digital platforms for volunteering. These findings point out the need to enhance digital platforms to improve volunteer interaction and engagement. Future research should incorporate qualitative methods to provide deeper in-sights into the motivations and experiences of student volunteers.*

Keywords: Volunteering, Digital Resources, Academic Community, Social Media, Post-COVID Education

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INTELLIGENT MODELS IN POWER DELIVERY MANAGEMENT FOR ECONOMIC DAMAGE COMPUTATION

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Abstract: *The presented article shows economic aspects of the power delivery systems due to loss of functional continuity. Complex power systems need to*

maintain their fault-tolerant operational stage. On this purpose intelligent models are used to compute the availability, taking in account the devices dependency (dependability). The intelligent models are meant to take in account the informatics/automation system action, designed to maintain the fault-tolerant stage. An algorithm is built for delivery system steady states performance computation. The measurable results are presented for a real power delivery case study. Delivery power flow and energy losses are used for the economic study with the economic damage computation. The 20kV power station was monitored and supervised for one year interval.
Keywords: Power Delivery, Power Loss, Intelligent Models, Economic Damage

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ELECTRIC NETWORK MONITORING SYSTEM - INTELLIGENT MODELLING FOR ECONOMIC DAMAGE ANALYSIS

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Abstract: *The risk analysis of the continuity for electric supply of the consumers involves the electrical networks. These analyzes are made difficult by the fact that the data monitoring system of the network, the operating regimes, their geometric characteristics, and the buses power consumption are uncertain. Currently, these difficulties can be overcome using the fuzzy logic, which can operate with such fuzzy input data. Intelligent models and associated algorithm are used for the power system continuity performance computation. The measurable results are presented for a real power network case study. Energy production/consumption data base is used for the operational continuity risk computation and for the economic damage, related to the undelivered energy evaluation, evaluation. The 20kV electric network was monitored and supervised for one year.*
Keywords: Electric Networks, Monitoring, Intelligence Models, Economic Damage

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SMART CITY PARKING APPLICATIONS IN ROMANIA: AN ANALYSIS AND CONCLUSIONS

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Abstract: *The concept of smart cities (SC) has emerged as a focal point in contemporary urban discourse, representing a paradigm shift in urban development, characterized by the strategic deployment of digital technologies*

to improve efficiency, sustainability, and quality of life for residents. Our research is based on the hypothesis that the role of information technology applications in a smart city is becoming increasingly important. In this context, we analyze and compare four existing smart parking applications in Romania based on key characteristics. Furthermore, we propose the integration of artificial intelligence (AI) concepts within these types of applications, noting that none of the analyzed applications currently incorporates such technology. Finally, we present the potential limitations of such applications and the possible improvements that could be made to them.

MEASUREMENT AND VERIFICATION SOLUTION FOR ENERGY PERFORMANCE CONTRACTING IN THE BUILDING SECTOR

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Abstract: *Facilitated by the global digitalization efforts and the proliferation of innovative technologies in the past decade, the cost of energy management solutions has decreased and they became widely available on the market. As Energy Performance Contracts (EPC) allows customers implementing energy efficiency measures to repay the project costs through the savings they achieve, a key aspect is to provide an instrument for a transparent and secure measurement and verification (M&V) of the benefit generated, both in terms of energy savings and cost. In this regard, FinSESCo provides a toolchain of innovative applications to generate and control the project data, manage investors, collect IoT data from the implementation premise and assess the savings achieved through the project. In this regard, the paper presents a M&V tool implemented within the FinSESCo toolchain for measuring the benefits achieved as a result of EPC implementation.*

A SPATIAL PANEL STIRPAT MODEL FOR EXAMINING THE IMPACT OF DIGITAL ECONOMY ON ECOLOGICAL ENVIRONMENT OF BEIJING-TIANJIN-HEBEI CITY CLUSTER

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Abstract: *The digital economy is a new economic form built on the basis of digital technology and generated with the change of the new social situation. Its characteristics of high informatization, high intelligence, green and low-carbon are highly compatible with the new quality productivity, and it is a new engine to promote the development of new quality productivity. In this paper, we further optimize the STIRPAT model, select the panel data of Beijing-Tianjin-Hebei city cluster from 2011 to 2020, and analyze the impact of digital economy development on carbon emission and air pollution from the perspective of digital economy development. The results show that there is a significant difference in the impact of digital economic development on different pollutants, which can effectively inhibit the emission of PM2.5, and at the same time, there is an interaction effect in space. After the introduction of export trade as a mediating variable, the impact of digital economy on carbon emissions is still positively correlated, but the export trade shows a certain inhibitory effect. Regional synergy is an important orientation for the development of large urban agglomerations, high-level economic development in the new era cannot be detached from ecological environmental protection, and it is the key to development to open up and cultivate digital new quality productivity, accelerate the green transformation of industries, and promote the collaborative emission reduction of the Beijing-Tianjin-Hebei urban agglomerations.*

Keywords: Digital Economy; Carbon Emissions; PM2.5; Spatial Aggregation

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CRAFTING A COMPETENCE PORTFOLIO FOR REMOTE EDUCATORS, TRAINERS AND WORKERS

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Abstract: *Our research is an integral part of the VirtualEdu project whose main goal is the development of a distance education/management methodology, a certification system and a training course for distance educators, managers and support staff, in view of the digital transformations of the EU. We initiated a quantitative research approach using the survey technique in order to identify the main necessary skills for remote educators, trainers and workers. The competence portfolio contains digital competencies, self-management and organization skills, collaboration competencies, interpersonal, intercultural and communication skills, and specific skills for remote teaching. The study employs Partial Least Squares Structural Equation Modeling (PLS-SEM) for analysis, contributing insights from diverse global perspectives. The paper concludes with implications and recommendations for future research.*

Keywords: Remote Education, Competence Portfolio for Online Education, PLS-SEM

ANALYZING THE ANTECEDENTS OF DECEIVED BUYING AND DISINFORMATION RISK

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Abstract: *The pervasiveness of social media advertising raises concerns about its potential to deceive consumers and exploit their susceptibility to misinformation. This study delves into the factors influencing deceived buying and leading to the propensity of believing and acting on disinformation in the context of advertised products on social media platforms. Employing Partial Least Squares - Structural Equation Modeling, the research analyzes data collected from 334 consumers. The findings reveal that perceived benefits, perceived risks of social media advertised products, and openness to change play an important role in deceived buying, while informativeness has no significant influence. Deceived buying, in turn, exhibits a strong positive association with the propensity of believing and acting on disinformation. The results hold significant implications for various stakeholders such as businesses, organizations, social media users, and policymakers. To combat deceptive social media ads, this study proposes a two-pronged approach: empowering platforms with algorithms specialized in deceived or false ad detection and creating educational programs for users to become more discerning consumers.*

Keywords: Deceived Buying, Propensity of Believing and Acting of Disinformation, Social Media Advertising, Consumer Behavior

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DRIVING FACTORS OF SOCIAL COMMERCE INTENTION: THE ROLE OF SOCIAL COMMERCE CONSTRUCTS, SOCIAL INFLUENCE AND TRUST

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Abstract: *The emergence of social commerce has revolutionized how consumers engage in purchasing experiences over social media platforms due to its novel technical features and interaction possibilities in online communities or forums. This re-search aims to assess how social commerce constructs, social influence and trust, as a main driver, influence usage intention. Two conceptual frameworks were selected and combined to emphasize the structures, social support (informational and emotional), and perceived value (hedonic and utilitarian), resulting in a final strong relationship between trust and usage intention. Based on a sample of 299 social commerce users, the proposed research model was tested using the PLS-SEM methodology. The study's findings demonstrated that al-most all hypotheses were confirmed, which fulfilled our research gap and postulated that social commerce constructs and social influence have a positive effect on usage intention, mediated by trust.*

However, one relationship was not confirmed, regarding the effect of utilitarian value on usage intention.

STRATEGIC COLLABORATION IN INTERNATIONAL UNIVERSITY NETWORKS - CASE STUDY

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Abstract: *The purpose of the research is to explore the conditions for transforming project partnerships into a strategic network, identify the key challenges facing individual participants, and outline research intentions for analyzing the transformation from operational to strategic interaction within the network. A case study of a university alliance of the non-spatial collaboration type is presented. Due to the early stage of development of the alliance, the study is still in a conceptual stage, outlining the main risks to interactive relationships within the network. These include managing subgroups, the collision between intra-organizational and network decision-making mechanisms, especially when there are institutional and cultural differences among participants, the balance between institutional and personal connections, and, broadly speaking, between formal and informal relationships within networks. A research program is outlined based on the specifics of the case study.*

ELECTRONIC DOCUMENT MANAGEMENT IN THE PUBLIC AUTHORITY

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Abstract: *On-line services become more and more popular forms of fulfilling the requests of the population. The share of electronically performed services in the*

total number of performed services is constantly increasing and the amount of managed information is in an "explosive state". The article represents a study of electronic documents, of the operation of support systems for management decisions according to the legal framework of the Republic of Moldova. Electronic documents and Decision Support Systems (SSD) are defined and classified. The impact of the "bounded rationality" phenomenon observed by Nobel Laureate Herbert A. Simon can be mitigated by assisting Public Authority (PA) managers with automated workstations that include customized SSD. AP integrates units with a hierarchical structure organized in several management levels. SSDs for AP activity assistance are designed with similar structure. The paper presents the problem family-oriented methodology for realizing customized smart SSDs. The information system of the AP integrates a set of hierarchically organized multilayer customized SSDs. OFP (Orientation on Families of Problems) realization technologies integrate several design techniques and artificial intelligence architectures. In general, the OFP information technology allows a single computer scientist to develop applications, which for the end user are application software products and at the same time instrumental software products. For this purpose, generic SSD models for AP are developed. A specialized generator was developed that uses SSD's knowledge base to generate specific customized models within each automated workstation that realize software options to support end-user functions and responsibilities according to the subordination level in the AP hierarchy. Generic and specific SSDs are made in end-user (UF) languages. They integrate: custom UF language interfaces, a knowledge base, a knowledge base management system, problem solvers, language processors of UF languages, explanatory modules, a custom SSD generator, etc. Specific custom developed SSDs allow their implementation, maintenance and development by UF without the mandatory assistance of the SSD developer. The application of OFP techniques, generic and specific SSD models ensures the adaptability of SSD to the evolving conditions of AP. The scientific problem discussed consists of the mathematical modeling and programming of intelligent computing applications for SSD, targeting families of problems, types of documents and decision-makers according to their status in AP. The objectives are to assist the processes of: transmission, modification, archiving, search, signing of electronic documents.

Keywords: Management, Electronic Document, Technologies, Intelligent Custom SSD

COMPARATIVE ANALYSIS OF NATURAL LANGUAGE QUERY RESPONSES ON BPMN MODEL SERIALIZATIONS: RDF GRAPHS VS. BPMN XML

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Abstract: *Leveraging the power of symbolic knowledge representation, this study compares outcomes of natural language interaction with BPMN model serializations, examining semantic graphs derived from RDF export of BPMN provided by Bee-Up, in contrast to the conventional BPMN XML export from the process modeler of SAP Signavio. Through meticulous prompt engineering, we investigate the proficiency of certain GPT services of OpenAI in navigating the semantic intricacies of RDF and the structural hierarchy of XML, ultimately illuminating implications for knowledge retrieval. The findings delve into the complexities of querying BPMN representations using natural language, revealing the transformative capabilities of RDF, but also the value of BPMN employed as a schema for procedural knowledge graphs – i.e. shifting away from their traditional role as diagrams or automation configurators. As per the experimental results, the RDF export showcases superior richness for natural language queries as the graph-like structure of visual diagrams is closer to semantic networks than to XML tag structures, carrying implications for business process management.*
Keywords: BMPN, RDF, Prompt Engineering, Process Queries

A HYBRID RETRIEVAL-AUGMENTED GENERATION APPROACH FOR HETEROGENEOUS KNOWLEDGE BASES

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Abstract: *Context and motivation. Large language models have the potential to bring important benefits in the context of processing high volumes of data and documents. LLMs led to the appearance of retrieval augmented generation in which chunks of relevant data are being injected into large language models prompts in order to ensure the generation of higher quality content, anchored in verified facts and data. Question / problem. Large language model generation capabilities can be improved by providing parts of data in a more structured format, expressing information with a lesser amount of characters and tokens, without losing its semantic richness, situation where knowledge graphs can play a vital role in storing, at least partially, facts and data. Principal ideas / results. The paper at hand present a hybrid RAG approach in which data is gathered from both natural language documents and RDF knowledge graphs in order to provide an interplay between multiple heterogeneous data sources.*

Contribution. The presented hybrid RAG aims to improve the quality of LLM-based retrieval and querying of data, subsequently offering more flexibility when storing information.
Keywords: Knowledge Graphs, Large Language Models, Retrieval Augmented Generation, RDF

OPENEDGECOMPUTEFRAMEWORK
A FRAMEWORK FOR SEAMLESS EDGE-CLOUD COMPUTING

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Abstract: *With the ever-increasing amount of data that is being sent to the cloud daily to be processed, scalability of our current computing model is placed under a question mark. As such, this topic has received much attention from both the researcher's community as well as the enterprise solution vendors in pursuit of future computing solutions that would relieve some of the strain by performing work close to the device, called edge computing, or on intermediate devices before the cloud, called fog computing. Among the emerging frameworks, be them open source such as EdgeX framework, research originating such as FogBus2, or enterprise solution such AWS GreenGrass, several common architectural patterns were identified such as the heavy use of containerization, decoupling of components by using message passing interfaces and network segregation among edge and cloud devices. The proposed solution aims to build on top of existing knowledge, by using lightweight peer-to-peer orchestration aimed at running centrally stored Java artifacts.*
Keywords: Edge Computing, Cloud Computing, Distributed Computing

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TEHNOLOGICAL INTEGRATION IN HIGHER EDUCATION

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Abstract: *In the academic realm, the process of registering for the bachelor`s degree examination often poses significant logistical challenges for both students and faculty. Traditional methods are characterized by administrative complexities and communication inefficiencies, necessitating a modern solution to streamline*

this crucial aspect of scholarly pursuit. This paper introduces a pioneering web application designed to revolutionize the registration process, fostering seamless collaboration between students and professors while optimizing administrative procedures. By leveraging contemporary technology and innovative design principles, this application aims to mitigate existing challenges and facilitate greater collaboration between students and professors, by seamlessly bridging the gap between both categories.

AN EXPLORATION OF NFTS AND BLOCKCHAIN IN ECOLOGICAL ECONOMIES AND ENVIRONMENTAL MANAGEMENT

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Abstract: *The goal of this study is to investigate how blockchain technology and Non-Fungible Tokens (NFTs) can be utilized in ecological economics and environmental management. The study explores the potential of blockchain to enhance transparency and reliability in environmental data, and examines three main objectives: the accuracy of ecological data verification, financing conservation efforts through NFTs, and the economic impact of tokenizing natural resources and ecosystem services. The research employs a combination of qualitative and quantitative methods, such as case studies, expert interviews, and data analysis, to evaluate how these technologies can affect environmental practices and economic behaviors towards sustainability. The study aims to provide policymakers and stakeholders in environmental management with recommendations and insights into the potential benefits and challenges of implementing blockchain and NFTs. It highlights the importance of considering ethical, technical, and economic factors in the tokenization of nature and emphasizes the need for balanced approaches in technology-driven environmental strategies.*

Keywords: Blockchain, Non-Fungible Tokens (NFTs), Environmental Management, Ecological Economies, Sustainability

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AN OVERLOOK OF IOT FINANCE AND PRE-EXISTING SECURITY CHALLENGES IN FINANCIAL TRANSACTIONS VIA IOT DEVICES ON BLOCKCHAIN NETWORKS

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Abstract: *The nearness of IoT (Internet of Things) gadgets in everyday life these days is expanding, each of us owning at slightest one IoT gadget. Therefore, the adoption of this technology is as global as possible and spread on a very large scale throughout the civilized world. Utilizing IoT gadgets most of the time on a day-by-day premise, we end up doing nearly any action with their offer assistance, as we also make online payments through different web or mobile applications, or specifically with the phone/smartwatch at physical portable POS (Point of Sale). For people, this possibility of carrying out financial transactions online is no longer a novelty, but we must indicate the fact that these exchanges are attempted through a mediator, specifically the issuing Bank of each client. Regarding financial transactions, the novelty exists when we talk about making them with cryptocurrencies, so using the same smart or IoT devices to make payments, but this time we no longer do them through an intermediary, i.e. the Bank, we do them directly on the so-called Blockchain. The main purpose of this paper is to cover a brief overlook of how these financial transactions made on Blockchain through IoT devices are vulnerable from a cyber security point of view.*

Keywords: IoT, Blockchain Networks, Security Vulnerabilities, Financiar

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MODELS FOR NETWORK TRAFFIC BEHAVIORAL ANALYSIS IN IOT SYSTEMS

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Abstract: *In today's interconnected world, the proliferation of Internet of Things (IoT) devices has revolutionized the way we interact with technology. From smart homes and wearable devices to industrial sensors and autonomous vehicles, IoT systems have permeated nearly every aspect of our daily lives. However, with this exponential growth in IoT adoption comes a host of challenges, particularly concerning the security and performance of these interconnected networks. One of the key methodologies employed to address these challenges is network traffic behavioral analysis. Moreover, network traffic behavioral analysis plays a crucial role in threat intelligence and incident*

35

response. By aggregating and analyzing network data over time, organizations can identify recurring attack patterns and indicators of compromise. This rich contextual information enhances their ability to anticipate and preempt future cyber threats. Additionally, in the event of a security incident, network traffic analysis provides invaluable forensic evidence, allowing investigators to reconstruct the sequence of events, attribute responsibility, and mitigate the impact of the breach. In this paper, we propose some models for the network traffic generated by sensors and actuators in IoT systems.
Keywords: Network Traffic, Behavioral Analysis, IoT systems, Security

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IMPLEMENTING ETHEREUM ACCOUNT ABSTRACTION FOR ENHANCED REPORTING

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Abstract: *While blockchain technology exhibits significant disruption potential, a primary drawback for its broader adoption and utility is the poor user experience. Addressing these user experience hurdles such as password and seed phrases protection, wallet management and transaction, is crucial for unlocking the next wave of technology adoption across various industries. The concept of simplifying the process for the end user by hiding out the complexities of the technologies is called account abstraction. Several proposals attend to implement account abstraction have been made, the most significant being Ethereum Request for Comments (ERC) 4337. The paper provides seeks to provide actionable insights on implementing account abstraction technology across various domains, presenting practical steps and recommendations for adopting this technology in reporting processes.*
Keywords: Blockchain, Smart Contract, Security, Ethereum, Exploit, Immutability, Solidity

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AUGMENTED REALITY IN EDUCATION – PROTOTYPE FOR THE UNDERGRADUATE SYSTEM IN ROMANIA

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Abstract: *While blockchain technology exhibits significant disruption potential, a primary drawback for its broader adoption and utility is the poor user experience. Addressing these user experience hurdles such as password and seed phrases protection, wallet management and transaction, is crucial for unlocking*

the next wave of technology adoption across various industries. The concept of simplifying the process for the end user by hiding out the complexities of the technologies is called account abstraction. Several proposal attends to implement account abstraction have been made, the most significant being Ethereum Request for Comments (ERC) 4337. The paper provides seeks to provide actionable insights on implementing account abstraction technology across various domains, presenting practical steps and recommendations for adopting this technology in reporting processes.

EMPOWERING SUSTAINABILITY: UPCYCLING SMARTPHONES AS THE FUTURE OF IOT AND EDGE COMPUTING IN EMERGING ECONOMIES

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Abstract: *Facing the accelerating issue of electronic waste (e-waste), with a record 62 million tonnes generated globally in 2022 and less than a quarter documented as formally collected and recycled, there is a pressing need for innovative solutions to mitigate their environmental and health repercussions. The rate at which e-waste is growing is five times faster than the rate of documented recycling, highlighting a widening gap in e-waste management. This burgeoning challenge not only poses severe environmental and human health risks but also signifies a loss of valuable natural resources, estimated at US 61 billion in 2022 due to inadequate recycling efforts. Moreover, the disparity in technological access continues to widen in emerging economies, often further hindered by the scarcity and elevated costs of modern hardware. This discrepancy exacerbates barriers to sustainable development, underscoring the urgent need for equitable and innovative technological solutions to bridge this gap. This paper introduces an innovative solution to these intertwined challenges: the repurposing of discarded smartphones as edge gateways for IoT applications, feasible on nearly all Android smartphones released later than 2014. By harnessing old Android phones that are readily available and perceived as having no value, we propose a sustainable solution that not only addresses the issue of e-waste but also democratizes access to advanced technological resources.*

HOW GENERATIVE AI IS TRANSFORMING THE EDUCATION?

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Abstract: *Generative AI systems are powerful tools that can be very valuable to be used in education, just like the Internet. When speaking about accuracy, ai systems seem to be very accurate with exceptions. Thus, the low confidence level in the generated results is still a big problem for users, generative systems tending to please the user most of the time at the expense of the precision of the information presented. The ease with which generative AI systems can generate various content is mitigated by the fact that these systems usually mix together true and false statements in a very undistinctive way, the average accuracy level pointing somewhere around 85%. This is why users have to strongly verify the results and double check any crucial information by using highly regarded sources like subject matter experts or academic, government or professional organizations. In some cases, the validation effort may consume more resources than the self-documentation part itself, making generative systems not yet a very viable option when addressing highly rigorous content. Determining the accuracy level of the information provided by generative ai systems seems to be a very big challenge, this is why we have to always validate the results by using a critical mindset filter based on a skeptical point of view.*

AUTOMATING ATTACK AND DEFENSE STRATEGIES IN CYBERSECURITY

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Abstract: *Given the ongoing development and variety of cyber threats, there is a growing urgency for a proactive and efficient approach to IT security. This article presents a novel approach to automating cyber security attack and defense techniques by using automated Cyber Range scenario development. Considering the intricate and ever-changing nature of the current cyber context, characterized by the continuous discovery of new vulnerabilities and quick evolution of attacks, it is imperative to establish effective and flexible testing and training methodologies. Therefore, by utilizing specific data such as operating system versions, application versions, and recognized vulnerabilities (CVEs), it becomes feasible to automatically generate appropriate and authentic test scenarios inside a Cyber Range. The process of adopting such a solution is not devoid of its difficulties. These encompass technical factors like the platform's ability to work well with other systems and its capacity to handle growth, as well as conceptual factors like guaranteeing that automatically created scenarios are both meaningful and realistic. The implementation of automated Cyber Range scenario production is not just a development, but a crucial requirement for effectively handling the intricacy and volatility of contemporary cyber threats. Organizations can enhance their ability to defend against cyber threats and improve their response to the dynamic digital landscape by implementing creative strategies.*
Keywords: Cyber Range, Cybersecurity, Automation, Strategy

CYBERSECURITY IN INDUSTRIAL APPLICATIONS

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Abstract: *An IoT system is largely data-driven, involving devices communicating to each other, collecting information about the environment, and then disseminating it through applications in all phases of a production cycle. IoT connects devices to exchange signals about their environments. This information becomes available across production stages through various applications. As a result, stakeholders have access to real-time updates, lowering risks associated with the transition from manufacturing to use. To maintain the integrity of this information we introduce a framework architecture, based on the blockchain technology.*
Keywords: Industry 4.0, IIoT, Security, Blockchain

QUANTUM COMPUTING AND CYBERSECURITY: THREAT OR OPPORTUNITY?

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Abstract: *Quantum computing development and market availability would be by far a break-through in computer science. Quantum computing perspective is that it will revolutionize the way we implement and execute highly intensive processing algorithms or large space solution search heuristics. So, algorithms of polynomial or exponential complexity will deliver their results in matters of hours, rather than days and the implications for classic and de-facto security algorithms are disruptive. The current paper explores this field of quantum computing and a number of possibilities for leveraging quantum computing power to secure data stored and trans-ported in non-quantum environments.*
Keywords: Cybersecurity, Quantum Computing, Quantum Algorithms

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BLOCKCHAIN-BASED VALIDATION OF SYNTHETIC MEDIA TO COUNTER DISINFORMATION

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Abstract: *Given the latest advancements in modern technology, there has been an increase in content generated by Artificial Intelligence, which has spread through various industries and changed the way we interact with technologies. In essence, the use of AI has proven to be useful to simplify day-to-day tasks and influenced everything from personalized services and entertainment, to transportation or medicine. However, this technology has stretched its boundaries towards deep fakes that propagate misinformation throughout social media, which became a reason of concern, especially by challenging the integrity of mainstream media. In order to counter this threat, this paper describes an analysis of blockchain-based solutions to authenticate media content, through its inherent features like decentralization, transparency and immutability, with the purpose of improving the trustworthiness and security of information spread through social media or other channels.*
Keywords: Blockchain, Synthetic Media, Fake News, Cybersecurity

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NEW REAL-TIME ENCRYPTION MECHANISM FOR FINANCIAL TRANSACTIONS

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Abstract: *There is a need for high security of information in financial transactions. This security is provided using various encryption mechanisms such as RSA, DES, AES, and hybrid encryption mechanisms. The problem, however, arises when financial transactions take place in the banking sector involving large amount of data, involving the need for very fast, even real-time, and strong secured encryption, transmission and decryption algorithms. In this paper we proposed a new cryptography system for sensitive financial (bank or stock exchange) data, that uses a combination of logistic map and sigmoid function for generating a secret key and a version of ElGamal cryptosystem based on elliptic curves for the transfer of the secret key on line. This approach assures higher efficiencies in term of fast and strongly secured performance.*

Keywords: Chaos based encryption system, Real-time performance, Security in financial transactions

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CLOUD FOG COMPUTING SECURE PLATFORM FOR CPU, GPU, AND QPU PROCESSING INTEGRATING AI LLM

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Abstract: *In the era of rapidly advancing technologies, the demand for efficient, secure, and scalable computing platforms has never been more critical. The emergence of cloud fog computing has boost how computational tasks are handled, offering a versatile approach that combines the power of cloud computing with the proximity and low-latency benefits of edge computing. This cutting-edge platform represents a fusion of cloud and fog computing paradigms, tailored to meet the diverse computational needs of modern applications. It provides a secure and robust infrastructure capable of harnessing the processing capabilities of Central Processing Units (CPUs), Graphics Processing Units (GPUs), and Quantum Processing Units (QPUs).*

Keywords: Fog Computing, Quantum Computing, Cloud DevOps Security, Artificial Intelligence, Deep Learning, Large Learning Languages

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MANAGEMENT OF IT AND CYBER SECURITY PROJECTS, AT THE GOVERNMENT LEVEL

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Abstract: *In an informational society where the quality of life, as well as the perspectives of social change and economic development, depend to a greater extent on information and its exploitation, the institional field of managing IT applications for European funds becomes a matter of national competence. importance, with critical values for national security. Scientific knowledge and information are of enormous importance in the global information society, by: supporting innovation, promoting economic development, making decisions in an efficient and transparent way, at the governmental level and especially for the implementation and use of intelligent technologies in developing the degree of digitization of public services through funding provided by European funds and the National Recovery and Resilience Plan. Reinventing the government can be achieved through digitization and government computerization, which involves the modernization of the current IT infrastructure through specific external funding sources, such as European funds, doubled and secured by advanced cyber protection and defense capabilities against possible vulnerabilities or cyber-attacks.*

Keywords: Digital Agile Transformation, Synergy in Innovations, Intelligent Technologies, E-business, Awareness, Cyber Security, Automation of Repetitive Processes

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ENHANCED BLOCKCHAIN-BASED E-VOTING SYSTEM USING ZERO-KNOWLEDGE PROOFS

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Abstract: *In the rapidly evolving digital landscape, electronic voting (e-voting) systems have the potential to offer improved accessibility and enhanced security. This paper introduces a novel e-voting solution deployed on the Ethereum blockchain, leveraging the strengths of zero-knowledge proofs (ZKPs). This approach ensures voter anonymity, prevent double voting, and verify voter eligibility. Our publicly available implementation uses the zk-SNARK protocol, a form of ZKP, to securely verify voter eligibility across both local and national elections. To contextualize our contribution, we conducted a comparative analysis against comparable solutions. This comparison focused on gas costs*

associated with blockchain operations and the range of supported functionalities. Our system stands out by incorporating a "voting sandbox" feature, which features the ability for a user to prove the eligibility for the vote session, through different criteria, while also maintaining anonymity.

THE ENVIRONMENTAL KUZNETS CURVE FOR DEFORESTATION FOR ROMANIA: AN ARDL-BASED EVALUATION

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Abstract: *Regional economic development and innovation play a crucial role in sustaining sustainable economic growth and promoting social inclusion. Our study examines the long-run and short-run relationship between forest area growth (FAG) as the dependent variable and its determinants: Gross Domes-tic Product (GDP), energy consumption (EUSE), and urbanization (URB). The data used covers the period 1990-2021 and is extracted from the World Bank database, with the methodology applied being AutoRegressive Distributed Lag (ARDL). The results of the long-run estimations indicate a positive and significant influence of GDP on FAG, while urbanization and energy consumption have negative and significant effects. Additionally, using Python programming language, we constructed the Environmental Kuznets Curve for deforestation in Romania, which is highlighted by the inverted U-shaped relationship between GDP and FAG. Our findings suggest that urbanization can contribute to the expansion of FAG through urban planning practices that incorporate green spaces and forests in urban areas. Moreover, energy consumption can have a negative effect on FAG, being associated with industrial and energy production activities that generate pollution and deforestation.*

MODELING FINANCIAL CONTAGION: EXPLORING INTERCONNECTEDNESS AND SYSTEMIC RISK THROUGH AGENT-BASED SIMULATION

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Abstract: *Our study delves into the dynamics of financial contagion within the network of 32 commercial banks in Romania through the application of agent-based modeling using NetLogo. What distinguishes our study is the incorporation of government intervention into the model when default occurs in the banking network to assess its effects. Our simulations demonstrate that the level of interconnectivity between banks plays a crucial role in determining the extent of systemic risk and the spread of financial contagion within the banking network. Higher levels of interconnectivity increase the risk of contagion, highlighting the importance of understanding and monitoring interbank linkages. Additionally, our results underscore the significance of government intervention in mitigating the effects of financial contagion. We observed that higher levels of government intervention lead to a reduction in the number of banks entering default, indicating the effectiveness of policy measures in stabilizing the banking system during crises. Banks that do not default, especially those without government intervention, demonstrate resilience to financial stress. Their ability to maintain stability without external assistance emphasizes the importance of sound risk management practices and capital buffers in safeguarding against systemic shocks. The insights gained from our simulations have significant implications for policymakers and regulators. Understanding the dynamics of financial contagion and the factors influencing systemic risk can inform the development of more robust regulatory frameworks and risk management strategies aimed at enhancing the stability and resilience of the financial system.*

Keywords: Financial Contagion, Agent-Based Modeling, Banking Network

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EXAMINING THE INFLUENCE OF ENERGY PRICE AND ENERGY CONSUMPTION FOR MINING ON BITCOIN PRICE

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Abstract: *This research utilizes Partial Least Squares Structural Equation Modeling (PL-SEM) to explore the relationships between energy price, mining energy consumption, and Bitcoin price. Building upon previous work [1], the research analyzes factors influencing energy prices (coal, natural gas, energy index,*

crude oil, inflation, and precious metals) and mining processes (Bitcoin energy consumption, miners' revenue, and mining time per Bitcoin). Obtained results contribute to a nuanced understanding of the complex interplay between energy prices, energy consumption, mining processes, and the valuation of Bitcoin.

MODELING SOCIO-ECONOMIC PHENOMENA: SOME CRITICAL THOUGHTS AND A POSITIVE EXAMPLE

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Abstract: *The paper presents some general thoughts on the subject of modeling of socio-economic phenomena and processes and the problems, related to such modeling. In particular, the subject of reliability and verifiability of models is taken up. The aspects of data and methodology, as well as theory are touched upon. Against this background a simple modeling exercise is shown of migrations in Poland at the municipality level. For the data on some 2 500 Polish municipalities over 20 years in the 21st century very simple models are built, based on quite basic hypothesis of relation between unemployment rate and migration flows. It is shown that not only the basic hypothesis gets confirmed, even if with a great variety of divergences, but quite plausible conclusions can be drawn from the results obtained, leading also to deeper analyses.*

ENHANCING SOCIAL ACCEPTANCE IN MICROGRID IMPLEMENTATION: A SHARE-OF-CHOICE OPTIMIZATION APPROACH

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Abstract: *The role of social acceptance is crucial in securing the commitment and cooperation of prosumers (i.e. contraction of producer and consumer), which are essential for the optimal operation and regulation of micro smartgrids. Although designing for social acceptance in smart grid diffusion within energy communities is increasingly recognized in both research and policy domains, its widespread implementation and empirical validation remain limited. This study aims to promote the widespread adoption of the micro smart grid paradigm to advance energy transition initiatives. To achieve this goal, it is necessary to actively engage with prosumers, local communities, and regulatory bodies, demonstrate sustained commitment from stakeholders, and ensure optimal microgrid orchestration through social acceptance.*
Keywords: Social acceptance, Conjoint analysis, Share-of-Choice

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GREENING THE WORKPLACE FOR HAPPINESS: EXPLORING CSR'S AND SUSTAINABLE PRACTICE'S EFFECTS ON EMPLOYEES' WELLBEING

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Abstract: *In contemporary times, there has been a notable surge in companies' attention towards the welfare of their employees. Employee well-being is no longer solely contingent upon financial incentives. Factors such as the work environment, corporate social responsibility (CSR) initiatives, green practices, and organizational culture have emerged as pivotal considerations among employees when evaluating job satisfaction. Through a structured questionnaire*

administered to employees across various industries, data were collected on perceptions of organizational culture, CSR practices, green initiatives, and self-reported levels of happiness. Utilizing Smart PLS 4 analysis, a robust statistical model was constructed to examine the interplay between these variables. Our research reveals a significant positive correlation between CSR endeavors, encompassing green practices, and employee happiness. Through elucidating the pathways via which CSR and green initiatives impact employee well-being, this study provides valuable insights for fostering a comprehensive approach to corporate sustainability and employee contentment. These results emphasize the strategic necessity for organizations not only to prioritize CSR and green practices but also to integrate them within their organizational culture, thereby enhancing both employee well-being and overall organizational effectiveness.

Keywords: Smart PLS, Happiness, CSR, Green Practices, Well-being, Green Economy

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DIGITAL SKILLS AND LABOR MARKET PROSPECTS: A CONJOINT EXPERIMENT ON STUDENTS' PREFERENCES

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Abstract: *This study aims to investigate students' preferences when selecting a master program. These preferences are expressed considering the labor market prospects. The findings of this study reflect students' perceptions of the utility of relevant digital competencies. The students that participated in the experiment are studying a field that combines mathematics, economics and information technology to understand economic systems. Upon graduation, these students should have the necessary skills to model economic behavior, utilize computational methods to solve economic problems, and make informed decisions using various quantitative methods. To investigate the students' preferences, the study uses a method called con-joint analysis. This method provides a framework to understand how people make decisions when faced with multiple options. In our study, the students are the decision-makers who are selecting their future master's pro-gram. Each student received two profiles and had to select one. This task simulates a decision-making process where*

respondents have to choose a preferred alternative from two options, where options vary across two or more attributes. In our experiment, the attributes are represented by a set of skills that are relevant to ICT professionals. The findings of the study emphasize the skills that enhance job prospects in this field. These skills include the ability to access and analyze digital data, and to use digital tools for collaboration and productivity.
Keywords: Digital Skills, Conjoint Experiment, Educational Path

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ESTIMATING PROBABILITY OF DEFAULT. A NEW QUALITATIVE PERSPECTIVE

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Abstract: *In today's economic landscape, accurate credit risk assessment is paramount for prudent lending decisions. This paper proposes a qualitative framework for modelling default probability (PD) in credit risk assessment. Unlike traditional quantitative models, this approach integrates a broader range of factors including market position, ownership structure, and sector risk. By complementing quantitative techniques with qualitative insights, this model enhances PD assessments and can be utilized in stress testing and macroprudential analyses. The methodology involves systematically evaluating qualitative dimensions contributing to credit risk and employs a logit model with backward selection. Drawing from a comprehensive dataset, including approximately 30 qualitative characteristics from financial statements, Credit Registry loan-level information, and Business Register data, this approach offers a robust framework for assessing default probability.*
Keywords: Credit Risk, Probability of Default, Micro Data, Logit

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BRAND ASSOCIATIONS BIBLIOMETRIC ANALYSIS

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Abstract: *Connectivity in modern society has revolutionized communication and interaction, transcending geographical barriers and fostering unprecedented exchange of information and ideas. Enabled by rapid technological*

advancement, connectivity has democratized access to knowledge, transformed various sectors including education, healthcare, and business, and reshaped social interactions. Moreover, connectivity has played a crucial role in reshaping the global economy, facilitating seamless trade and creating new opportunities for businesses and entrepreneurs. In the context of brand associations, a bibliometric analysis was conducted to provide insights into the existing literature. Results revealed a growing interest in the topic, with a significant number of publications primarily focused on quantitative studies within the business domain. However, there remains a notable gap in qualitative studies exploring brand associations, indicating opportunities for further research and innovation. Overall, the analysis underscores the importance of connectivity in driving growth, innovation, and deeper connections with consumers in the sphere of brand associations.

Keywords: Brand Associations, VOSviewer, Web of Science, Databases, Bibliometric Analysis

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COMMUNITY DETECTION ON AN EUROPEAN AIRPORTS NETWORK

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Abstract: *Topics related to community detection and complex network indicators are increasing notoriety in the literature. In this research, we focus on network indicators such as average degree, average clustering coefficient, average path length, network density, network diameter, nodes centrality, and on detecting communities with Louvain algorithm. We build an European airports network, apply and discuss the network indicators, as well as the community detection algorithm.*

Keywords: Community Detection, Louvain Algorithm, Network Indicators, Airport Complex Network, Closeness centrality, Important nodes

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THE IMPACT OF MINIMUM WAGE ON EMPLOYMENT. THE CASE OF ROMANIA

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Abstract: *The minimum wage is probably one of the most debated topics among economists, and its impact on other macroeconomic variables is challenged by numerous studies. Therefore, it is of high importance to understand how the minimum wage influences the economy. The heightened attention that this index receives at European level is noticeable both through the recently published directives, and through the numerous studies dealing with this subject. This article aims to analyze how the minimum wage, together with a set of other relevant economic indicators, influences the employment rate in Romania, both in total and among young people, because the expectation is that the impact is greater among young people, the latter being the ones who can get easier a minimum salary at the beginning of their career. The considered period is 2000-2022, and the examined variables are the following: in-work productivity, minimum wage and the employment rate. Regression models were estimated for each category separately: total employment, as well as young women and men under 24 years, male and female employed.*

DEVELOPING A GENERATIVE AI-DRIVEN VIRTUAL ASSISTANT FOR ENHANCING LEARNING SUPPORT

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Abstract: *This research paper presents the design and implementation methodology of a Gen AI based chatbot tailored for assisting users in learning Python programming language. Leveraging the capabilities of Streamlit, an interactive web application framework, and OpenAI's GPT-3 model, the virtual assistant provides a chat-like interface for users to interact with. The assistant can respond to user queries, providing explanations, and guiding them through Python-related concepts and problems. The paper outlines the development process, including the setup of the development environment, design of the user interface, interaction with OpenAI's GPT-3 model, and implementation of the main functionality. Furthermore, the paper discusses potential enhancements and customizations for future iterations of the virtual assistant.*
Keywords: Chatbot, Generative AI, LLMs, Virtual Assistant, Python

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THE ANALYSIS OF THE REAL ESTATE MARKET USING THE K-NEAREST NEIGHBORS ALGORITHM

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Abstract: *Machine learning methods and techniques are a current reality in artificial intelligence, which is rapidly developing and encompassing most aspects of social life. The k-Nearest Neighbors (k-NN) algorithm is a prevalent machine learning method for classification and regression problems. It is based on the assumption that similar data points will have similar labels or values. k-NN is a*

non-parametric algorithm, meaning it makes no assumptions about the input's probability distribution. In this paper, we developed a model that uses the k-NN algorithm to study the USA real estate market based on house price classification. When looking to buy a property, one of the most important factors to consider is the price. Therefore, we trained a model to classify new data into a specific price category with its own set of characteristics, thereby facilitating buyers' decision-making processes.

Keywords: K-nearest neighbors, Real Estate Market, Classification, Machine Learning

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PREDICTION AND CLASSIFICATION OF SPECIFIC TYPES OF RESEARCH METHODS IN PROJECT MANAGEMENT USING MACHINE LEARNING

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Abstract: *This paper investigates the potential of machine learning in project management, specifically focusing on using machine learning models to predict and classify suitable research methods. To analyze this data, we create a dataset containing information on the accurate application of research methods used in project management. The findings indicate that all three models explored (Random Forest, K-Nearest Neighbors, and Support Vector Machine) achieved high accuracy in classifying research methods, making them promising tools for project managers and researchers. The paper emphasizes that selecting the most suitable model depends on computational efficiency and project-specific requirements. By understanding the strengths and weaknesses of each model and their performance metrics, project managers and researchers can use machine learning to make informed decisions about research methods and improve project outcomes.*

Keywords: Machine Learning, Project Management, Prediction and Classification, Research Method

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VIABILITY OF OPEN SOURCE ASSISTANTS FOR ADAPTIVE LEARNING SYSTEMS

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Abstract: *The paper aims to test the viability of a small number of open source Large Language Models for the role of a live learning assistant integrated in an adaptive learning system. Several models were selected for testing which are based on variants of Meta's Llama and were fine-tuned by Open-Assistant with high-quality human feedback data. The models were tested against a previous generation LLM (a variant of GPT2) and a current generation LLM (GPT3.5-Turbo). The quality of the generated text was analyzed, as well as the general performance and running cost. The open source models were found to be acceptable and had the added advantages of increased control (over a commercial solution) and being available for an on-prem installation, with the notable caveat that they had significantly higher running costs.*
Keywords: LLM, Learning Assistant, Open Source

SYNERGIZING IoT, BIG DATA AND ML FOR SUSTAINABLE AGRICULTURE

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Abstract: *This article delves into the transformative potential of integrating Internet of Things (IoT), Big Data, and Machine Learning in agriculture, showcasing their collective impact on sustainability and efficiency through case studies and expert insights, culminating in a detailed examination of a Convolutional Neural Network (CNN)-based pest classification system.*
Keywords: Internet of Things, Machine Learning, Big Data, Sustainable Agriculture

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DIFFERENT ENTROPY MEASUREMENTS IN MACHINE LEARNING

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Abstract: *Entropy is a very wide-meaning scientific term. This article specifically associates "entropy" with the state of disorder, randomness, chaos, and uncertainty in data science analysis perspectives. More specifically, machine learning (ML) and data mining (DM) mathematical models are the environments*

in which entropy would be related and referenced in its contexts. What are the key roles of entropy in ML and DM? How does it affect results and interpretation procedures? Are the currently used models considering the entropy and aware of major mathematical faults, in incorrect or improper entropy prediction? Lastly, what are the implications in such a case? The article is based on a few years of research, for a Ph.D. thesis, theoretical and practical research field. The article suggests practical implemental software-based apparatus to increase precision, accuracy, and possibly better math-models results after performing some math-models analysis. It offers a simple pre-process stage which decreases the possible faults of wrong entropy pre-process use.

Keywords: Data Mining (DM), Entropy, Ergodic Math (EM), Hidden Markov Model (HMM), Machine Learning (ML), Markov Chains

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ALGORITHMIC TRADING BOTS USING ARTIFICIAL INTELLIGENCE

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Abstract: *This study presents a comparative analysis of two algorithmic trading bots employing distinct artificial intelligence algorithms, namely Lorentzian classification and K-Nearest Neighbors (KNN), in the context of Bitcoin/USD trading. Over a period spanning from February to April 2024, the bots were deployed on the Pionex exchange with an initial investment of $100 each, with profits systematically reinvested at each trade. Through meticulous examination of the code, strategy comparison, and rigorous evaluation of results, this study aims to discern which algorithm yields superior performance in terms of profitability and efficiency. While both bots demonstrate viability in generating profits, the KNN algorithm-driven bot showcases superior performance across key metrics. Its higher win rate, profit factor, and average profit per trade underscore the robustness and efficacy of the KNN algorithm in capturing profitable trading opportunities. Nonetheless, the Lorentzian classification algorithm-driven bot still exhibits commendable performance, highlighting the versatility of AI algorithms in algorithmic trading contexts. Further research and refinement of algorithmic trading strategies utilizing AI algorithms hold promise for enhancing performance and unlocking new frontiers in algorithmic trading excellence.*

Keywords: Algobots, Trading, Artificial Intelligence, Bitcoin

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MULTINOMIAL NAÏVE BAYES CLASSIFIER FOR ROMANIAN NEWS IN THE CONTEXT OF A TELEVISION STATION

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Abstract: *News television stations are reporting current events form multiple fields such as political, social, sports and so on. Having a report that classifies the news generated by the journalists would significantly benefit the management of the news station by assisting at resource allocation, editorial content strategy, performance measurement and audience insight. This paper proposes a supervised machine learning model that can automatically classify news using text data from a Romanian branch of a multinational news network that currently does the news classification process manually. We first collect the data from the media asset management system of the news station. With this data, we then create and pre-process the dataset, vectorize the text data into numerical values using both CountVectorizer and TF-IDF, train the model using Multinomial Naïve Bayes algorithm and evaluate the results. The model evaluation shows good performance, the classification accuracy varied from 79% to 82%, depending on the vectorize method ap-plied for the text feature extraction. A better accuracy was achieved when CountVectorizer method was applied.*
Keywords: Supervised Machine Learning, News Classification, Multinomial Naïve Bayes, Romanian Language Processing

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TEXT SUMMARIZATION AND SENTIMENT ANALYSIS PIPELINES USING LARGE LANGUAGE MODELS FOR FINANCIAL NEWS

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Abstract: *In an era dominated by vast amounts of unstructured web data, the need for sophisticated extraction and analysis methodologies is imperative. In this paper our goal is to address the challenge of summarizing financial news efficiently utilizing state-of-the-art transformer-based Large Language Models (LLMs) — specifically "t5-small", and "sshleifer/distilbart-cnn-12-6" and conducting preliminary sentiment analysis. The performance of these summarization pipelines is rigorously evaluated against a comprehensive suite of metrics, including ROUGE, Keyword Overlap Score and Semantic Similarity*

Score for both models to validate the summaries' accuracy and coherence. This investigation involved the CNBC news dataset, selecting 309 articles from the entire set available. By showcasing the capability of these models to distill pertinent information and hint at market sentiments using sentiment analysis pipelines, the research subtly underscores the emerging credibility and potential of AI techniques. This foundational work aims not only to en-rich financial market analysis but also to catalyze further in-depth studies that refine Artificial Intelligence's role in interpreting and leveraging the vast digital information landscape for strategic insights.
Keywords: Large Language Models, Sentiment Analysis, Financial News, Summarization

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GENERAL CHARACTERISTICS OF THE NEW LEARNING PARADIGM

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Abstract: *Throughout the centuries, various revolutions have occurred, each transition sparking debates and concerns. For instance, the shift from computers, emerging from the mid-20th century, to the advent of the internet post-2000, stirred numerous myths regarding the perceived dangers of computing machines. Presently, a new paradigm emerges, one of technology integration into the human sphere, inciting conflicts between modernists and traditionalists. Technological progress in fields such as medicine is embraced, exemplified by the use of AI in tumor detection from radiographs. However, negative perceptions persist, notably concerning virtual reality, viewed by a segment of the populace as both frightening and inscrutable.*
Keywords: Learning, Paradigm, GPT, Characteristics

DEVELOP A SENTIMENT ANALYSIS FOR TEACHING PERFORMANCE USING A MACHINE LEARNING PIPELINE

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Abstract: *This article identified a lack in scientific literature for topics such as sentiment analysis systems, pipelines, and teacher evaluation. I exposed the challenges in developing sentiment analysis for teaching performance. An Anaconda environment with Jupyter Notebook and Spyder IDE was used to build the machine learning pipeline. To implement the pipeline, I used a large (2 million records and 8 attributes), cleaned, open-source data set for aspect-based*

sentiment analysis. The focus was to prepare a reduced pandas DataFrame by filtering the larger data set by the number of total words for student comment, sentiment type, and subjectivity type. The word cloud feature provides a clear status for teaching performance in visual approach. To pro-duce sets of advice for each student comment, I have integrated the OpenAI and MistralAI models, comparing the generated content from both approaches in terms of LLM size, price, quality of content, and the execution time.

Keywords: Sentiment Analysis, Teaching Performance, Machine Learning, Pipeline.

ARE LLMs HALLUCINATING WHEN ANSWERING SPECIFIC QUESTIONS? EXPERIMENTS WITH A RAG PIPELINE

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Abstract: *While industry aims to automate more and more tasks with the help of Large Language Models (LLMs), assessing their capacity to provide reliable responses represents a legitimate concern. LLMs are trained over general knowledge bases, thus they are not intrinsically able to respond questions over private, specific knowledge regarding the auto-mated processes. This issue represents the main source of hallucination, as the LLM with not recognize its inability to supply a truthful response. This paper introduces a RAG pipeline for query answering from a specific text corpus, allowing to evaluate the quality of the retrieved responses. Inspecting the variability of LLM performance in time over the same query answering task, we strive to detect the potential hallucinations. Results show that by analyzing the computed metrics we could advance towards a framework for hallucination detection and for assessing the confidence on the LLM performance.*

Keywords: Sentiment Analysis, Teaching Performance, Machine Learning, Pipeline.

GO PLAYING AGENTS ON STANDARD COMPUTING RESOURCES: EVALUATING SEVERAL REINFORCEMENT LEARNING STRATEGIES

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Abstract: *From the beginning of computing, artificial intelligence was concerned with creating game-playing agents, capable of surpassing human intelligence.*

The game of GO represents one of the most difficult challenges for AI, given its computational complexity. Google DeepMind's AlphaGo proved that reinforcement learning could be the winning strategy for this game. Without owning the computational resources of Google, we analyze several reinforcement learning algorithms implemented for a 9x9 board game of Go using a convolutional neural network. Considering a relatively small number of self-played games together with 2 learning strategies: gradient descent and q-value, we assess the impact of different tuning values throughout the training process. The current study covers three main steps for each model: self-played game generator for data extraction, training on experience, and evaluation with direct confrontation. Our agent was implemented in Python using Keras library for neuronal network building and training, and PyQt for an interactive interface that lets users view games between different models.

Keywords: Go, Machine Learning, Reinforcement Learning, Agent Training

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