KEYNOTE

Prof. Olawande Daramola
Faculty of Informatics and Design, Department of Information Technology, Cape Peninsula University of Technology, Cape Town, South Africa

Title: AI and Data Science for COVID Response in Resource-limited Settings: Affordances, Possibilities, and Challenges

Abstract

COVID-19 has adversely affected many countries in the world with most healthcare systems in the developed and developing countries overstretched. A relatively new perspective to tackling the problems of COVID-19 is the application of AI and Data Science methods. While these methods have been encouragingly successful in some developing countries, the scope of application of AI and Data Science for COVID-19 in sub-Sahara Africa (SSA) is small and scarce. Most parts of SSA can be described as resource-limited settings because of different forms of resource limitations that exist. Resource-limited settings are characterised by poor and inadequate healthcare infrastructure, shortage of qualified medical personnel, poverty, lack of access to technology, and high cost of healthcare for the common people. These limitations impose additional complex requirements for the application of AI and data science methods for COVID-19 response in SSA. In this keynote, I will discuss the affordances of AI and Data Science for COVID-19 response in resource-limited settings; the future possibilities, and how the existing challenges can be surmounted to realise the vision of AI and Data Science for COVID-19, and improved healthcare delivery. I will also provide an overview of relevant ongoing research projects that I am involved in that relate to this topic.

Prof. Marwala Tshilidzi
Vice-Chancellor and Principal, University of Johannesburg,South Africa
Title: Closing the Gap: The Fourth Industrial Revolution in Africa
Abstract

Dr. Jacques Ludik
CORTEX LOGIC, South Africa

Title: AI-enabled, ultra-personalized health wellness

Abstract

Cortex Logic's AI-enabled, ultra-personalized health wellness platform called Journey provides real-time, relevant, on-demand and proactive guidance, advice, support and recommendations to help optimize a user's wellness whilst ensuring high standards of data privacy and choice. The system makes use of the Cortex AI engine to build a holistic and dynamic 360-degree wellness profile and has an AI-driven personalized wellness coach that provides information and personalized advice, coaching and guidance with respect to healthy eating and diet, exercise and fitness, mental wellness and health with a specific focus on chronic lifestyle diseases. Apart from

having access to these deep domain knowledge on wellness related knowledge bases and building up rich user interaction data and personalized context of the individual's wellness state over time, Journey connects with a spectrum of data sources such as digitized health risk assessments and surveys embedded within the platform, wearable devices, medical claims data, employee data, and other external health and wellness data.

Dr Ruth Lennon
Letterkenny Institute of Technology (LYIT), Port Road, Letterkenny, Co. Donegal, Ireland, F92 FC93

Title: DevOps for Security Analytics

Abstract

DevOps and DevSecOps are popular words but what do they really mean for our daily work? If we understand who people care about DevOps and DevSecOps we can understand how structured pipelines can increase quality and security throughout our systems. In practice we find that there is no single solution but there are established procedures which can help. In this talk you will hear about the importance of DevOps in carrying out Security Analytics; understanding how DevOps and DevSecOps impact on your daily work and learn that applying a comprehensive strategy for the integration of processes can aid your ability to provide quality systems to support security analytics.

PLENARY SPEAKERS

Prof Buarque de Lima Neto Fernando
Computer Engineering Doctoral Program - School of Engineering - University of Pernambuco, RuaBenfica, 455 - Recife/Pernambuco, Brazil. 50720-001

Title: Curbing the data volume and combinatorial complexity on Gene Regulatory Networks with Swarm Intelligence

Abstract

Complex combinatorial problems are now common, with more challenging presentations becoming quite frequent. Gene regulatory network (GRN) is one of such hard problems to solve. In this talk I present you our approach to tackle GRN, by means of Partially-Observable Boolean Dynamical System (POBDS) model and our novel continuous-discrete Fish School Search particle swarm algorithm for efficient simultaneous maximization of the penalized likelihood over the discrete space of networks and the continuous space of observational parameters.

DrCoelloCoello Carlos
CINVESTAV-IPN, Departamento de Computacion, Av. IPN No. 2508, Col. San Pedro Zacatenco,Mexico City, MEXICO 07360

Title: An Overview of Evolutionary Multi-Objective Optimization

Abstract

Multi-objective optimization refers to solving problems having two or more (often conflicting) objectives at the same time. Such problems are ill-defined and their solution is not a single solution but instead, a set of them, which represent the best possible trade-offs among the objectives. Evolutionary algorithms are particularly suitable for solving multi-objective problems because they are population-based, and require little domain-specific information to conduct the search. Due to these advantages, the development of the so-called multi-objective evolutionary algorithms (MOEAs) has significantly increased in the last 15 years. In this talk, we will provide a general overview of the field, including the main algorithms in current use as well as some of the many applications of them.

Prof Ming Zhang
School of Electronic Engineering and Computer Science, Beijing, China

Title: Graph Representation Learning for Drug Discovery

Abstract

For decades, scientists have been seeking to aid drug discovery with modern computing techniques. Many fundamental problems of drug discovery are closely related to graph representation learning and graph neural networks. Actually, a molecule is naturally a heterogeneous graph, where atoms corresponds to nodes and chemical bonds corresponds to edges. Based on this observation, how to use deep learning algorithms, especially graph-based algorithms, to assist various tasks in drug discovery has been attracting growing attention. In this talk, we study two different tasks in drug discovery, leveraging the recent advance in representation learning for molecular graphs. First, we propose a flow-based generative model for molecular graph generation. The training process of our model is two times faster than existing state-of-the-art approach GCPN. After fine-tuning the model for goal-directed generation using reinforcement learning, our model achieves state-of-the-art performance on both property optimization and constrained optimization. Then, we design a template-free approach for retrosynthesis prediction, which bypasses reaction templates and graph isomorphism. Experimental results show that our model significantly outperforms existing template-free approaches and achieves a performance close to that of state-of-the-art template-based approaches, but does not require domain knowledge and is much more scalable. The two models are published in ICLR2020 and ICML2020 respectively.

Prof Virgilio Almeida
RuaReitorPÃ-res Albuquerque, ICEx - Pampulha, Belo Horizonte - MG, 31270-901, Brazil

Title: Social and Ethical Impacts of Algorithms

Abstract

With the increasing digitization of society and the advancement of artificial intelligence (AI), developing countries face new challenges and opportunities. On the positive side, developing economies have a window of opportunities to explore new possibilities in areas such as public services, healthcare, safety, mobility, education, entertainment and innovation. On the other hand, there are many challenges associated with the dissemination of AI algorithms, such as disinformation, social exclusion and discrimination. In this talk, I will discuss advances in artificial intelligence as well as its challenges with social and ethical issues.

Prof Hesham El-Askary
Center of Excellence in Earth Systems Modeling and Observations, Schmid College of Science and Technology, United States

Title: Earth Observation Solutions addressing SDGs in support of key environmental challenges

Abstract

This talk will address the capacity, methods and case studies to facilitate the way we understand, measure and describe the value of Earth observations (EO). While assessing the benefits and impacts of EO is the primary goal, improving the capacity to address applications such as the UN SDGs will be included. Building on the work of the GEO community for a framework and repository of methods and use cases. In my talk I will shed light on methods for quantifying the impacts of environmental information on society and examples of their applications for the SDGs. The goals are to demonstrate and compare approaches for valuation of geospatial information; to develop economical approaches using EO to ensure SDG operational applicability and to forge a path forward for interdisciplinary research that leads to standards of practice.

SDG SESSION
Dr. Max Paoli
The World Academy of Sciences

Title: Global Challenges and Sustainable Development: the Need for a Change of Mindset

Abstract

As societies worldwide become more engaged with the global challenges and work toward sustainable development, the need to increase and improve the awareness, knowledge and understanding of sustainability issues is more urgent and essential than ever before. Familiarity with the SDGs is limited amongst scientists and policy-makers alike, in developed as well as developing countries. Moreover, there is an understated barrier: unless we truly change our mind, and consequently our behavior, no research or science-driven solution will be enough to resolve the current threats to humanity and our future life on the planet. Therefore, education is key: whether scientist or politicians, global citizens ought to develop a more responsible attitude, towards both the planet and the next generations, through knowledge and understanding.

INVITED SPEAKERS

Prof Utku Kose
SuleymanDemirel University, Dept. of Computer Engineering, Faculty of Engineering, E9 Block, Z-23, West Campus, 32260, Isparta, Turkey

Title: Data Science for the World After COVID-19

Abstract

COVID-19 has caused appear of new normals in daily life. Because of its rapid transmission and fatal effects, governments around the world took careful precautions and all these have caused routines of daily life to different ways. Eventually, the world has become different and started to take immediate actions for the era after that pandemic period. As it is known, fields such as medical have been giving valuable efforts to eliminate COVID-19 and make new generations ready for future pandemics. On the other hand, massive nature of that pandemic has caused some technology fields like Data Science to run innovative solutions by data oriented applications. In this context, objective of this speech is to give a view for possible future world after COVID-19 and potential applications of Data Science for fighting similar threats. The speech targets everybody interested in how we can use data against COVID-19 and massive health issues.

Dr Bolanle Ojokoh
Department of Information Systems, Federal University of Technology, Akure, Nigeria

Title: Data Science for COVID Impact on Agriculture and Agro-allied in selected West African Countries

Abstract

To be submitted

Dr. Lipika Deka
The Gateway House, Faculty of Computing Engineering and Media, De Montfort University, Leicester, United Kingdom

Title: Data Science for Sustainable Agricultural Practices

Dr Mustafa Ozuysal
Izmir Institute of Technology, Department of Computer Engineering D129, 35430 Urla/Izmir, Turkey

Title: Diagnosing Scaphoid Fractures on Direct Radiography with Deep Learning

Abstract

We present an approach to analyse radiographic images with deep learning to determine whether the scaphoid bone is fractured or not. The goal is to improve diagnosis especially in emergency rooms where an orthopaedic specialist is not present. We also discuss challenges of applying

deep learning in medical applications including data availability and performance analysis aspects.

Dr Oghenejokpeme Orhobor
Department of Chemical Engineering and Biotechnology, University of Cambridge, Cambridge, United Kingdom

Title: Generating Explainable and Effective Data Descriptors using Relational Learning: Application to Cancer Biology

Abstract

The key to success in machine learning is the use of effective data representations. The success of deep neural networks (DNNs) is based on their ability to utilize multiple neural network layers, and big data, to learn how to convert simple input representations into richer internal representations that are effective for learning. However, these internal representations are sub-symbolic and difficult to explain. In many scientific problems explainable models are required, and the input data is semantically complex and unsuitable for DNNs. This is true in the fundamental problem of understanding the mechanism of cancer drugs, which requires complex background knowledge about the functions of genes/proteins, their cells, and the molecular structure of the drugs. This background knowledge cannot be compactly expressed propositionally, and requires at least the expressive power of Datalog. Here we demonstrate the use of relational learning to generate new data descriptors in such semantically complex background knowledge. These new descriptors are effective: adding them to standard propositional learning methods significantly improves prediction accuracy.

Prof Emile Rugamika Chimusa
University Of Cape Town, Research & Innovation, South Africa
Division of Human Genetics, Department of Pathology, Institute of Infectious Disease and Molecular Medicine, Faculty of Health Sciences, University of Cape Town, South Africa.

Title: Tantalizing Dilemma in Health Prediction from Genome-Wide Association Studies

Abstract

Following recent advanced in Genome-Wide Association Studies (GWAS), methods to training risk prediction, detecting new risk gene, imputing untyped variants and fine-mapping causal variants from GWAS summary statistics, are playing an increasingly critical role. Several methods including polygenic risk, combined the effect of several SNP-association at gene and pathway level computed from GWAS summary statistics have proven valuable for predicting disease risk and understanding the genetic architecture of complex traits. In addition, the power of GWAS may significantly improve by estimating the proportion of SNP heritability attributable to various functional categories. In this talk, we will briefly present some works done and ongoing projects in both GWAS and post-GWAs. We will also discuss basic background in disease scoring statistics, and the role of ancestry in mapping disease genes in Africa context.

Prof Aman Dekebo
Department of Applied Chemistry, Adama Science and Technology University, P.O.Box 1888, Ethiopia

Title: Establishment of Natural Product Bank of Bio-active compounds

Abstract

The natural products derived from medicinal plants have proven to be an abundant source of bio-active compounds, many of which have been the basis for the development of new lead bio-active molecules in the drug discovery program. With respect to diseases caused by microorganisms, the increasing resistance in many common pathogens to currently used therapeutic agents, such as antibiotics and antiviral agents, has led to the discovery of novel anti-infective chemicals. Developing novel bio-active molecules is never ending process to cater the need of society include human and animals. Traditional medicinal plants are the source of lead bio-active molecules and for drug discovery program. In Ethiopia various plants are commonly used for the disease treatment by traditional healers and community people. An estimated 80% of the Ethiopian population relies on traditional medicine. Socio-cultural appeal, accessibility, affordability, and effectiveness against a number of health problems seem to promote its widespread use. The aim of the study is to create a diverse bank of natural extracts, fractions and pure compounds in more automatic, systematic preparation and utilization systems to be used in applied research programs in a sustainable manner. Our ethnobotanical survey results indicated various parts of these plants have several traditional uses such as antiviral, antimicrobial, anticancer and others. In this study we reported anticancer, antimicrobial, antioxidant phytochemicals from these traditional medicinal plants. Based on the survey results, phytochemical of these plants might have a potential to treat COVID-19 disease caused by SARS-CoV-19. We are screening these plants extracts, fractions and isolated compounds their antiviral activities against SARS-CoV-19. Creating data bases for natural products bank is crucial for this project which needs worldwide collaboration.

Dr Enzo Ferrante
Research Institute for Signals, Systems and Computational Intelligence, sinc(i), CONICET, Universidad Nacional del Litoral Ciudad Universitaria UNL, RutaNacional NÂº 168, km 472.4 FICH, 4to Piso, Argentina

Title: Fairness in AI for healthcare: Gender imbalance in medical imaging datasets produces biased classifiers for computer-aided diagnosis

Abstract

Artificial intelligence (AI) systems for computer-aided diagnosis and image-based screening are being adopted worldwide by medical institutions. In such a context, generating fair and unbiased classifiers becomes of paramount importance. The research community of medical image computing is making great efforts in developing more accurate algorithms to assist medical doctors in the difficult task of disease diagnosis. However, little attention is paid to the way databases are collected and how this may influence the performance of AI systems. In this talk I'll discuss our work recently published at PNAS, where we highlight the importance of gender

balance in medical imaging datasets used to train AI systems for computer-assisted diagnosis. Our work provides empirical evidence supported by a large-scale study, based on three deep neural network architectures and two well-known publicly available X-ray image datasets used to diagnose various thoracic diseases under different gender imbalance conditions. We found a consistent decrease in performance for underrepresented genders when a minimum balance is not fulfilled.

Dr. Haider Waseem
COMSATS University Islamabad (CUI), Pakistan

Title: Data Science for Bioinformatics and Genome Sequencing

Abstract
Novel and advanced techniques and instruments have revolutionized the scope and pace of scientific discovery. Sequencing a new genome has become a manageable task in today's scientific era. Modern sequencing technologies are dedicated towards incremental improvements in Fred Sanger's dideoxy chain termination method coupled with Shotgun sequencing strategy. Shotgun methods involve breaking of large DNA segments into smaller pieces followed by their sequencing. Various strategies to perform sequencing of the large genomes have been evolved into modern day's second or Next Generation Sequencing (NGS) technologies. Whereas human genome project (HGP) took almost 15 years and 3 billion US dollars for sequencing the human genome, these NGS technologies take a week or less and cost less than 1000 US dollars. NGS technologies comprise of but not limited to; Illumina (Solexa) sequencing, Roche 454, Ion-torrent and ABI's SOLiD sequencing. The Genome sequencing strategy is implemented as; Extraction and fragmentation of the genome content, Shearing of DNA to generate short fragments, Sequencing the fragments with NGS instruments yielding huge number of short sequences called reads, Mapping of these reads to a reference genome to guide the assembly of the sequenced genome or de-novo assembly of the genome by determining sequence overlaps and finally the Annotation of the assembled genome to identify significant features. This great technology has revolutionized concepts of personalized medicine, cancer research, clinical environmental and industrial microbiology as well as leading to far-reaching implications for agricultural biotechnology.

Dr Selma Tekir
Izmir Institute of Technology, Dept. of Computer Engineering, Gulbahce Campus, 35430, Urla, Izmir Turkey

Title: Text Analytics for Credibility Assessment: A Case Study of Grey Literature

Abstract

Grey literature (GL) is materials and research produced by organizations outside of the traditional commercial or academic publishing and distribution channels. GL is classified using two dimensions: The level of expertise/credibility and the level of outlet control. In this two-dimensional space, GL sources are categorized into three tiers. Tier 1 consists of those sources

with high outlet control and high expertise (e.g., books and magazines). Sources with moderate outlet control and moderate expertise (like annual reports, Questing Answer Sites, and Wiki articles) are included in tier 2. Finally, sources with low outlet control and low expertise (like blogs, tweets, and emails) are placed in tier 3. GL's main problems are a lack of validation of the authority of knowledge producer and a subjective knowledge creation process, which is not based on a substantial peer-review process. Grey Literature (GL) is a vital knowledge source in the field of Software Engineering. Especially Wikipedia and Q&A sites like SO are good platforms for practitioners knowledge sharing. In this work, we propose an author reputation measurement scheme for Q&A sites.

Dr Elijah Kolawole Oladipo
Laboratory of Molecular Biology, Immunology and Bioinformatics, Department of Microbiology, Adeleke University, Ede, Osun State, Nigeria

Title: Exploring Surface Glycoprotein to Design Multi-Epitope Vaccine against COVID-19

Abstract

SAR-CoV-2 which is reported to gain access into the system of its host by binding to the receptor-binding domain (RBD) of angiotensin-converting enzyme II (ACE2) is responsible for COVID-19. Stimulating and generation of T and B memory cells mediated long-term immune response is important for the curb of this deadly virus. Immunoinformatics approach to vaccine design which takes advantage of antigenic and non-allergenic epitopes present on the spike glycoprotein of SARS-CoV-2 to illicit immune responses was employed in this study. T cells and B cells epitopes were predicted and the selected conserved residues were subjected to allergenicity, antigenicity and toxicity screening. Selected epitopes were linked together using appropriate linkers to form a multi-epitope subunit vaccine and the physicochemical properties of the vaccine construct were analyzed. The molecular weight, molecular formula, theoretical isoelectric point value, half-life, solubility score, instability index, aliphatic index and GRAVY were all predicted. The vaccine structure was constructed, refined, validated and disulfide engineered to get the best model. Molecular docking and molecular dynamics simulation was done to predict the binding affinity and stability of the vaccine construct with TLR2, TLR3, TLR4, TLR8 and TLR9. Codon adaptation and in-Silico cloning was performed to confirm the vaccine expression and potency. Result obtained indicated that this novel vaccine candidate is non-toxic, capable of initiating the immunogenic response and will not induce an allergic reaction. At this point, the vaccine awaits animal trial to validate its efficacy and safety for use in the prevention of the novel COVID-19 infections.

ORAL

Prof Hassane Bouzahir
National Engineering School of Applied Science, IvnZohr University, Morrocco.

Title: Impact study of loss function on the adversarial attacks methods

Abstract

The research concerns the numerical modeling and analysis of artificial intelligence systems. The main goal of this presentation is to contribute to design of new methods for improvement of robustness of deep neural networks. In recent years, many attacks methods have been developed (L-BFGS, FGSM, IBM, ILCM, PGD, DeepFool, Carlini-Wagner ...). Most of these methods use the gradient of the loss function to maximise the error rate of the model. We have been able to measure the robustness of deep neural networks under adversarial settings. The motivation of our research project lies in the fact that a large number of methods employ the cross-entropy as loss function despite the existence of many other loss functions.

Dr Kolawole Valere Salako
Laboratory of Biomathematics and Forest Estimations, University of Abomey-Calavi, 04 BP 1525, Cotonou, Benin

Title: On the reliability of predictions on Covid-19 dynamics: a systematic and critical review of modelling techniques

Abstract

Since the emergence of the Covid-19 epidemic, numerous modellers have used diverse techniques to understand its dynamics, predict its future course and determine the impact of different control measures. This study presents a global systematic review that (1) summarizes trends in the modelling techniques used for Covid-19, and (2) examines the accuracy and precisions of predictions. Results showed that most of studies used compartmental models (45.2%) and statistical models (32.6%), while few used artificial intelligence (6%), Bayesian approach (5%), and Agent-based models (3.2%). Considering the number of cumulative infected cases, the ratio predicted/observed values and the ratio of the amplitude of confidence interval (CI) or credibility interval (CrI) of predictions over the central value were on average larger than one for 36% of predictions indicating cases of inaccurate and imprecise predictions. There was no clear difference among models. In 60% of the predictions that reported CI or CrI, observed values fell within the 95% CI or CrI of the cumulative cases predicted. This study suggests that while predictions made by the models are useful to understand the course of the pandemic, some were relatively accurate and precise while other not, and that caution should be exercised in their use.

Prof Tulay Yildirim
Technical University,Faculty of Electrical and Electronics Engineering,Department of Electronics and Communications Engineering, DavutpaÅŸa Campus,34220 Esenler-Istanbul- Turkey

Title: Data Privacy Issues Arising with COVID-19

Abstract

The development of technology significantly affects the amount and quality of data collected. While this situation enables the applications that make life easier to enter our lives, it also brings some question marks with it. The pandemic process has increased attention on this issue. As known, The COVID-19 (2019-nCov) virus, which was first detected in Wuhan/China in

December 2019, and spread to the whole world in a short time was explained as a new corona virus by the World Health Organization (WHO) on February 11, 2020. Countries are developing web-based or mobile applications to reduce the spread rate of the epidemic and reduce its economic damage. When we take a closer look at these applications, it is seen that the existing applications contain characteristic data identifying people as well as location information. While these data mean a lot for the world's fight against COVID-19, it also raises personal data privacy concerns. On the other hand, in this process, with the effect of digitalization, people started to perform many personal transactions with the help of applications including govermental, financial, healthcare...etc. This means that much more data is circulating than expected. It is clear that societies that manage data privacy in a healthy way will win. Today, it is possible to consider data privacy in two approaches : legal framework and algoritmic framework. At the legal framework, we see regulative studies which shape in terms of legal points. But when it comes to technology, the legal effect is limited with algorithmic ability. So privacy preserving technologies should support legal concerns. There have been exciting approaches to privacy protection technologies in recent years. I would like to briefly mention these approaches during my speech.

Mr Oluwaseun Jinadu
Nigerian Navy Naval Headquarters Area 8, Garki, Abuja, Nigeria

Title: The Use of Divide and Conquer Classification Method and Other Optimization Techniques Towards Improved Latency And Scalability In Big Data Analytics: A Case Study of Sentiment Analysis of Covid-19 Related Tweets.

Abstract

Early data were stationary; hence, the methods of analysing them to derive meaningful patterns or insights were simple. For example, the earliest form of data analytics could be traced to the Palaeolithic era when early men inscribed marks and patterns on sticks and bones for counting and enumeration. However, the advent of information revolution has led to the Big Data era where data streams are generated at high velocity, volume, and variety. The temporal properties of this category of data imply that the traditional analytic frameworks, techniques and methods employed for static data analytics would not be applicable. Prominent among the challenges of Big data analytics are scalability, poor latency, as well as heterogeneity of data. While researchers have invested a lot of efforts to mitigate some of these issues, poor latency as well as inadequate parallelization techniques for hardware as well as machine learning models that scales well with the exponential demands of Big data analytics have remained major challenges. For example most researchers have made cases for improved scalability by adding more hardware components. However, Amdahl's law shows that the computing efficiency exponentially decreases as number of parallelized hardware such as memory and processors increase. In line with Amdahl's law, this research shows the relationship between Speedup and parallelizable part of a computing process as shown in Equation 1.1
This paper focused on optimization mechanisms used to improve speedup, latency and scalability within the context of Big data. The novel framework christened Afaara 1.0 employed a layered approach comprising of 3 layers which are the application layer, analytics layer and infrastructure layer. Afaara 1.0 handles the issue of analysis of Covid 19 related messages posted

on Twitter in context of the sentiment expressed by the tweets. Apache flume was configured to ingest real-time Covid 19 related tweets. Tweets collected are sampled together, and an average sentiment score is computed . This experiment gives a cursory view of overall sentiment trend regarding the COVID-19 pandemic on Twitter. The use of Divide and Conquer method in Decision Tree for classification showed a great improvement in speedup, and hence improved latency when compared with SVM. Parallelised techniques for data ingestion and data processing also greatly improved scalability.

Mr Chukwuma Okafor
Center for Integrated Health Programs, Afghanistan

Title: Data Science for Health Related Applications

Abstract

Real time Applications are crucial in this Modern times especially in the Medical Health Systems. One of the best way of applying Data science in Health Systems is by teaching the Application how to interpret Medical Imaging, monitoring patient health, providing virtual assistance, Analyzing data and a whole lot more.

Dr Olufunso Alowolodu
Federal University of Technology,Km 7, Akure/Ilesha Expressway, Akure, Obanla Campus, School of Computing, Nigeria

Title: Cloud Computing in Developing Economies: A Case Study of Nigeria

Abstract

As more computers were manufactured, computer scientists and technologists discovered more ways to make large-scale computing available to more users through time sharing, writing algorithms to give an efficient use of the computer infrastructures, applications and platforms. This has given rise to the concept termed Cloud. Organizations, Institutions and individuals have adopted the use of the cloud for their works because it is cheaper to use compared to on-premise resources. Though cloud service is cost effective, most organizations do not fully adopt it for their businesses because of security and trust issues regarding information and data. To harness the benefits of cloud computing to the peak, there has to be an articulate breakdown of its infrastructural challenges and see if there are possible solutions to the challenges. The adoption of cloud computing has a good potential in Nigeria and there had been little research into this in literatures available. This research is to determine the level of awareness of people from IT managers and other operatives of organizations about cloud computing technology in Africa, determine the impact of cloud computing adoption on the operations of organizations and institutions in developing economies and finally, infrastructural challenges faced by stakeholders will be investigated to infer methods of combatting challenges faced in developing Economies.

Mr Olayinka Ayodele Jongbo
Ekiti state university,15, Embassy island off moferere street Ado Ekiti, Nigeria

Title: Diabetes Mellitus Prediction Using Information Gain and Logistic Regression

Abstract

Diabetes is a dreadful disease triggered as a result of hyperglycemia. An early detection of this disease is a challenging task due to unhealthy lifestyle of people which may lead into further complications of health related issues if an intelligent diagnostic system is not employed, Data mining techniques has been used recently in making predictions of cardiovascular diseases which has the potentials to efficiently diagnose diabetes mellitus disease. The study aims to develop intelligent diagnostic models for early prediction of diabetes disease. Three data mining algorithms including k-nearest neighbour (KNN), Naive Bayes and Logistic regression were used in making predictions. Feature selection was performed on Pima Indian dataset attributes using information gain attribute evaluator to determine the best subset of attributes for disease classification. Result obtained from the study based on four selected conditional attributes revealed that KNN and Naive Bayes achieved accuracy of 75.2% and 80.9% respectively while Logistic regression achieved the highest accuracy of 82.2% that can be used for predicting diabetes mellitus disease efficiently. The model can be used in medical domain for early prediction of diabetes disease for making intelligent decisions.

Mr Akeem Babatunde Sikiru
Department of Animal Production, Federal University of Technology, Minna, Nigeria.

Title: Application of big-data for understanding the toxicogenomics of AflatoxinB1 in animals and humans for promotion of food security in developing countries

Abstract

Aflatoxins are the most predominant secondary metabolites of fungi Aspergillus sp. contaminating food and crops harvests including maize, cassava, rice, wheat and barley which are the commonest staples for the consumption of teeming population of the developing countries. This is a huge burden on food security and well-being as the aflatoxins infestation potentials spread across cultivation, storage, processing and packaging of foods. However, the biological mechanisms associated with the promotion of their toxicity is poorly understood; therefore, efforts towards stamping out aflatoxinsâ€™ toxicity has been challenging area of interest. Meanwhile, toxicogenomic compromise is a candidate point of better understanding negative effects of the aflatoxins in animals and human which required harnessing of big data approach for better understanding of structural and functional genetic modifications associated with these toxic principles. Hence, this paper presents an introduction to application of big data mining from toxicogenomics and gene expression databases, analyses suitable for understanding the data and insights into the mechanisms associated with promotion, inhibition, and the prediction of the specific molecular effects of Aflatoxin â€“ B1 in animals and humans.

Mr Samson Adebowale Abosede

Nigeria

Title: A Fog Computing Based Healthcare Delivery System for Hemorrhagic Stroke Patients

Abstract

Health is a fundamental state of human well-being. These entails their ability to perceive, feel and respond adequately to life and fellow human beings. One of the major health challenges that has deteriorated the state of well-being of men since the 90s up till date has been Stroke. Hemorrhagic Stroke is one of the prevalent ailment because it is hereditary and occur between the Age of 16 to 50years. This study aims at designing an IoT-based healthcare delivery system for hemorrhagic stroke patients in a fog computing environment. The system used an IoT-based wearable device optimized for a Fog computing technology to deliver an on-demand healthcare system for hemorrhagic stroke patients which would be capable of detecting irregular blood pressure and heartbeat. This quality healthcare service would be provided using Continuous Wavelength Transform and IF-THEN Rule-based mining on an Arduino microcontroller (NodeMCU32). The system was implemented in the form of a wearable armband and a web page was developed with HTML, CSS, JavaScript and PHP used for allocating the device, monitoring the healthcare delivery between the patient, the hospital (Admin) and the doctor. The system was evaluated by comparing it with measurements using Sphygmomanometer, the results has an average difference of 0.4 beat/secs for heartbeat and an average difference of 4.4mmHg for blood pressure, thus it is effective for monitoring heartbeat and blood pressure of hemorrhagic stroke patients.

Dr Olatunji Omisore
Research Center for Medical Robotics and MIS Devices, Shenzhen Institutes of Advanced Technology, CAS, Shenzhen, China.

Title: Flexible Snake-like Robotics Control: Motion and Trajectory Planning

Abstract

Prototypes of snake-like robots have been proposed to enhance surgical suturing, resection, and radiosurgery in human core areas; nonetheless, precise constraint control models are still needed for flexible pathway navigation. In this paper, design of a flexible snake-like robot is presented along with the constraints model that is proposed for kinematics control, and trajectory planning during motion. Simulation of the robot and implementation of the proposed control models are done in Matlab. Validation with circular paths shows the model is very fast with a mean kinematics error of 0.37 Â± 0.36mm. Further, movement of the robot is continuous geometrically and parametrically in three trajectory cases used for demo. Analyses of the trajectory results show the constraint control is optimal in determining apt joint angles to reach given targets.

Mr Olanrewaju Victor Johnson
Department of Computer Science, Federal Polytechnic, Ile-Oluji, Ondo State, Nigeria

Title: p-Agriculture: Improving Weather Predictability Using Ensemble Learning Techniques toward Sustainable Agriculture

Abstract
Precision Agriculture (p-Agriculture) is the answer to agricultural productivity for meeting the demand of feeding a growing global population today. The Food and Agriculture Organization of the United Nations (FAO) and the International Telecommunication Union (ITU) has continued to work together in promoting the use of Information and Communication Technologies (ICTs) for sustainable agriculture. The synergy is designed to overcome challenges arising from climate change, ecosystem uncertainties, epidemiological cases, diminishing arable areas etc. It is evidence to mention that for every 17% rise in temperature there is a decline of about 10% of crops yield. One aspect of study in p-Agriculture is the use of machine learning techniques to proffer useful insight from available huge climate and crops data. Couple of research works have presented predictive solution from AutoRegressive Integrated Moving Average (ARIMA), Neural Network, Genetic algorithm, Fuzzy Logic, spatial-temporal and deep learning methods using climate data for forecasting. Algorithm performance and predictive accuracy have been the target of many of these machine learning techniques, whereas many of them are used independently. Our paper, therefore, presents a multi-model approach called Ensemble learning meta-algorithm, which allows the use of multiple algorithms to strengthened predictive accuracy. Bagging (Ensemble) with Classification (RPART), Regression tree (CTREE), and Random Forest methods were used on periodic data collected in our ATMOS 41 all-in-one weather station to investigate the claim. Specific data exploration was carried out on some selected weather variables to produced performance measures and predictive accuracy. The results further reveal that bagging helps to decrease forecasting error for RPART and CTREE, while Random Forest has best predictive accuracy among all tested methods. With appropriate use of machine learning techniques, many forecasting problems could be solved in agriculture.

Mrs Iyanu Pelumi Adegun
Federal University of Technology Akure/ Rufus Giwa Polytechnic, Owo, Nigeria

Title: Modelling and Predicting The Spread Of Covid-19: A Continental Review And Analysis

Abstract

The outbreak of COVID-19 which emanated from Wuhan, China in late 2019 and spread like a wildfire to every continent in the world has unfolded from a global health crisis to an economic emergency. Ä°n addition to the public measures put in place by respective governments and institutions to curb the spread of COVID-19, researchers have also made efforts to understand the spread pattern and predict its growth rate in different communities and countries. Many of these studies have shown that statistical modeling methods are useful in epidemiological and clinical research for data analysis, forecasting, and decision making. Hence, this work seeks to provide an indepth review and analysis of the modelling techniques that have been explored for predicting the spread of COVID 19 in major continents of the world. The review includes sixty-nine (69) articles with a focus on Asia (34.8%), Europe (28.2%), North America (14.5%), South America (8.7%), Africa and Australia (about 8%) and an additional 7.2 % focused on multiple continents. Analysis of these research works revealed that the trend of research focuses more on Asia and Europe, followed by North America and very few contributions from Africa and Australia. Furthermore, many of the modelling and predictions in literature were based on

compartmental epidemiological models (SIR, SEIR, SIRD) and only a few used advanced machine learning techniques, despite being a promising modelling approach to address uncertainties in estimation especially for long term prediction. With the second wave of the COVID-19 pandemic gradually hitting some parts of the world, it is recommended that researchers explore the use of more intelligent techniques for modelling and prediction of its spread pattern. This would in turn provide a viable approach to curb the menace of the spread of COVID-19 pandemic and guide decision makers until more effective medications and vaccines are developed.

Dr Oluwafemi A. Sarumi
Department of Computer Science, The Federal University of Technology, Akure, Nigeria

Title: Contact tracing technologies as a viable approach for alleviating the spread of COVID-19

Abstract

The striking spread of Coronavirus Disease (COVID-19) in the world has been a trending issue across the globe. The exponential increase in the number of COVID-19 infected and death cases is really alarming. To curtail the human to human transmission of the COVID-19 virus, many countries have implemented several containment strategies such as total or partial lockdowns at all sectors within the country. As several countries have started the relaxation of different containment strategies, there is a need for an effective system of monitoring new cases of COVID-19 infections to prevent the second wave of the epidemic. Automated contact tracing has been identified as one of the viable means of identifying those infected in most developed countries due to the challenges associated with manual contact tracing such as human errors, shortage of health personnel, inadequate infrastructure, patients' disclosing wrong information, and process handling delays. In this paper, we presented an holistic view of several contact tracing technologies for COVID-19 available in literature identifying their strength and weakness. Consequently, we propose an improved method for COVID-19 automated contact tracing using Internet of Things (IoT) and cloud computing technologies.

Mr Olawale Adeboje
Federal university of technology Akure, ondo state, Nigeria

Title: An adaptive negotiation multi agent system for e commerce system using Artificial Neural Networks

Abstract

Electronic commerce which is the trading of product or service sing computer networks such as Internet has been widely used these days because it draws on technologies such as mobile commerce, electronic fund transfer, supply chain management, Internet marketing e.t.c. However, most buyers see prices online as inflated prices because of their inability to negotiate with the seller. In order to address this, this research work proposes an adaptive negotiation multi agent system for e commerce system using Artificial Neural Networks. The research work made used of three types of agents, which are buyer agent, seller agent and facilitator agent. The seller agent and the buyer agent allow buyers and sellers to negotiate their strategies f selling and

buying respectively while the facilitator agent handles the negotiation strategies between the seller agent and the buyer agents. Factors such as price, quality, quantities, warranty and delivery date were considered from both the buyer and the seller and feed into the Artificial Neural Networks system through the facilitator agent. The evaluation result shows high precision, high accuracy and a very good response time.

Eng. Mrs. GbÃªmÃªmali Castro Hounmenou
BP1525 Cotonou

Title: A formalism of the mathematical expression of neural networks with multiple hidden layers and multivariate outputs

Abstract

Neural networks, a subset of the methods of artificial intelligence, are mathematical models inspired by neuroscience and function like the human brain. They are being used in areas of prediction, classification and clustering, areas where models and other related statistical techniques have traditionally been used, and also to the learning of function approximation tasks. These models are most often represented by oriented graphs where only the components, constitutive elements of the graph are transcribed into mathematic expression. Indeed, in simulation studies based on an existing model, knowledge of the full expression of the model is required. In this paper, we formalize the mathematical expression of oriented graphs of a multilayer perceptron neural network with several hidden layers and multivariate outputs for being used as a mathematical model in scientific works and in simulation studies. An application case is presented in the context of solving a nonlinear regression problem.

Mr Oluwasegun Somefun
Department of Computer Engineering, Federal University of Technology Akure

Title: On the nlogistic-sigmoid modelling for complex growth processes: in application to the COVID-19 pandemic

Abstract

Real-world growth processes, such as epidemic growth, are inherently both noisy, complex and often involve multiple growth phases. The sum of logistic-sigmoid functions has been suggested and applied in the domain of modelling such growth processes. However, existing formulations are lacking, as the modeling and estimation of logistic parameters become more cumbersome, requiring more complex tools and analysis. To remedy this, we propose the nlogistic-sigmoid function as a powerful, compact and unified tool for modeling such real-world growth processes. In addition we introduce two characteristic metrics of the sigmoidal curve that can give more robust measures of the growth process. Specifically, we apply this function to modelling the daily World Health Organization published COVID-19 time-series data of infection and death cases of the world and countries of the world to date. Our results demonstrate statistically significant fitting for affected countries of the world exhibiting patterns of either single or multiple stages of the ongoing COVID-19 outbreak, such as the USA. Consequently, this helps to provide clearer monitoring and quantification of: the ongoing pandemic growth process, and

the effectiveness of containment strategies by a country's public-health body.

Mrs Afoussatou Amadou
Research Unit in Applied Microbiology and pharmacology of Naturals substances (URMAPHA), Benin

Title: Food contamination by mycotoxins: Major associated impacts and detoxifications actions

Abstract

Mycotoxins are toxic substances resulting from the secondary metabolism of a number of moulds belonging mainly to the Fusarium, Claviceps, Alternaria, Aspergillus and Penicillium. These Fungi imperfect develop particularly on cereals before, during and after harvest. The objective of this study is to promote food and feed safety. The detection methods used in this study are HLPC, mass chromatography and liquid chromatography. Approximately 25% of foodstuffs are contaminated with fungal toxins, representing a loss of 5-10% of the world's harvest. The diversity of mycotoxins is quite vast but not all are worthy of interest. Of the 400 known mycotoxins, only about 30 have toxic properties of concern. Fungal toxins cause adverse biological effects in animals and humans that consume them, which are grouped together under the term mycotoxicosis. Acute intoxications are rare and even less frequent in humans than in animals. Chronic intoxications are much more feared. Carcinogenesis, immnunotoxicity, nephrotoxicity, hepatotoxicity and neurotoxicity form the range of adverse chronic effects of fungal toxins. Several processes are used for the detoxification of these mycotoxins, like natural substances such as medicinal plants and probiotic bacteria. This study focused on the antifungal and detoxifying properties of these substances. But also, to study the synergistic effect of these elements in order to manufacture a biosensor that can be used in agriculture and food. In addition to the economic impact, mycotoxins therefore pose a real public health problem. The implementation of this biosensor will solve a food safety problem in animals and humans.

Prof Olatubosun Olabode
Information Systems Department, The Federal University of Technology, Akure, Ondo State, Nigeria

Title: Ensemble Machine Learning Classification algorithms for Diagnosis and Prediction of COVID-19 severity level

Abstract

An alternate method to reverse transcription polymerase chain reaction (rRT-PCR) screening method can be based on chest radiography images. Researchers found that the lungs of patients with COVID-19 symptoms have some visual marks like ground-glass opacities hazy darkened spots that can differentiate COVID-19 infected patients. This paper presents an Ensemble Machine Learning Classification algorithms for the Diagnosis and Prediction of COVID-19 patient severity level. One objective of the research work is to identify, collect and clean dataset of valid and useful information from medical officers, COVID-19 patients case notes and chest X-rays. Identify the vital signs and critical Clinical features of patients presenting with COVID-

19 and create a database repository using MySql. Develop a bootstrapping and aggregate ensemble of Multilayer Perceptron, Logistic Regression, Support vector machine, Convolutional Neural Networks and NaÃ¯ve Bayesian model as base models for COVID-19 victim diagnosis and the determination of its severity status. The intelligent systems, is Benchmark with a dataset of chest X-ray images from open source Github and Kaggle repository and a locally sourced COVID-19 X-ray images from some selected isolation centers to establish the accuracy, reliability, efficiency and F1 score of the proposed system. The system presented a 96.4% of accurate classification.

Mrs Racheal Akinbo
Federal University of Technology Akure Nigeria, PMB 704, Ondo State, Nigeria

Title: Ensemble Machine Learning Classification algorithms for Diagnosis and Prediction of COVID19 severity level

Abstract

The coronavirus COVID-19 pandemic is re-defining global health crisis in recent time and the greatest challenge we have faced since December 2019 is the continuous spike in the death rate. Coronavirus disease 2019 (COVID-19) is an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (COVID-19). Since its emergence in Asia in December 2019, it has become a global pandemic and it has spread to every continent except Antarctica. Healthcare is the management, prevention and the treatment of illness and the main aim is to provide clean and effective services that lead to the preservation of mental and physical well-being of everyone. The major challenge facing the healthcare industry is the provision for quality services at affordable costs to patient presenting with COVID-19. A quality service implies diagnosing patients correctly and treating them effectively. In this research, the Ensemble approach will be adopted using the bagging method of both bootstrapping and aggregate ensemble machine learning system of Artificial Neural Networks, Logistic Regression, Support vector machine and Naive Bayesian model will be implemented to predict or medically diagnose the true positive of COVI-19 and also use the Fuzzy logic model to determine the severity status of patient presented with COVID-19.

Dr Oluyemi Gbadamosi
Federal University Of Tech. Akure, OndoState, Nigeria

Title: Effects of dietrary Moringaoleifera on zootechnical performance and expression of Heat ShocK Protein Genes in African catfish

Abstract

The effects of dietary Moringaoleifera supplementation freshwater microalga on the zootechnical performance and expression of heat sock protein genes in African catfish, Clariasgariepinus subjected to aquaculture related stressor was assessed in this study. Five isonitrogenous and isocalorific experimental diets were formulated to contain 40 % crude protein and 9 % lipids. A. platensis was used to replace soybean meal at 0% (control), 25%, 50%, 75% and 100%. After the 70 days feeding trial, fish were subjected to thermal induced stress. Genomic analyses of the heat shock proteins (HSP) showed more diversity of HSP genes in the fed Moringa based diets than

those fed the control diet. Significant improvement (p<0.05) were observed in the feed intake, zootechnical performances in terms of growth performance and nutrient utilization of fish fed Moringa based diet compared to the control. This study showed the efficacy of Moringa plant as phytogenic product for sustainable stress management in the farming of African catfish without any adverse effects on the nutrition and health of the fish.

Dr John Oredo
University of Nairobi, Nairobi, Kenya

Title: Predicting Users' Intention to Migrate from Freemium to Premium Cloud Storage Services: A Comparison of Machine Learning Classification Models

Abstract

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=0.70, recall=0.52 with an overall accuracy of 0.73 while for the logistic regression, precision=0.68, recall=0.55 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.

Dr Olorunshogo Jacob Mebawondu
Computer Science Dept, School of Information Technology, Nasarawa, Nasarawa State, Nigeria.

Title: Modeling of Nigerian Service Providers Audio Quality of Service using Supervised Machine Learning

Abstract

One of the foremost challenge the unique infectious disease (CONVID-19) ravages people, especially in Africa, is the total dependence on the mobile phone for communication, mainly during the total lockdown. The modeling of service providers on the audio quality of service (QoS) is a solution- driven and sustainable response to the CONVID-19 challenge in Africa and

its agenda 2063 goal. The growing number of subscribers over the years and quality of service crisis especially from the users end hence the need to have users based data to model audio QoS motivated this research work. The goal is to model key service providers audio QoS in the country. To achieve the goal, crowdsourcing approach used for data collection and supervised machine learning paradigm used to determine the QoS of the network providers in Nigeria. The results show the performance of the algorithms, SVM performs better than MLP for determining the providers' QoS. Therefore the work recommend integration of the developed model to telecommunications network system to monitor providers audio QoS.

Mr Timothy Ogunleye
Department of Statistics, University of Ilorin, Nigeria

Title: The Fight against COVID-19 Pandemic in Nigeria: A Situational Analysis of the Most Affected Zone

Abstract
Since the appearance of the new coronavirus in Nigeria dated 27th February, 2020, Nigerian Government has been collaborating with other national and international agencies to fight the medical battle created by the pandemic. It's still on record that about 66,439 Nigerian citizens have been confirmed positive of COVID-19 as at 23rd November, 2020. Though, many people including the medical personnel consider it as incurable, Governments of many developed and under-developed nations of the world including international communities are hopeful of its vaccine some day. However, while investigating which geo-political zone in Nigeria is most affected, the data sets were sourced from NCDC webpage. These were classified according to zone. One-way unbalanced analysis of variance (ANOVA) was applied as statistical tool to investigate whether or not the occurrence of this pandemic across the zones was equal. All calculations and graphics were performed by R software engine. Meanwhile, normality and homogeneity assumptions have been tested on the data set. Results show that occurrence of COVID-19 pandemic in south-western part of Nigeria is different from other zones. With these results, governments are advised to increase the level of partnership with states in the south-western parts of Nigeria as this has been empirically established.

Mr Sola Babalola
8B Banire Street, Amazing Grace Complex, Lafe, Akure, Nigeria

Title: Anti-vaxxers: an approach to identify and balance views using news analytics and scientometrics

Abstract
Anti-vaxxers are already on the task of raising negativity in people's minds about Covid-19 vaccination. We present a framework to identify and examine the views and issues raised by the anti-vaccination movement and a method of counter-acting the same using scientometrics.

POSTER

Dr Monday Osagie Adenomon

Department of Statistics, Nasarawa State University, Keffi, PMB 1022, Keffi, Nasarawa State, Nigeria

Title: Curbing the trend of covid-19 in Nigeria using non- pharmaceutical Interventions and Mathematical models

Abstract

The recent out- break of covid-19 which has been declared a public health emergency by world health organization (WHO) in Nigeria and other countries around the world has led to high death rate, downturn of economic growth and exacerbated the standard of living around the globe. Different organizations, agencies and government parastatals have been working round the clock to get the right cure for people affected by corona virus this has led to implementing non-pharmaceutical ways to limit the transmission and spread of the virus among which, the most effective and reliable ways are use of face mask, regular washing of hands or hand sanitizers and social distancing method which entails giving about 2 meters physical gap from the next person and reduces interaction within groups of people. The research suggests how covid-19 vaccine and the frequency at which it should be administered when made available, further policies are to be implemented by Nigerian government and other stakeholders to resuscitate the falling economy thereby improving standard of living. SIR model is employed since there is no medicine or vaccine available for the cure of covid-19, it is only possible to reduce the infection rate with the most appropriate and effective non-pharmaceutical methods to flattening the curve. Ordinary differential equation which are deterministic are utilized in the model, to get a more realistic result, we will also consider the basic reproductive number.

Mr Felix Akintola
Federal University of Technolgy, Akure, Nigeria

Title: Data Science and Lassa Fever

Abstract

Lassa fever, still in the space of January to February, 24% mortality rate was recorded in Nigeria, which is on the high side for a disease that is not terminal as Covid-19. More than the scope of this project, Data Analytics techniques, has the ability to predict, map, track, monitor, and raise awareness about these epidemics and pandemics. This research will study will study general data and cluster areas where Lassa fever is plummeting, and have been successfully defeated, and also area that are still struggling with the virus. It will study the areas where this viral disease as high fatality rate with respect to their cultural practices, population, proximity to wildlife and the mastomys rats, relationships between these cities. The data analytics would be used to predict strategic positions for full awareness, special mobile hospitals for Lassa fever, and also to instigate all other methods used in curbing this virus in area where it has successfully been defeated.

Data from the world health organization, would be used to carry out this research, other information on the cultural practices and kind of living poverty rate etc. would be gotten on administering questionnaires.

Mr Olatunde Akintoye
Federal University of Technology Akure, Nigeria.

Title: A Web Based Career Recommender System for Pre- University Students using Fuzzy Logic.

Abstract

Career is an occupation or profession, chosen to do in life to get income and to sustain life, is very important to every man, especially students of secondary school in order to secure a brighter future. Majority of the students get it wrong when it comes to choosing a career path. This can be ascribed to factors like lack of information, improper guidance, lack of proper orientation and so on and this can potentially cause mismatch among personality, interest, and skill of students. Relative to this context, this research work developed a web based automatic career recommending system for pre university students in Ondo state using Fuzzy logic system. A recommender system is a system that gives suggestions and recommendations to users when they are making a decision while faced with different choices. The student data were obtained from senior high school students of some selected public secondary schools in Ondo state, Nigeria where their demographic data were gathered through a structured questionnaire. The inputs are deduced from the response that will be fed into the fuzzy logic system such as mode of subject, Class teacher recommendation, Subject Score, Final Grade and Career Interest. The result of the experiment shows reasonable result for career recommender system for pre university students in Ondo state and Nigeria at large.

Miss Asegunloluwa Eunice Babalola
Anchor University, Lagos, Nigeria

Title: Personalized Health Monitoring Diet Recommender System for Adults Using Anthropometric Indices

Abstract

Good nutrition is crucial for the health, growth, development, and economic well-being of individuals. This research presents a personalized diet recommender system that enables users without knowledge about nutrition to get diet that best suit their needs based on their anthropometric measurements. Recommender systems are regarded as an interdisciplinary applied science which employs knowledge and skills associated with AI, data science and decision making. The developed system is a knowledge-based system which receives information from the user such as gender, age, activity level, height and weight to compute Body Mass Index (BMI), waist circumference and hip circumference to compute Waist to Hip Ratio (WHR). These data are combined using RETE pattern matching algorithm to classify the users. For each possible classification an existing meal plan generated with the assistance of a professional nutritionist is recommended. The system was evaluated by users in which the user interface, availability of diets, accuracy, trustiness, and satisfaction derived from the recommendations and the usage of the system. The result showed that the developed system is effective in recommending diets to the users.

Mrs Olamatanmi Josephine Mebawondu
The Federal University of Technology Akure, Computer Science Department, School of Computing, Akure, Ondo State, Nigeria

Title: Classification of Multi-Class and Binary-Class Analysis using C4.5 and Naive Bayes Algorithms

Abstract
All around the world, the rapid spread of the pandemic (COVID-19) has brought a huge challenge, especially to the ICT industry. The total lockdown which prevailed in Africa among other continents of the world had increased the use of the internet which is a challenge to the safety and security of its SDG 2063 goal. Thus, the need for an intrusion detection system (IDS) to maintain this emergence of a boundless communication paradigm. This paper proposed an optimized Network IDS by applying two machine learning algorithms in 10-Class and 2-Class sets. Feature weighting techniques employed to optimize the IDS model. To show the feasibility of this work the result of the model using the two subsets of the data is compared to the previous author's work. The result showed the best result of the feature weighted than un-weighted features. The decision tree applied outperformed the Naive Bayes algorithm with an accuracy of 90.44% and 75.09% respectively.

Mr Feyi Oluwasanmi
Gaspet Trust Technical Services Ltd, Akure, Ondo State, Nigeria.

Title: Optimizing solid waste generation and management techniques in Nigeria: a case study of Akure Metropolis

Abstract

This study is designed to offer significant insight into the damage that improper management of solid waste does to our society and our biodiversity. It will help to predict the patterns of waste generation and disposal in the south western states of Nigeria and how it can best be managed. There is an imbalance between the production of solid waste and efficient waste disposal in Nigerian urban cities. This is because clear priority has often been given to issues of industrial and commercial development without paying attention to solid waste disposal facilities. As a result, waste is being piled up along street sidewalks, dumped in waterways and at times totally blocking the traffic. Wastes properly managed can be a source of employment and wealth while indiscriminate waste disposal puts the populace at a great health risk apart from distortion to the aesthetics. Consequently, gaseous emissions and odours can also be released upon decomposition of waste, with negative consequences for the environment and its biodiversities. The emission of dangerous greenhouse gases (NH3, N2O, CH4) from wastes is likely to aggravate respiratory diseases especially at this period the world is grappling with the coronavirus pandemic.

Mrs Fadekemi Adediwura Adetoye
Unique Choice Computer and information Technology, Akure. Nigeria

Title: Intrusion Detection using Association Rule and Support Vector Machine

Abstract

This research shows the comparison between two intrusion detection systems, one that uses the association rule data mining approach (Apriori) and the other that adapts the use of a machine learning technique (Support Vector Machine). The performance of the two systems was compared using the Network Security Laboratory Knowledge Discovery and Data Mining (NSL-KDD) dataset and the University of New South Wales NB 2015 (UNSW-NB15) dataset. Evaluation results show that SVM performs better than Apriori in terms of accuracy using Nigeria as a case study.

Miss Olutoroti Jane Mebawondu

Electrical Electronic Engineering Dept, FUTA, Nigeria.

Title: Obstacle Detection using Ultrasonic Sensor and Location Based Component in a Microcontroller System

Abstract

Out of seven billion of the world population, two billion and two million people that amounts to 31.43% have visual impairment or blindness according to World Health Organization (WHO) statistics report. Hence, the need to develop a wearable device with reduced size, efficient power usage, and for visually impaired or blind people. This work aim to design an obstacle detection system using an ultrasonic sensor interfaced with an Arduino board, to track location, and send a message to visually impaired patient as a feedback mechanism using a GPRS and GSM module. The C programming language was used to program an interface, Arduino device for definite instructions. At the design level, the circuit tested on Proteus software before its implementation. The results obtained from the tests show the variation of distance as the patient approaches the obstacle. This design concept would help reduce danger across the way of those with sight defects and allow them to go to familiar places without any aid smoothly.

Mr Oluwafemi Joshua Adebile

3, Tiwantiwa Oka Ondo City, Ondo, Nigeria

Title: Online Recommender System

Abstract

Movies, which is a visual communication which uses moving pictures and sound to tell stories or teach people something has been the favorite of many people because of its advantages which are education, entertainment, medium of raising awareness, convey emotion to the viewers, source of income etc. Movies can come in different types depending on the userâ€™s interest includes action movies, comedies, romantic movies, adventure movies, musical movies, religion movies, historical movies etc. However, users find in very difficult in the choice of movies among many varieties of movies. In this case, movie recommender system has been the best solution. A recommendation system is a system that provides suggestions to users for certain resources like books, movies, songs, etc., based on some data set. The proposed work focused on two main algorithms for recommendations which are: Collaborative filtering and Content-based filtering. This proposed system explored three algorithms for Collaborative filtering, which are: K-Nearest Neighbors Algorithm, Latent Factors Algorithm and slope one algorithm. The

proposed system was evaluated using Mean Square Error, Mean Absolute Error, Precision, Recall and Computational Time. The result after evaluating the developed mobile application shows that it has high performance.

Dr Israel Ropo Orimoloye
Centre for Environmental Management University of the Free State Bloemfontein, Soth Africa

Title: Facilitating agricultural drought disaster risk management through space-based information

Abstract

Agricultural drought has been identified to have significant impacts on crop yields. Monitoring agricultural drought can deliver critical information to farmers on when, where and how much to irrigate as well as facilitating drought-associated risk management. However, precisely monitoring which requires many kinds of data sources, in-situ data, and data fusion and mining is still a huge challenge for scientists. Agricultural scientists faced various challenges in acquiring data for their analysis, for instance, inadequate meteorological stations, missing data, data errors, these posed a serious challenge on drought monitoring. In recent decades, data sources such as remote sensed hyperspectral images are made available and open to the public, and this has been widely used in various fields. This paper aimed at facilitating drought monitoring and drought disaster risk management through satellite remote sensing data over Limpopo Province of South Africa and R programming and Google Earth Engine. Results from the study revealed rainfall deficits have negative effects on the agricultural systems, resulting in a decrease in agricultural activities, loss of livestock, shortage of potable water and low crop yields in the region. As noted in the study, drought impacts in the province are not only affecting the agricultural sectors, it is also affecting the vegetation status in the region. The quality and status of vegetation can be severely impacted by drought periods especially with a prolonged drought duration. Vegetation health has been severely impacted by drought during the period of investigation. The combination of these factors, for example, low rainfall, poor vegetation condition and a range of other constraints, heightened during droughts, unfortunately, produces a range of additional stressors for farmers and other water-reliant sectors in the province.

Prof Eman Nossier
Al-Azhar University, Faculty of Pharmacy (Girls), Pharmaceutical Medicinal Chemistry Department, Cairo, Egypt.

Title: Design, Synthesis, Cytotoxic Activity and Molecular Docking of Novel Triazole-Thienopyrimidine Hybrid Glycosides Targeting EGFR

Abstract

Novel thienopyrimidine conjugates bearing 1,2,3-triazoles core and different sugar moieties have been designed and synthesized by Cu(I)-catalyzed click dipolar cycloaddition. The cytotoxic

activity of the synthesized conjugates 2, 5, 7 and 13-18 was studied against HCT-116 and MCF-7 cell lines by the MTT assay. The triazole glycosides 16 and 18 provided significant cytotoxic activities against HCT-116 cell lines comparable to that of doxorubicin and other studied compounds. The cytotoxic behavior against MCF-7 exhibited that all the investigated compounds were more potent than doxorubicin. Moreover, all screened targets 2, 5, 7 and 13-18 were evaluated against mutant EGFR kinase type L858R and the results revealed that the acetylated 1,2,3-triazole glycosides 13-18 exhibited excellent EGFR inhibitory activity in comparison with gefitinib. Furthermore, the molecular modeling studies were performed to investigate the binding affinity of the most active compounds to EGFR enzyme.

Mr Oluwaseun Adebayo Jinadu
Directorate of Procurement Naval Headquarters, Area 8, Garki, Abuja, Nigeria

Title: The Use of Divide and Conquer Classification Models and other Optimized Techniques Towards Real- Time Data Analytics: a case study of sentiment analysis of COVID -19 Related Tweets

Abstract

Early data were static, hence, the methods of analysing them to derive meaningful patterns or insights were simple. However, the advent of information revolution has led to the 'Big Data' era where data streams are generated at high velocity, enormous volume and of diverse variety the temporal properties of this category of data implies that the traditional frameworks, techniques and methods employed for static data analytics would no longer be applicable for real- time analytics; which involves analysis of data 'on the fly' as they are being generated. Prominent among the challenges of real-time data analytics are scalability, latency and heterogeneity of data. There is therefore the need for parallelization techniques both for hardware and programming and machine learning models that scales well with the demands of real- time data analytics. This paper focused on optimization mechanics that could be improve speedup, latency and scalability within the context of real-time data analytics. The novel framework christened Afaara 1.0 employed a layered approach to conduct sentiment analysis on COVID 29 related tweets. The use if Divide and Conquer method in Decision Tree for classification showed a great improvement in speedup, latency and scalability when compared with other contemporary models. Parallelized techniques for data ingestion and other parallelizable processes led to improved speedup and scalability as well.

Dr Frederick Adzitey
University for Development Studies, Department of Food Science and Technology, Box TL 1882, Tamale, Ghana

Title: Impact of COVID-19 on butchers in Ghana: A case study in Tamale

Abstract

COVID-19 had negative impact in most businesses in the world. Butchers in Ghana contribute to food security by making meat affordable, accessible and available all year round to Ghanaians. This study assessed the impact of COVID-19 on butchers in the Tamale metropolis, Ghana. A semi-structured questionnaire was used to obtain data from 98 randomly-selected butchers on the

impact of COVID-19 on their operations. The results revealed that all the butchers were males with the majority aged between 21 and 40 years. Most of the butchers had Primary education (53.1%). COVID-19 had a very negative impact on butchers (80.6%). Low sales were a prominent impact experienced by butchers (54.1%). This was mainly due to the catering industry closing down (butchers). Butchers (28.6%) laid off some workers. Lack of animals to buy was the most important effect of COVID-19 on their business and threaten the food security of Ghanaians in terms of protein intake from animal sources. 51% of the butchers were prepared for COVID-19. The butchers least expected COVID-19 would cause such a crisis (36.7%), did not know it would enter Ghana (7.1%), or reach Tamale (4.1%), and thought it was not a disease that would infect Africans (1.0%). The butchers (90.8%) expected the government to make farming resources available during the COVID-19 period. To ensure the survival of the meat industry to promote food security after COVID-19, butchers (59.2%) proposed the provision of financial support for their business. The findings of the study revealed that COVID-19 negatively affected the meat industry of Ghana and a potential threat to her food (meat) security.

Dr Kouanou Aurelle Tchagna
College of Technology-University of Buea- Cameroon

Title: Biomedical Image Classification for Corona Virus Detection using Spark Framework with Deep Learning

Abstract

The outbreak of new Corona Virus Disease (COVID-19) has become a clinical threat to the population and healthcare workers worldwide. Today the COVID-19 is spread out in almost all countries in the world making an increasingly number of deaths each day. Based on their scientific background, many scientists and researchers are looking forward to either quick methods of detecting the virus or developing a vaccine to fight the virus. In this paper, we propose a method based on Big Data Technology using Deep Learning (DL) to classify and identify Corona Virus in a carrier (symptomatic or not) through computer tomography chest. We provide a literature review of methods used to detect Corona Virus in a person and propose our pipeline for automatic diagnosis of COVID-19. We use Convolutional Neural Network (CNN) as our DL method and its architecture of the set of layers used is designed. Spark framework is considered here as our Big Data Technology for its speed and efficiency. We construct our dataset into two categories namely; normal chest and COVID chest. Parameters like sensitivity, specificity, training loss and training validation are evaluated. It comes out from our analysis that when the number of epochs reaches 200, the specificity equals 1.0, the sensibility equals to 0.999997 while the accuracy is close to one and thus the efficiency of our model. The proposed algorithm is written in the python programming language as it is more suitable for this kind of classification problem. The obtained results in this paper demonstrate the proof-of-principle for using machine learning alongside with DL to automatically diagnose COVID-19 on time and with accuracy by making use of radiological features.

Dr Saheed Ajao
LadokeAkintolaUniversity of Technology, Ogbomoso, Oyo State, Nigeria.

Title:

Abstract

Tumor-infiltrating immune cells play critical roles in immune-mediated tumor rejection and/or progression, and are key targets of immunotherapies. Estimation of different immune subsets becomes increasingly important with the decreased cost of high-throughput molecular profiling and the rapidly growing amount of cancer genomics data. Here, we present Tumor IMmune Estimation Resource (TIMER), an in silicodeconvolution method for inference of tumor-infiltrating immune components. TIMER takes bulk tissue gene expression profiles measured with RNA-seq or microarray to evaluate the abundance of six immune cell types in the tumor microenvironment: B cell, CD4+ T cell, CD8+ T cell, neutrophil, macrophage, and dendritic cell. We further introduce its associated webserver for convenient, user-friendly analysis of tumor immune infiltrates across multiple cancer types.

Mr Mahmoud Ahmed Warda Warda
33 El Bohouth St. El Dokki , Giza National Research Center of Egypt
Title:

Abstract

Tumor-infiltrating immune cells play critical roles in immune-mediated tumor rejection and/or progression, and are key targets of immunotherapies. Estimation of different immune subsets becomes increasingly important with the decreased cost of high-throughput molecular profiling and the rapidly growing amount of cancer genomics data. Here, we present Tumor IMmune Estimation Resource (TIMER), an in silicodeconvolution method for inference of tumor-infiltrating immune components. TIMER takes bulk tissue gene expression profiles measured with RNA-seq or microarray to evaluate the abundance of six immune cell types in the tumor microenvironment: B cell, CD4+ T cell, CD8+ T cell, neutrophil, macrophage, and dendritic cell. We further introduce its associated webserver for convenient, user-friendly analysis of tumor immune infiltrates across multiple cancer types.

Mr Nnaemeka Success Esiobu
Department of Agricultural Economics, Imo State University Owerri, Nigeria

Title: How Does COVID-19 Pandemic Affect Rice Yield? Lessons from, Southeast Nigeria

Abstract

Across Nigeria, while rice farmers are still battling the negative impact of climate change, the COVID-19 pandemic has brought a new risk that not only threatens farmers livelihoods but also the most important global food security crop Rice• . Every farming season, rice farmers face risks such as low rainfall, price volatility and poor government policies. But the present risks from the COVID-19 pandemic are putting new challenges in front of rice value-chain that is already under serious threat. As a matter of urgency, farmers must respond to this new threat by choosing measures that increase their yield. Incidentally, empirical studies that documented the effect of COVID-19 pandemic on rice yield cannot be found as at the time of this study. These create emptiness in research. With this present threat, South-east Nigeria is likely to experience a reversal in the development gains already achieved and will be unlikely to achieve the Agenda

2030 Goals. The study was logically guided by five objectives. The survey was conducted at the onset of discovering of the index case of COVID-19 in Nigeria (27 February 2020) that is, from March to July 2020 with the help of two-hundred (200) enumerators i.e forty (40) for each State. A cross-sectional data was elicited from 504 rice farmers selected from Abia, Anambra, Ebonyi, Enugu and Imo State.

Dr Godwin Ubi
Department of Genetics and Biotechnology, Faculty of Biological Sciences, University of Calabar, Calabar Nigeria.

Title: Data science for health related applications using bioinformatics and genome sequencing

Abstract

The applications of bioinformatics in structural and ligand based drug design and discovery provides an excellent foundation for in vitro and in vivo validation of potential drugs for the much dreaded SARS-COV 2 coronaviruses. Bioinformatics analysis of genomic DNA information isolated , sequenced and deposited in NCBI by Nigeria, China, USA, Australia, Italy, Spain, Egypt, Kenya and other endemic countries using expasy.org. MEGA X, Nsopma, Phyre 2, Genscan, Swiss model and proteomic param revealed significant variations in molecular weights, total no. of amino acids and atoms, size of gene, total no. of positive and negatively charged amino acid residues, instability index, extinction coefficients, aliphatic index, hydropathicity, isoelectric points pH (8.1- 9.25) half life (1 - 7.2 hrs), mutations , evolutionary paths, phylogeny, secondary and tertiary protein structure characteristics and motif identification. Furthermore, structural and ligabnd based drug design and discovery analysis of the coronavirus genomic sequences of coronaviruses using bioinformatics tools such as the Swiss model, swiss target predictor, Swiss dock and autovina software revealed the available protein target sites, proportions of bad bonds and angles, C-beta deviations, Ramachandran favoured (92 -98%), target - ligand complexes, binding site energies, Gibbs free energies, energy affinities, root mean squared deviation , 3301 total systems, 96.81- 99.97% fixation, binding modes, molprobity score, receptors, potential ligands, core atoms, charges, geometric optimization, simple and full fitness, radar lot of X.Y.Z coordinates of the coronaviruses for effective design, discovery, management and development of suitable therapy. Hence, the effective application of computer aided structural and ligand based drug design through bioinformatics analysis of genomic sequence of coronavirus isolate is a stepping stone towards finding a potential therapy and prevention of the pandemic which second wave of infections is around the corner.

Dr Ramia AlBakain
The University of Jordan, Department of Chemistry, Jordan

Title: Comprehensive chromatographic profiling of cannabis from 23 USA States marketed for medical purposes

Abstract

Cannabis is an important medicinal plant. To validate medicinal cannabis marketed in USA as a predictable medicine and to use cannabis plant as a medicinal drug, it is necessary to quantify their contents using chemical profiling system. In this study, cannabis varieties from 23 different USA States were analyzed to establish their complex chemical profiles by GC-FID that was validated for quantitative analysis of cannabis content. Results showed that 45 cannabinoids and terpenoids were quantified in all plant samples, where 8 cannabinoids and 18 terpenoids were identified. Î”9-THC and CBN and Fenchol not only showed the highest levels overall contents, but also were the most important compounds for cannabis classification. Regarding the States, Washington, Oregon, California and Hawaii have the highest cannabis content. Quantitative data was analyzed using PCA and HCA to find (1) the variation on cannabis chemical profiles as a result of growing plants in different States and with deviations in growth time, (2) to confirm whether the cultivars in the cluster analysis would also be grouped together, (3) to reveal the compounds that were responsible for grouping cultivars between clusters and (4) to develop a database that can predict the origin of unknown cannabis based on its chemical profile. Correlation studies on the bases of peak area ratios showed the feasibility of tracing cannabis chemically to its State of origin. The 23 cannabis USA States were grouped into three clusters based on only Î”9-THC, CBN, C1 and Fenchol content. Cannabis classification using a full profiling of compounds will more closely meet the practical needs of cannabis applications in clinical research, industrial production, patients' self-production in USA, contribute to the standardization of commercially-available cannabis cultivars in support of a continuously growing market and facilitate the future simple and rapid profile prediction of unknown cannabis provided from different States-origin.

Dr. Bukola Badeji-Ajisafe
University of Medical Sciences, Ondo, Nigeria

Title: Fertility Analysis based on Data Mining Techniques

Abstract

Fertility rates have drastically reduced in the last two decades, especially in men. It has been described that environmental factors, as well as life habits, may affect semen quality. This paper evaluates the performance of different artificial intelligence (AI) techniques for classifying the fertility dataset that includes the semen sample analyzed according to WHO 2010 criteria and publicly available on the UCI data repository. In this context, the ensemble approach involved in many studies is proposed to classify the fertility dataset successfully. For the purpose of comparing the proposed method performance, the Adaptive Neuro-Fuzzy Inference System (ANFIS), SVM+PSO, and multi-layer perceptron (MLP) are also used for the classification problem. The results of the other ANFIS methods are also satisfactory.

Dr. Mrs. Folasayo Titilola Fayose
Department of Agricultural and Bioresources Engineering, Federal University OyeEkiti, P.M.B. 373, Oye-Afao road. Oye- Ekiti, Nigeria

Title: Stage for Precision Agriculture Technologies for African Small Holders

Abstract

Computers, data, and Information are part of our lives. Devices, Data, and Decisions are backbone to Future of Farming. We can only feed a growing Africa when we farm with data. Precision agriculture is scale independent, site specific, locally adaptive, operational feasible and economically affordable. This article aims to bring a robust discussion and view about precision agriculture in Africa since the majority of farmers here are small holders. The importance, status, tools, issues in implementing and strategies for adoption of precision agriculture for small holders are discussed.

Mr Diana MacKay
Aga Khan University, Canada

Title: Getting Started in Data Science -- Faculty and Administration Collaboration

Abstract

As talented data scientists emerge in universities everywhere, how can data science initiatives that involve transformative investments in institutional capacities best support these ambitious faculty members? This presentation invites discussions on best practices in establishing university policies and practices (e.g., IT and computing infrastructure, legal and regulatory frameworks, interdisciplinary collaboration, HR investments, etc.) that support data scientists in advancing their research work.

Mrs Yemi Fatokun
Osun State University, P.M.B. 4494, Oke-Baale, Osogbo, Osun State, Nigeria.

Title: Development of a Health Cloud Big Data Security Model using Lattice Cryptography

Abstract

The use of digital technologies and data has increased over the years to improve businesses and human life generally thereby increasing productivity. In the health sector, Electronic Health Records (EHR) has helped in collecting demographic medical data which helps healthcare practitioners to provide quality health care. The EHR generates lots of medical data and ultimately, big health data. Results of analysis carried out on these data could form the basis for decision making by government health agencies and other stakeholders, towards improving quality of life and prediction/prevention of premature deaths as well as disease development. In this research work, we propose a framework using lattice-based cryptography to encrypt health big data and deploy a decoy model which will be coined in fog computing facility to serve as honeypot or trap machine to attract attackers. User interfaces will be designed and categorized to create and control access privileges, while ifogSIM simulator will be employed to model and simulate fog and cloud computing using the same physical configuration and different encryption techniques on devices. Performance evaluation of the system over popular encryption schemes using standard metrics.

Mr Adebayo Adegboyega
Computer Science Department, Federal University of Technology, Akure, Nigeria

Title: An improved Epidemiological Surveillance System using Big Data Analytics and Complex Adaptive Models

Abstract

Recently, many researchers have explored the prediction of infectious disease outbreaks using big data, artificial intelligence among other technologies have .But the decreased predictability of infectious disease outbreak with increasing time series infers the presence of underlying dynamic model structures, which explains why most epidemiological surveillance systems have been restrained to the use of case-based, real-time data for active surveillance rather than passive surveillance. Since the emergence of outbreaks is due to the multi-level of interactions of human, pathogens and environments, the major socio-ecological research programs allude that the phenomenon of infectious disease outbreaks are best tackled from the perspective of complex adaptive systems (CAS) Â In this research, we introduced the use of CAS leveraging their ability to improve our understanding of dynamics and complexities inherent in standard case definitions of infectious disease outbreak. Also, we integrate the planning prospect of complex adaptive systems with their learning capability. A model-free, learning-based technique was proposed for the validation of an outbreak and to aggregate the long term prediction of outbreaks. This approach provides ample time for an improved outbreak preparedness, and also to trigger active surveillance before an outbreak starts.

Dr Md. Anwar Hossain
Bangladesh Council of Scientific and Industrial Research, Dr. Qudrat-I-Khuda Road, Dhanmondi, Dhaka-1205, Bangladesh

Title:

Abstract

Establish a world-class informatics laboratory in BCSIR.
To set up a total of several Management Information System (MIS) for the collection of scientific and technical data for the Informatics Laboratory. Provide informational support for setting important government policies. Creating opportunities for bio, health, chemo and materials informatics research. To assist in the development of industry in the relevant field through the results of the research. Ahieve the ability to do other research including verifying the safety and quality of different products through research of the collected data. Establishment of Data warehouse in BCSIR.

Mr Isiaka Abdulwahab
Federal College of Agriculture, Akure, Ondo State, Nigeria

Title: An ANN model for Predicting distance learning student performance

Abstract

Predicting student academic performance is very important to students because it gears them to perform better in their academic performance. Whether the performance is good or poor, it

challenges the students to give their best. This research paper proposes a mobile learning model to predict the performance of students engaging in distance learning program in higher institution in Nigeria using Artificial Neural Network. Distance Learning is a system of education characterized by physical separation between the teacher and the learner in which instruction is deliver through a variety of media including hardcopies and other ICTs to learner who have been denied the face-to-face formal education due to socio-economic, career, family and other circumstances. Artificial Neural Networks (ANNs) are the form of artificial intelligence which is based on the function of human brain and nervous system. Factors considers that affects the student performance in this research work includes the Cramming Ability, Assimilation Rate, Parent Education, Teaching Method, Family Issues and Instability, Peer Relationship, Learning Environment, Financial Strength and Performance in Secondary School. The result after evaluating the developed mobile application shows that it has high performance, fast loading time, attractive graphical user interface and good session length.

Dr Oluyemi Adetoyi
Department of Electrical and Electronic Engineering, University of Ibadan, Nigeria

Title: Hardware Implementation of Intelligent Wireless Surveillance

Abstract

There has been growing interest in autonomous surveillance systems. Many algorithms have been developed to detect targets and possibly analyse their behavior in order for necessary actions to be taken. Such actions could be an alert to nearby security agents or event video sent to a remote location. This work focused on development of a low cost autonomous surveillance system. The design consists of at least one robot surveillance agent and a control centre. The robot was equipped with camera and raspberry pi board to capture environment scene, process the video and store or transmit video frames to remote locations. The control centre for monitoring the robot was a personal computer but could be a mobile device too. In order to reduce storage and transmission requirement, the video frames can be analysed using various machine learning techniques. The incorporation of machine learning enables robot intelligent capability.

Mr Chiedu Edoamodu
House 46, Old Hogsback Ring Road, UFH Campus, South Africa

Title: Molecular identification of Bacteria laccase producers

Abstract

The cold marine temperate systems are a significant wellspring containing psychrophilic microorganism and which comprises of different nature of diversity of bio-discovery. With diversified activities performed by bacteria isolated from marine habitats and regardless of the few study, Marine organisms have premised the feet of this research. Marine sediments were sampled at Cove rock beach and Bonza bay beach, Eastern Cape, Province, South Africa. The samples were enriched with some aromatic compounds (CuSO4, 2, 6 Dimethoxy-phenol DMP, and Lignin) to selectively pulled out active bacteria biodegraders. Selected isolates were primarily screened for laccase potentials and applied for laccase production in broth fermentation

medium and oxidative activity was analyzed with substrate 2,2 Azinobis -3-ethylbenzothiazoline-6-sulphonic acid with other oxidative substrate Potassium ferrocyanoferrate PFC, syringaldazine, Guaiacol, 2,6 DMP, Î±-naphthol, and pyrogallol. Thereafter 16 S rRNA molecular identification of selected active laccase producers were analyzed. Results revealed marine habitat a reservoir for active proteobacteria of Enterobacter sp. Kamsi and Enterobacterasburiae ES1 which displayed sharp pigmentation on different aromatics substrate and of good oxidizing strength on the utilized phenolic substrates. The enzymatic catalytic unit measured on best-utilized substrates are 50.245 U/mL and 63.536 U/mL for ABTS, 20.115 U/mL and 20.07 U/mL respectively for PFC. They were also active on all other substrate measured which might be useful for bioremediation purposes and thereby reducing cost. In conclusion, marine habitat serves as a reservoir for an ideal bacteria candidate producing laccase best feet for remediation application.

Miss Tolulope Adebayo
Federal University of Technology, Akure, Ondo State, Nigeria

Title: Prescriptive Analytics for Publication Venue Recommendation

Abstract

Prescriptive analytics has been found to position data analytics in a more matured manner by optimizing decision making ahead of time in order to improve performance; and ideas on this are increasingly gathering interest in the research domain. One of the steps to effectively support decision making in this regard is recommendation provision. Publication venue recommendation provide answers to one of the major challenges of researchers while seeking to get their results or findings published in high-valued journals and conferences for easy dissemination and to maximize effects on future research. However, identifying suitable journals involves the combination of key parameters which is usually challenging for most researchers as it entails manual or use of traditional approaches. In this work, a recommendation model was developed using fuzzy logic technique to intelligently infer decision on suitable journal avenue for publication based on key parameters such as the cost of publishing, impact factor of a journal or rank of a conference, and the average duration of review. Experiments were carried out on real-world dataset obtained from DBLP and Aminer digital repositories. Results obtained from the evaluation of the system in terms of Accuracy, Precision, Recall and F1-Measure were 96.28%, 84.73%, 70.78% and 73.13% respectively which show that the system performs well and provides accurate recommendations.

Dr Abiola Ezekiel Taiwo
Department of Chemical Engineering, Faculty of Engineering, Landmark University, Km 4 Ipetu, OmuAran Road, PMB 1001, Omu-Aran, Kwara State, Nigeria.

Title: Data Science for Health-Tech Solution: Response To Covid-19

Abstract

The rapid spread pattern of coronavirus disease 2019 (COVID- 19) from human to human makes it a unique infectious disease. In the bid to combat this disease over the months, several data

have been gathered about its spread in different locations all over the world, for contact tracing, identifying symptomatic and asymptomatic cases, current and future epidemiological spread prediction, evaluating effectiveness of containment measures among others. Furthermore, while treating infected patients, healthcare workers have also accumulated data on symptoms of patients, death cases, CT scans, PCR results, hospitalized patients, and other situations. These data, provide a good basis for use by digital technologies to make worthwhile, quick, useful and effective decisions now and after the pandemic. Digital technologies are being used to support the public-health response to COVID-19 worldwide for population surveillance, case identification, contact tracing, and evaluation of interventions based on mobility data and communication with the public.

These rapid responses make use of billions of mobile phones, huge online datasets, connected devices, cheap computing resources, and advances in machine learning and natural language processing. In many countries, technologies with numerous applications have been developed. By improving on the existing facilities or creating new inventions, technologies allow the governments and health personnel to use intelligent approaches to overcome this pandemic. The future of public health is progressively more digital, and it is necessary for the alignment of international strategies for the regulation, evaluation, and use of digital techniques to strengthen pandemic management, and future-readiness for COVID-19 and other infectious diseases. Digital technologies cannot operate alone and this calls for the integration of existing public healthcare systems. Therefore, the spread of the COVID-19 pandemic has demonstrated the need for government, policymakers, and health organizations to accelerate the evaluation and adoption of digital technologies.

Mr Taiwo Olatunde
Member Computer Society of Nigeria

Title: Nigeria Paper Currency Serial Number Pattern Recognition System for Crimes Control.

Abstract

Only secured and conducive environment void of robbery, kidnapping, fake currency and all forms of insurgencies will foster production and distribution of goods, investment and saving that enhance national economic growth and development. This is a mirage in a country generally believed and tagged the giant of African; Nigeria. Crime, in whatever name or nomenclature, has a significant negative impact on the welfare and economy prosperities of our society. The urge to get rich promotes Crime like armed robbery, kidnapping for ransom and production of counterfeit banknotes to mention but a few. Innocent people have suffered psychological distress, fear, anger, depression, physical harm, financial loss and in most cases untimely death during the operations by these hoodlums. Banks, Cash-In-Transit Vehicle, and ATM points are often robbed by gangs in search for paper currency. Kidnappers as well demand for paper currency as ransom while some other gangs are involved in the production of counterfeit banknotes so as to enrich themselves no minding the negative effect on the nation's economy. The banknotes collected during the operations by the hoodlums are taken to banks. Yet, the banks will not detect or recognize any of these notes which attest to the fact that our system lacks check and balance. The system is very porous without a recourse to this era of technology when machine is trained to do virtually everything for our convenience. Currency as an entity has a

unique identification number. The identification number is an alphanumeric currency issuance of about 10 digits comprises two (2) capital letters and eight (8) numbers usually positioned at a strategic location on either front or back of the 5, 10, 20, 50, 100, 200, 500 and 1000 naira notes. It is a reliable and intelligent system developed to track banknotes unique identifiers numbers-serial numbers, in order to control financial related crimes.

Mr Abayomi Olawumi

Federal University of Technology, Along Ilesa / Owo Expressway; PMB 704. Akure, Ondo State, Nigeria

Title: Classification of Electricity Consumers into Bands using Energy Data and Exogenous Variables in Nigeria

Abstract

The Tariffs Structure of Electricity Distribution Companies (DISCOs) in Nigeria took a new twist September, 2020 as it adopted a new service plan called Service Reflective Tariff (SRT) plan. The plan whose implementation has commenced divides consumers into five (5) different service bands (Band A, B, C, D, E), each band having different number of hours of supply per day, charges and quality of service. The approach seems promising as it addresses issues such as: imbalance in the charges placed on consumers in relation to the service provided. However, the DISCOs classified the feeders under their franchise areas into these service bands through prior consultation with customers. This approach is inefficient and tedious. With the advent of smart meters, consumers energy data and other geo-demographic characteristics such household income, size, and wealth can be used in classification. This possibility provoked the development of a Power Load Sensing Device that will capture energy usage pattern of consumers for 8 months, with the goal to carrying out a predictive analysis on the data collected. The K-means clustering algorithm is to be adopted in categorizing consumers into any of the 5 clusters (Bands). The result aims at emphasizing that consumers can be classified using energy data which is smarter than method employed by the DISCOs.

Dr Halleluyah Aworinde
College of Computing & Communication Studies, Bowen University, Iwo, Nigeria

Title: Increasing Agricultural Productivity in Africa using Discriminative Deep Learning Models for farmland Bird Invasion Identification and Dispersal System

Abstract

Ever since the recognition of birds as hazard to farm produce, there has been serious interest in techniques and products that could control this hazard; several traditional bird invasion prevention systems have been adopted. However, the techniques applied so far have predominantly been manual, less effective due to the fact that the birds are able to recognize the artificiality of such devices. Bird dispersal model presented in this work was developed with 4000 subjects for training set and 3000 as test set using Python libraries (Tensorflow and OpenCV). Retinanet, YOLOV3 and Faster-Region based Convolutional Neural Network (F-

RCNN) deep learning algorithms were used for bird detection and their varying accuracy and time recognition rate were reported. Retinanet had an accuracy of 80.07% with average recognition time of 2286.87s while YOLO V3 had 76.27% with 165s and F-RCNN had accuracy of 87.68% with average recognition time of 3646.21s. Analysis of Variance (ANOVA) carried out to validate the result obtained revealed that in terms of accuracy, F-RCNN outperformed the other two algorithms while YOLO V3 happen to be the fastest of the three in terms of average recognition time. The model developed is able to identify pest birds and trigger sound alarms using predator sounds and ultrasonic sounds that are irritating and scary to birds. This model introduced a new way to automatic bird dispersal using deep learning object identification and thereby increasing agricultural productivity in Africa.

Dr Ebenezer Ajayi
Instituto Ferreyra, Av Velez Sarsfield, Cordoba, Argentina

Title: Antileishmanial efficacy of 4 African vegetal extracts

Abstract

In our work, we discovered that the vegetal extracts caused morphological transformations in the promastigotes. The amounts of the promastigotes were reduced compared to the untreated control in response to the challenge of the treatments, as observed under contrast microscope (inverted and confocal), and in UV spectrophotometer measurements. In a few cases, morphological changes to amastigotes were seen, whereas these did not return to the promastigotes, and may as well be on their way to cell death, however, we need to test the abilities of these amastigotes to infect macrophages. Now in this sense of interaction, we are concerned by what danger is posed by the transformation to amastigotes caused by the vegetal extracts when fibroblasts are exposed to these cell-free, morphologically transformed promastigotes?

Dr Adeyinka Abiodun
Bowen University Iwo, Iwo Osun State Nigeria.

Title:

Abstract

Malaria is a serious global health problem and it requires fast and effective diagnosis and classification of the type of infection. The Current malaria diagnosis relies primarily on microscopic examination of Giemsa-stained thick and thin blood films. One major challenge of this method is that, it requires vigorously trained technicians to efficiently detect and classify the malaria parasite species and also predict its severity levels of mild, moderate and severe. This paper present the classification of the Plasmodium falciparum based on severity level by applying the Neuro fuzzy rule based algorithm. The dataset is sourced from Federal Teaching Hospital, Ido-Ekiti, Nigeria. The Dataset contains 18 features extracted from thin blood smear from 500 patient observations. The dataset is divided into the training set and validation set. The analysis of the results compared with other machine learning methods shows significant improvement in accuracy and reliability.

Mrs Sadura Akinrinwa
Computer Science Department, Federal University of TechnologyAkure,Nigeria

Title: A study on Breast Histopathology Images Multi-Classification with Ensembles of Deep Convolutional Neural Networks.

Abstract

Breast cancers have constituted a major health challenge as a leading cause of mortality in women. Classification and analysis of breast histopathology images digitally provides a means for computerized-clinical diagnosis of breast cancers. In this study, a system based on an ensemble of Convolutional Neural Networks (CNNs) for the analysis and classification of histopathological images of breast tissue is presented. The proposed system seeks to extend the performance of existing CNNs by combining the scores using a voting rule. The CNN methods considered are used with different learning parameters to obtain an optimal training of each CNN and provide improved performance of the ensemble architectures on histopathology images classification. The classification architectures explored are CNN architectures; ResNet-34, ResNet-50, VGG-16 and VGG-19 which are pre-trained on ImageNet dataset. The CNN classifiers are trained separately, and are combined by a voting rule. The proposed system exhibits improved accuracy in comparison with the individual CNNs.

Dr. Mrs. Opeyemi Abisoye
Federal University of Technology, Computer Science Department, Nigeria

Title: Ensemble Feed-Forward Neural Network and Support Vector Machine for Prediction of Multiclass Malaria Infection

Abstract

Globally, recent researches are focusing on developing appropriate and robust algorithms to provide robust Health Care System that is versatile and accurate. Existing malaria models are plagued with low rate of convergence, over-fittings, limited generalization due to restriction to binary cases, proneness to local minimum errors due to complexity of features in the feature space which is black box in nature. This study adopts a stacking method of heterogeneous ensemble learning of Artificial Neural Network (ANN) and Support Vector Machine (SVM) algorithms to predict multiclass, symptomatic and climatic malaria infection. ANN produced a result of 48.33

Mr Oluwatobi Shadrach Akanji
Federal University of Technology, Minna, Nigeria

Title: Mitigating Slow Hypertext Transfer Protocol Distributed Denial of Service in Software-Defined Networks

Abstract

Availability of services hosted on a server is valuable to legitimate clients who want to access and utilise the service and attackers who seek to deny legitimate clients access to the resources.

In a bid to circumvent fast-rate DDoS attack detection and mitigation measures, attackers have resorted to slow DDoS which mimics the behaviour of a slow legitimate client. In this work, a machine learning based detection and a Selective Adaptive Bubble Burst (SABB) mitigation of slow Hypertext Transfer Protocol (HTTP) DDoS attack was examined in a Software-Defined Network (SDN). The SDN environment was simulated in Graphical Network Simulator-3 (GNS3) where the controller was used to collect attack and benign netflowflowsets for feature selection using Genetic Algorithm (GA) and attack detection using Radial Basis Function (RBF) kernel-based Support Vector Machine (SVM). Results obtained shows that the GA-SVM classification of netflowflowsets achieved an Area Under the Receiver Operating Characteristic Curve (AUC), Accuracy, True Positive Rate (TPR), False Positive Rate (FPR), and False Negative Rate (FNR) of 99.89%, 99.89%, 99.95%, 0.18%, and 0.05% respectively. Furthermore, the SABB mitigation mechanism achieved an average response time and percentage of completed request of 387.743 milliseconds (ms) and 92% respectively.

Mr Olubusade Adedayo
1, JareAlade street jericho/Idi-Ishin Ibadan, Nigeria

Title: A Fuzzy Logic Control of Automated Irrigation System

Abstract
Water is an essential resource for the growth of crops and plants in agriculture. Hence, it's important that water is conserved and made available to be consumed by plants and crops in due time. Manual irrigation system is simple and cheap but is more labour intensive and wastes water. As water is brought into the system manually, this requires high labor input, moreover it is important to check the systems regularly to improve the production and avoid water loss on the plantation and wasteful energy. Avoiding the problems fuzzy logic control automated Irrigation system is introduced. When the moisture level in the soil reaches below threshold value then system automatically triggers the relay to switch on the water pump. When the water level reaches normal level, the relay is triggered to switch off the water pump. Also the following readings will be sent to the farm manager or owner via SMS technology: the current soil moisture level, light intensity on the soil, soil temperature and humidity.

Mr Taiwo Fele
Computer Science Department, School of Computing, Federal University of Technology, Akure, Nigeria

Title: Digital Signal Classification using Spectral and Statistical Features in Wireless Communication and Cognitive Radio Network

Abstract
This paper presents digital signal modulation classifier based on Spectral and Statistical Features using support vector machine. The objective of this work is to design and implement an automatic digital signal classification technique for wireless communication and cognitive radio network (CRN) capable of classifying multiple digital signals simultaneously. The proposed work utilizes support vector machine (SVM) tool in MATLAB 2019a for the classification of BPSK, QPSK, 16QAM, 64QAM and OFDM digital modulation types. SVM maps the input vectors (radio frequency dataset) nonlinearly into a high dimensional feature space, constructs

the optimum separating hyper plane in that space and makes the non-separable data separable. Computer simulations of five digitally modulated signals corrupted by additive white Gaussian noise (AWGN) were carried out over a range of signal-to-noise-ratio (SNR) of 0 20dB. Simulations show satisfactory results even when evaluated at a signal-to-noise ratio (SNR) as low as 0dB. The proposed technique provides a promising solution and cost-effective classification technique for modulation types in next wireless communication and cognitive radio networks.

Dr. Oluwafemi Sarumi
Federal University of Technology, Akure, Nigeria

Dr. Emile Chimusa
University of Cape Town, Research & Innovation, South Africa Division of Human Genetics, Department of Pathology, Institute of Infectious Disease and Molecular Medicine, Faculty of Health Sciences, University of Cape Town, South Africa

Dr Bolanle Ojokoh
Federal University of Technology, Akure, Nigeria

Dr. Olatunji Omisore
Research Center for Medical Robotics and MIS Devices, Shenzhen Institutes of Advanced Technology, CAS, Shenzhen, China

NOT PRESENTING

Mr Rasaki Olanrewaju
JKUAT main campus, Juja, Nairobi, Kenya.

Mr Samson B
Federal University of Technology Akure, Ondo State, Nigeria

Title: A Machine Learning Approach for Selection of Trainees for Entrepreneurship Development

Abstract

Mr Uduakobong Mfoniso Umoren
Federal University of Technology Akure, Ondo State, Nigeria

Dr Chidiadi Ezenwa-Ahanene
Department of Haematology and Blood Transfusion, University of Port Harcourt Teaching Hospital, AlakahiaObio/Akpor L.G.A. Rivers State,Nigeria.

Mr Geofery Luntsi
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Title: A Yoruba-English Neutral network translation system

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Title: Bayesian spatio-temporal machine learning

Abstract

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Title: Omics Data Solutions

Abstract
Omics Data Solutions seeks to create value for its customers through state-of-the-art services and in custom (contract research/collaborative) projects. Omics Data Solutions combines cutting-edge, information-rich omics technologies with bio-computational applications to convert digital big omics data into scientific knowledge, clinical and pharmaceutical applications. Omics Data Solutions is leveraging a variety of external resources to create economies of scale and scope. This is a necessary antecedent for rendering cost-effective health care, diagnostic, through digital omics data sciences solutions in Africa. In so doing, Omics Data Solutions orchestrates available capacity in a networked fashion that facilitates agile responses to a wide range of needs and enables the rendering of customized solutions to the constituent user-base. The network approach also facilitates the creation and diffusion of knowledge â€“ a crucial prerequisite for innovation in the rapidly evolving both machine intelligence and Big digital omics arena. The target customers are the life sciences, both academia and industry, throughout the country, continent and world. Omics Data Solutions offers full-range Big Omics and biomedical data sciences and bioinformatics support services, accompanying client's project from the very beginning, i.e. by proposing an appropriate experimental design and Data analysis plan (i.e. Bioinformatics consulting services, machine learning tools development).