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Book of Abstracts

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Towards a Secure RFID Micro-controller Based Media Integration Auto- Stream Framework for Car Packing

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Over time there has been many approaches for innovative electronic car park parking system that provisions car parking services but haven't offered the ultimate solution for drivers, municipalities, and private parking lot owners. However this solution will be an alternative by enabling drivers to be guided when parking their cars at the exact place in a specified period of time, it will also simplify the monitoring and also intelligence gathering of parking occupancy. It will be built-in with a powerful RFID based micro-controller functioning as a vehicle parking meter, The framework will also provide an efficient alternative to barcode readers which are often expensive and cannot be used innovatively for automatic redirection of cars to the exact empty lot. Also, it will be simple and cost-effective to implement and operate as a standalone system or alongside traditional parking payment systems that owns his vehicle parking tag. This tag contains information that are necessary for communication with the car park system. The RFID tag readers will be fixed at the entrance of the car parking space. he has to show his parking tag before the reader before parking. The reader reads the in time of the car and passes the data to the parking system. When the car exits out from the parking center, the driver once again has to show his card so that the reader records the out time now. Checking the in and out times, the parking system schedules for vacant spaces and also takes images and video of cars approaching and when exiting. The information regarding a particular car will then be provisioned on the interface of the main car parking system as a display from the monitor.

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A REVIEW OF THREATS, ATTACKS AND SECURITY COUNTER-MEASURES IN FOG COMPUTING

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Abstract
The world currently is experiencing an upsurge growth in the number of devices that are connected to the internet. This development is being referred to as Internet of Things (IoT). This phenomenon has presented new challenges to the already existing cloud infrastructure and in turn led to development of an inter-mediating paradigm called Fog Computing. Fog computing as a subset of IoT is being used to improve on the challenges faced by the cloud computing infrastructure especially when it comes to latency and real-time feedback of processed data. Several research have been done addressing the issue of privacy in Fog Computing but few have tackled the specific threats, attacks and security countermeasures facing Fog Computing. Therefore, this paper addresses the threats, attacks and security measures related with Fog Computing. The methodology opted for this paper is a review of papers with keywords IoT, Fog Computing, Threats, attacks and solutions or countermeasures. The aim of this paper is to critically review the studies of Fog computing Security, analyzing threats, attacks and propose security countermeasures to make the IoT landscape secure. In addition this paper provides basic understanding of key concepts in IoT, Fog Computing and Cloud Computing.

Keywords: IoT, Cloud Computing, Fog Computing, Fog Computing Security

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VOICE RECOGNITION ALGORITHMS FOR USER AUTHENTICATION

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ABSTRACT

At the present day, solutions for user authentication are insecure and have been hacked frequently especially the use of passwords. Biometric authentication is a good solution as it provides unique identification of personalities. It includes solutions as fingerprints, Iris recognition and voice recognition. Voice recognition system changes the human voice into signals which can be comprehended by machines which would be a computer, typewriter or even a robot. Voice recognition algorithms are used day by day; they use algorithms to convert the sound waves into helpful information for handling which is then deciphered by the machine. A portion of these machines utilize more seasoned algorithms while the more up to date algorithms utilize neural networks to interpret this information. These systems then produce an output generated in the form of text to be used. A lot of training data is needed to make the algorithms function effectively. This paper analyses and provides a review of the current voice algorithms used for user authentication. In addition the paper will provide an assessment of the algorithms, implementation and conclusions.
Keywords: Voice recognition, algorithms, user authentication,

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Challenges of Health Information Exchange in Maternal Healthcare in Kenya

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In Kenya, Medical facilities have made efforts to adopt Electronic Health Records systems at various levels and for different use cases. However, there lacks a robust and secure system for sharing sensitive and confidential health records. This curtails the potential benefits that can be gained by shared electronic health records especially the antenatal care process. Besides, there lacks a portable mechanism of sharing patient medical history especially when the patient seeks care from one provider to another. This situation is even dire and most detrimental to the most vulnerable of citizens, in expectant mothers, children and marginalized groups. This study seeks to determine the challenges of Health Information Exchange in Maternal healthcare, Antenatal Care Process. The findings were drawn from a qualitative research study conducted at the Nakuru County Level Five Hospital utilizing a case study methodological approach

Key Words: Electronic Health Records systems, Health Information Exchange.

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A MODEL FOR PREDICTING SHORT TERM MOBILE LOAN APPROVAL

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Abstract: Currently there are billions of users of cell phones and portable devices. With this growth of mobile technology, it comes with a lot of applications; one of them is applying for a soft quick loan. However, since financial institutions offering such services have limited resources and assets, it is required of them to check several factors before approving a mobile loan for a customer. This paper proposes a hybrid machine learning model for predicting whether a customer is credit worthy or not. This paper experiments; using existing financial institution data for both approved and disapproved customers for mobile loan facilities. The proposed model is a hybrid of machine learning techniques namely SVM, regression, KNN, and decision trees. Our model is further trained and tested on the various datasets. Machine learning and data mining experiments are conducted using existing ML libraries. The results and discussions are presented in the form of descriptive statistics and prediction metrics.

Keywords: Loan, Machine Learning, mobile, model, Training, Testing, Prediction.

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Review of Similarity measures in machine translation

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Abstract:Sentence similarity measure has continued to play an increasingly important role in text-related research and applications in areas such as text mining, machine translation, web page retrieval and, text categorization. Different methods for computing sentence similarity exist and have been adopted from approaches used for long text documents. These methods process sentences in a very high-dimensional space and some are consequently inefficient, require human input, and are not adaptable to some application domains. This paper focuses on reviewing different work done on similarity measures between sentences. Reviewing present algorithms that take account of semantic information and word order information implied in the sentences.

Keywords: sentence similarity, algorithms, semantics, machine translation

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Building a Data Pipeline for a Real World Machine Learning Application

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Predicting hypertension among individuals using historical blood pressure (BP) readings has been the focus of recent studies in Artificial Intelligence in health. This has been occasioned by the growing prevalence of hypertension in the general population as well as individuals' desire to manage their health. The BP data used for predictions is collected during clinical visits and does not capture fluctuations in between clinic visits. Additionally, current prediction approaches rely solely on the

BP readings without regard for the individual's lifestyle and activities, which are known to affect individuals' BP. This study developed and tested a system for regular collection of BP and related activity data for use in monitoring and prediction of an individual's BP. The system developed comprised of (i) a smartwatch with a Photolethysmography (PPG) heart rate sensor for detecting the BP and (ii) a mobile phone application for receiving the BP readings and to collect data on participants age, weight, height and other health conditions. Activities at the time of BP reading (sleep, exercise, chores) are also recorded. An alert was sent to the participant if the BP reading was high. The pilot unearthed the following challenges: inability of the smartwatch to take readings on dark-skinned persons, short time interval (30 mins) duration caused inconveniences, missing of readings during device charging, lack of complete integration between smartwatch and mobile application for the automatic transmission and recording of readings, inability to take readings in some locations due to security concerns for devices, inability to take readings at night because the smartwatch required light to function and cases of forgetfulness by the participants in wearing smartwatch and/or entering the data. An increase time interval for readings will make it convenient for data collection. Additionally smartwatches that use infrared and electrocardiogram heart rate sensors need to be identified.

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DIGITAL TECHNOLOGIES AS A DRIVER IN THE PROVISION OF UNIVERSAL HEALTH COVERAGE

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The digital revolution is affecting various sectors in the world ranging from banking, healthcare, telecommunications, retail, insurance, and Government. Technological innovations like digital health and electronic healthcare are core in the attainment of Universal Health Coverage in developing countries. However, their successful deployment is faced by several barriers and challenges in Kenya. This paper applied exploratory research methodology in reviewing existing literature in the health sector with an objective to analyze the benefits and challenges associated with the application of digital technologies for universal health coverage. The results of this study show that some of the benefits of digital technologies to universal health coverage are efficiency, controls, and quality to areas of health finance, e-referrals, electronic health records, and health information systems. This results in reduced healthcare costs, predicting epidemics, avoiding preventable deaths, improving quality of life, reducing healthcare waste, developing new drugs and treatments, improving efficiency, and quality of healthcare. While these technological developments offer countless benefits, some of the concern revolves around the distributed storage of medical data across various facilities leading to lack of data interoperability among medical agencies and the security of health information systems and patients' medical records. Lack of digital health causes delayed decision-making processes, poor medical service delivery, inaccuracy, untimeliness, and inefficiency in access to medical data. The results were used to guide the development of a conceptual framework that would be used to address the challenges for the adoption of digital technologies for Universal Health Coverage.

Key Words: Digital Technologies, Universal Health Coverage, Digital Health, Healthcare Technological Innovation, Information Communication Technology,

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CRITICAL SUCCESS FACTORS FOR IMPLEMENTATION OF INFORMATION COMMUNICATION TECHNOLOGY STRATEGY AMONG NON GOVERNMENTAL ORGANIZATIONS IN KENYA

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The study interrogated the critical success factors for implementation of information communication technology strategy among non-governmental organizations in Kenya. Specifically, the study focused on Human Resource, leadership, Information Technology Infrastructure and organization culture as independent variables and implementation of information communication technology strategy as dependent variable. Anchored on the Resource Based view theory, Systems theory, Human Relations theory and Upper Echelons theory, 70 registered NGOs were targeted. A census was adopted for the study and the data was collected through a structured questionnaire. The data was analyzed through descriptive statistics and inferential statistics such as correlation and regression. The findings indicated that that Human Resource, leadership and Information Technology Infrastructure has a positive and significant influence on Implementation of ICT Strategy among NGOs in Kenya. However and organization culture has a positive but not significant influence on Implementation of ICT Strategy among NGOs in Kenya. The study concludes that availability of human resources for instance employees in the organization having high knowledge of IT, high technical expertise, high level of IT skills and a high work experience is associated with high rate of implementation of ICT strategy. Another conclusion is that various leadership attributes like having top management's committment to introduction of new technology by providing funds, employee participation in making organization's key decisions, top management's support to introduction of new technology and the employees leading from the front is associated with high rate of implementation of ICT strategy. It was also concluded that investment in ICT infrastructure ICT hardware, ICT software and having ICT policy is associated with high rate of implementation of ICT strategy. The study also concluded that organizational culture committed to mission and employee trust is associated with high rate of implementation of ICT strategy although that is not critical factor given the other three factors.

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Effect of Technological Capability, Innovativeness and Performance of Commercial Banks in Kenya

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Abstract
In most of the developing countries, the performance of the Banks is a key issue today. In the modern rapidly changing business environment, information technologies (IT) has become an essential component of firm capability and a source of sustainable competitive advantage. The main purpose of the study was to determine effect of technological capability and firm performance among commercial banks in Kenya. The study was informed by social exchange theory. Explanatory research design was used in this study. The used a sample of sample of 173 top management employees from 32 hotels in Nairobi county. The study used questionnaires to collect data. The Cronbach alpha coefficient test was employed to measure the internal consistency of the instruments. The study used descriptive statistics such as means, standard deviation, frequency and percentages. In addition, inferential statistics such as correlation and multiple regressions analysis were used. Study findings indicated that technological operating capability, technological upgrading capability and technological acquiring capability had positive and significant effect on bank performance. However, technological upgrading capability had most influential effect bank performance. The study concluded that technological operating capability, technological upgrading capability and technological acquiring capability is important factor for enhancing bank performance. Thus banks management should have long-term commitment for developing and improving technological capability.
Keywords; information technologies, technological operating capability, technological upgrading capability and technological acquiring capability

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E-PORTFOLIO AS A TOOL FOR PROMOTING COMPETENCE-BASED E-LEARNING IN UNIVERSITIES: A CONTEXTUALIZED PERSPECTIVE

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Ubiquitous Information communication technologies (ICT) and dynamics in today's society (both disruptive and progressive changes) are increasingly driving adoption of e-learning models at all levels of education. Previous research has shown that the synergy between learner and assessment centered dimensions are antecedent to knowledge centeredness which is a key goal in higher education. This briefing paper offer insights on effective use of e-portfolio in e-learning as a tool for fostering learner and assessment centeredness. The ultimate goal is to enhance understanding on effective integration of e-portfolio in e-learning courses as a strategy for promoting competence-based education, while providing information that serve formative and summative purposes. More importantly and to the core of this paper, use of e-portfolio as a tool for assessment for learning (formative assessment) is an important requirement for active and meaningful engagement particularly in e-learning settings. Formative assessment should be seamlessly integrated within teaching and learning processes; and it entails enabling adequate opportunities for continuous monitoring and assessment to inform formative feedback. However, such a focus has been lacking or inadequate based on what characterizes continuous assessment in many Universities e-learning settings. This implies that the validity of continuous assessment cannot be realized without purposeful focus on formative assessment and tailored feedback. This briefing paper therefore aims to offer better understanding on the role of e-portfolios from a contextualized perspective as an important pedagogical strategy for enhancing e-learning. Contextualization implies paying attention to the unique needs of particular e-learning settings including ICT capacity, learners' needs and experiences. Drawing from related literature and practical experiences, the paper offers best practices that need to be emphasized in applying e-portfolios to promote learner and assessment centeredness that are desirable for achievement of envisaged core competences.

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A Reinforcement Learning Approach to Service Based User Admission in a Multi-Tier 5G Wireless Networks

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The expected massive connectivity in 5G wireless
the network is bound to have become a challenge to service providers.
Many services over the 5G network will be aligned to a particular
radio access network (RAN). As a result, admitting a service-based user to a particular RAN will depend on the most efficient
radio access technology selection(RAT). This is because 5G
the network will adopt multi-tier radio access networks ranging
from high power macro base stations to extremely low power
Bluetooth connectivity. The selection of a service-oriented RAT is

critical because some wireless services have a superior quality of service under certain RATs. Maintaining efficient RAT selection by network operators will improve power allocation efficiency, bandwidth allocation efficiency, and operational expenditure. The complexity of associating a RAT to a service-based user while considering network states such as service packet size, the turn around time, the power allocation has not to been fully explored. In this paper, we propose a reinforcement learning approach to user admission based on efficient RAT selection considering wireless services in a cross-tier wireless radio access network domain. The proposed algorithm is expected to improve RAT selection efficiency while minimizing the computation complexity. We perform extensive simulation using Python dynamic libraries and present our results alongside existing approaches.

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The Moderating Effect of Information Systems Capabilities on the Relationship between Information Systems Resources and Performance of Firms in the Telecommunications Industry in Kenya

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Kenya's economy is today driven majorly by information-based service businesses where telecommunication industry is playing a critical role. A 2018 report from Communications Authority of Kenya indicated that mobile phone service providers have a combined total of 38 million subscribers with Safaricom Kenya Limited leading in subscription rate, innovative products and services. Extant literature shows that information systems (IS) resources have a direct impact on firm performance; however the influence of information systems capabilities on the relationship between IS resources and firm performance has not been fully explored. Anchored on resource-based view and contingency theories the study utilized correlational survey design. The population of the study was 408 with a sample of 202 members of staff being drawn through proportionate stratified random sampling method. The findings indicated a positive effect of IS capabilities ($\Delta R2 = .096$, $p<0.05$) on the relationship between IS resources and firm performance signifying that firms in the industry should ensure proper development of innovative IS capabilities as they significantly influence the relationship between IS resources and firm performance. The findings may be useful to industry players in gaining better understanding on various IS capabilities that they can utilize to improve and sustain their performance besides policy formulation; and by advancing a model that depicts the influence of IS capabilities on the relationship between IS resources and firm performance, this study may make a significant contribution to theory building in the field of information systems.

Key words: IS Resources, IS Capabilities, Telecommunication, Firm Performance

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Security Framework for Internet of Things Based on 4G Communication

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Internet of Things, a revolutionary paradigm, is burgeoning in ubiquitous wireless systems allowing autonomous communications fueled by wireless sensor nodes and intelligent nodes. The incessant dynamic advancement in deployment of Internet of Things (IoT) for 4G systems has resulted to enhancement in in-depth networking inspection, network indicator analysis and network evaluation through intelligent tracking, intelligent identification and monitoring. The objective of this study was to design a security framework for internet of things based on 4G communication and elucidate its implications. The study identified security breaches of IoT in telecommunication systems and designed SFIT4G (Security Framework for Internet of Things based on 4G Communication), a security framework to decouple the emerging security threats. The SFIT4G architecture comprising of sensing, application and network layers was characterized by resilient processing, intelligent sensing and robust transmission of signals between nodes in 4G. The study used EM3G (Existing Methods Based on 3G) analysis model on the transmission speeds with emphasis on security performance during communication then compared to existing security architectures of internet of things.

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SENTIMENT ANALYSIS OF KENYANS ON TWITTER:A CASE OF #Covid19Millionaires

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Abstract
Kenya has witnessed a massive growth in social media over the last few years. Thanks to the availability of affordable smartphones and internet bundles, more Kenyans are converging online. Various social media platforms are used for different reasons. Twitter in Kenya is generally used for political discourse. Social media has been used in political campaigns in Kenya, and there is a linkage between political discourse online and votes cast. Social media statements and posts are made up of an enormous amount of sentiments which are either classified as positive, negative or neutral. While these sentiments may not be true, they contain a strong sense of personal belief and judgments from the people who post them. This study seeks to examine the sentiments of Kenyan Social Media users. Data was collected using the Node XL Twitter Search Network data collector and Brandwatch to get tweets having each of the study blogs hashtags, tweets, retweets, or mentions of the hashtags collected. The conclusion proved that Kenyans on social media are very vocal politically wise and clamour for change and justice with the majority of the sentiments being negative.

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Customer Profiling from Social Media Engagement using Latent Dirichlet Allocation (LDA) and sentiment Analysis Approach

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Social media is now an essential component of the daily life of consumers. People usually share their interest, thoughts on brands and companies through discussions, tweets and status. At present,

companies are competing to attract and meet customer needs. For companies, managing customer relationship through social media engagement has become a significant part of digital marketing strategies. The modern customer has different needs, expectations and behaviours which ought to be managed differently by companies., Customer engagement on social networks helps to create relationship with customers, and also acts as quick and cost-effective marketing tool. Social Customer Relationships Management (SCRM) provides a two-way communication channel between customers and businesses through social media sites. SCRM is based on a model of customer engagement which requires strong partnerships and interactions. The purpose of this research study was to understand customer interactions with business using topic modelling. The study analysed customer engagement on Twitter of Four selected banks in Kenya. We apply unsupervised topic modelling of LDA and sentiment analysis to create a profile of different customers of selected banks in Kenya. We focus on interactions from a consumer-centric perspective, not focusing on specific firm channels. We conclude that the extracted latent models not only provide insight to the consumer behaviour but also can also improve any company's Social Customer relationship management(sCRM) focused on different customer profiles

Keywords: Social Media; Customers, Sentiment analysis; Topic modelling, LDA, CRM, sCRM

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Comparing Logistic Regression and Decision Tree Classifications Performance in the Context of Personal Cloud Storage Post-Adoption Behaviour

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Machine learning literature is replete with algorithms for classification problems. The choice of an algorithm for a particular problem is not only dependent on statistical assumptions but also its performance. The current study compares the performance of logistic regression and decision trees when used in a binary classification in the context of personal cloud storage post-adoption behaviour. The users' intention to switch from freemium to premium personal cloud storage services was the classification problem. From literature review, six features were identified as predictors of intention to adopt premium personal cloud storage service. Data comprising the six features and a single dichotomous target was collected from university students. Machine learning techniques were used to balance the sample and split the data into training and validation sets. Classification analysis was then conducted on the data using both the logistic regression and decision tree algorithms. The performance of the classification algorithms was compared using the confusion matrix and the ROC Curve. For the decision tree, precision=0.75, recall=0.74 with an overall accuracy of 0.73 while for the logistic regression, precision=0.66, recall=0.65 with an overall accuracy of 0.65. The area under ROC curve for the decision tree was 0.79 while that of the logistic regression was 0.71. The decision tree algorithm therefore performed better than the logistic regression in all the metrics used for performance comparison. Perceived Usefulness, Perceived Risk and Perceived satisfaction emerged as the most important features in predicting users' propensity to migrate from freemium to premium personal cloud storage services.