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Predictive analytics-based evaluation of performance of public bus transportation San Antonio, Texas as a case study [CAIS] 3

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Citizens in large cities utilize public transportation as an alternative to self-driving for several reasons, such as avoiding traffic congestion and parking costs and utilizing their time for other things (e.g. reading a book or responding to emails). While large cities provide public transportation as a service to their citizens, they need to consider optimizing their budget and ensuring that public transportation is available and reliable. Using our case study, the public bus transit system in the city of San Antonio, Texas, in this paper, we used predictive analytics models to evaluate the performance of public bus transportation. We used time point stops as the target variable in order to evaluate their impact on the overall performance of the system. We also evaluated methods for the detection of potential bus-time savings and reported several examples of possible savings.

Optimal Energy Management Strategy for Microgrids in Developing Countries: A Focus on Battery Energy Storage System [CAPE] 9

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Microgrid failure is a significant concern in developing countries and rural areas, necessitating effective energy management strategies to enhance post-failure reliability. The battery energy storage system plays a crucial role in microgrids by managing imbalances, mitigating voltages, and improving system reliability. This paper presents a method for optimizing the energy storage system in a photovoltaic-connected microgrid. The method controls battery discharge and charge

operations based on load requirements, considering fluctuations in demand over a day. Simulations using MATLAB R2022a employed state flow analysis and linear programming to minimize variable electricity prices before and after islanding events. The results demonstrate significant improvements in energy management by reducing total variable electricity costs. The proposed method enhances the performance and resilience of microgrid systems, addressing challenges associated with intermittent renewable energy and potential system failures. Effective energy storage management enables risk mitigation, improved reliability, and enhanced utilization of renewable resources, ultimately contributing to sustainable and resilient energy systems.

Perspectives of Using Load Balancing for Supporting Devices in Reconfigurable Ubiquitous Environments [AHPC] 15
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The user can access data and services anytime and from any location, thanks to ubiquitous computing. As a result, device collaboration is essential. The devices and networks become overloaded as a result. As a result, the network becomes unstable, and network activity is suspended. By addressing these load-balancing issues with the new necessity of ubiquitous environments, these systems may be able to move toward greater user/device collaboration and mobility in the future. For various types of devices, this position paper shows how reconfiguration is one of the critical solutions for reducing energy usage in ubiquitous surroundings. We suggest a new way to adjust the distribution of device components as soon as high energy consumption is detected to lower and/or balance the energy consumption.

Digital Economy and Artificial Intelligence in Sub-Sahara Industrialization [CECA] 19
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This article examines the effects of the digital economy and artificial intelligence on the industrialization of sub-Saharan African economies. Thus, from a sample of 47 countries observed over the period 2003 – 2021, we estimate a model in panel data by the GMM system method. Overall, our results show that the digital economy and artificial intelligence contribute significantly to improving industrialization. In addition, they keep their robustness against the use of competing estimators. We suggest more investment in technological infrastructure, better human capital formation for a better contribution of the digital economy and artificial intelligence to industrial development.

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A Real-Time Energy Management of a PV/Battery/Grid-Connected System Under Uncertainties [CAPE] 27

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Building up grid-connected Hybrid Renewable Energy Systems (HRES) is one of the major challenges of developing countries. This relies on the feasibility study and moreover on the optimization of the system built. This paper aims to provide a good framework for Energy Management Systems (EMS) strategies. It consists of PV/Battery/loads connected to the power grid. Hence, the Hybrid Micro Grid System (HMGS) obtained is subject to meteorological uncertainties due to shadowing of the solar panels. Two approaches have been applied in this work: heuristic method using State Machine Logic (State Flow Method) and Linear Programming. These methods have been implemented using MATLAB R2018a. A thorough discussion describes the results of the simulations using both methods for two meteorological conditions: clear and cloudy periods. Four scenarios are presented in accordance to the specifications above-mentioned. A real-time analysis is performed for a specific case study on a daily basis.

Time-Variant Band-Pass Filter for Noise and DC Baseline Optimisation in Fast FEE for CdZnTe/CdTe Detector [CAPE] 33

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A time-variant circuit is examined in the context of readout electronics for silicon sensors. It consists of a time-variant differentiation and a two-stage integrator. To lower mean power consumption, the circuit can alternate between the on and off states. This will improve noise performance and restore output undershoot and offset.

The Effectiveness of Carbon Taxes - An Analysis Across Multiple Countries [CGRT]..... 35

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With worldwide emissions of carbon dioxide contributing to global warming, countries are looking for ways to lower local emissions. One strategy for reducing carbon emissions is through national carbon taxes. These taxes vary both in terms of amount of the tax and industries included in the tax. With the first carbon taxes imposed thirty years ago, it is possible to assess effectiveness and challenges associated with carbon taxes.

Geothermal Potential Assessment of the Bare-Bakem Region (Cameroon Volcanic Line): Contributions From Geophysical and Geothermometric Studies [CGRT]..... 39

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In order to determine the geothermal potential of the municipality of Baré-Bakem, located in both the sedimentary basin of Moungo and the volcanic region of Nkongsamba (Cameroon Volcanic Line), geophysical measurements using electrical resistivity tomography were conducted along a 1km profile between two opposing thermal sources spaced 20 meters apart. The profile was acquired in the SW-NE direction using a 945m-long array with 64 electrodes spaced at 15 meters intervals. The ZZRes2Dinv44 software was employed to generate investigative images. The obtained results along the profile reveal the presence of two geothermal zones of interest trapped within permeable sedimentary formations at depths ranging from approximately 20 to 110 meters and close to the surface. From a geothermometric perspective, chemical geothermometers such as silica and Na-K-Ca were calculated by collecting water samples from these thermal sources and analyzing the physicochemical parameters at the Laboratory of Geochemical Analysis of Waters (LAGE/IRGM) in Nkolbisson. The calculations indicate that the Baré-Bakem locality exhibits temperatures ranging from 51 to 90°C for near-surface anomalies and temperatures ranging from 283 to 300°C for deeper anomalies. These geothermal resources possess high energy potential suitable for electricity production.

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Machine Learning-based Positioning using Multivariate Time Series Classification for Factory Environments [CAIS]

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Yanqiu Huang, University of Twente

Indoor Positioning Systems have gained significance in numerous industrial applications. While state-of-the-art solutions are accurate, their reliance on external infrastructures can lead to considerable costs, deployment complexities, and privacy concerns, making them suboptimal for specific contexts. Recent advancements in machine learning have surfaced as a potential solution, leveraging data solely from onboard IoT sensors. Nonetheless, the optimal machine learning models for IoT's resource constraints remain uncertain. This research introduces an indoor positioning system using motion and ambient sensors tailored for factories and similar settings with predetermined paths. The problem is framed as multivariate time series classification, comparing various ML models. A novel dataset simulating factory assembly lines is utilized for evaluation. Results demonstrate models achieving over 80% accuracy, with 1 Dimensional-Convolutional Neural Networks showing the most balanced performance followed by Multilayer Perceptrons, considering accuracy, memory footprint and latency. Decision Trees exhibit the lowest memory footprint and latency, rendering its potential for practical implementation.

Optimal Transport-based Loss Functions for Machine Learning [CAIS] 53
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This short paper briefly reports the essential facets of the article (Kamsu-Foguem & al., 2022) presented and discussed as a Journal First paper. The article overviews generative neural networks whose loss functions are based on optimal transport with the Wasserstein distance. This tool of mathematical origin allows interesting automatic learning to be obtained in a reasoning time under Lipschitz constraints. As the proposed studies are based on Wasserstein Generative Adversarial Networks (WGAN), we conclude this report with a short discussion on how WGAN currently supports critical, intelligent applications in our society and nearly all industry sectors.

Improving Human-Agent Team Performance through Audio-Visualized Communication [CAIS]..... 55
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In this paper, we deal with human-agent teams involving software agents and human agents collaborating to resolve a common problem. We propose experimenting the impact of integrating audio-visual interactive skills on the team performance: vocal communication act is integrated in the autonomous agent so that it can explain its behavior to human using voice as a communication channel; visual communication act is modeled to allow humans to track software agents' movement in the environment. We carry out a series of tests using the testbed BW4T (Block World for Teams) to highlight the evolution of agents' communication with new interactive capabilities partly adapted from DEFACTO(Demonstrating Effective Flexible Agent Coordination of Teams through Omnipresence) experiment . We propose implementing that experiment in Jason platform well adapted to develop such very complex systems where BDI (Believe Desire Intention) agents need to interact in complex ways with humans and/or with each other. The result is a significant improvement in team performance assessed through the completion of the joint task due to a better understanding of the overall situation of the task workflow.

Gender Bender Bot - The Effect of (Not) Following Gender Stereotypes in Conversational Agent Design [CAIS]..... 59
Fabian Hildebrandt, Dresden University of Technology

Conversational agents (CAs), are increasingly becoming a common presence in our daily lives (e.g., Alexa or ChatGPT). Research has shown that designing CAs humanlike (e.g., through social cues such as a human name or avatar) results in a higher perception of humanness, which increases and service satisfaction by the user. In this context, CAs are exclusively designed to portray stereotypical genders (e.g., combining a female name and avatar). To challenge this quasi-standard, a 2x2 experiment (male/ female avatar x male/ female name) with 262 participants was conducted to investigate the effect of gender-mixed CAs. Our results indicate that users of CAs

with a stereotypical gender report higher service satisfaction and a partially higher perception of social presence for male CAs. However, the results do not reveal any differences in perceived empathy and competence. Thus, it appears that users prefer stereotypically CAs, which is in sync with current practice.

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