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1st International Conference and Research Showcase on Science, Technology & Innovation (ICRS-STI 2024)

November 18 – 20, 2024

BOOK OF ABSTRACTS

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A circular collage of various colorful microscopic organisms, including bacteria, viruses, and fungi, arranged in a circular pattern. The colors range from light blue and green to yellow and red.

**1ST INTERNATIONAL CONFERENCE AND RESEARCH
SHOWCASE ON SCIENCE, TECHNOLOGY AND
INNOVATION**

**ICRS-STI, 2024
COVENANT UNIVERSITY
NOVEMBER 18-20, 2024**

ADDENDUM

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ICRS-STI 2024

Covenant University, Ota Nigeria
November 18-20, 2024

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*“ Science, Technology and Innovation
for Translational Research and Sustainable
Development ”*

**BOOK OF ABSTRACT FOR THE 1st
INTERNATIONAL CONFERENCE AND**

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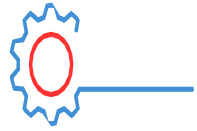
*INTERNATIONAL CONFERENCE AND RESEARCH SHOWCASE ON SCIENCE,
TECHNOLOGY AND INNOVATION*

**A Conference Held at the CUCRID
Conference Hall, Covenant University,
Ota Nigeria
*November 18-20th 2024***

Compiled and Edited by:
Obinna C. Nwinyi Ph.D



1ST INTERNATIONAL CONFERENCE AND RESEARCH SHOWCASE
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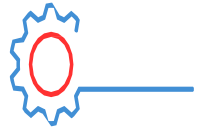


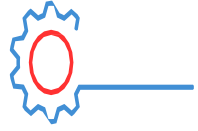
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PREDICTIVE EFFECTIVENESS OF DEEP LEARNING ALGORITHMS FOR METASTATIC PROSTATE CANCER AND LYMPH NODES ON PSMA PET SCANS

Oyelade O. Jelili and Anthony I. Micheal

¹Covenant University

P.M.B. 1023, Ota, Ogun State, Nigeria.

²Covenant Applied Informatics and Communication Africa Centre of Excellence (CApIC-ACE).

P.M.B. 1023, Ota, Ogun State, Nigeria.

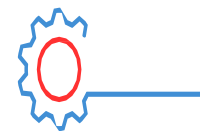
Corresponding Author : micheal.anthonypgs@stu.cu.edu.ng

Abstract

This review evaluated the predictive effectiveness of various deep learning algorithms in identifying metastatic prostate cancer and lymph node involvement on PSMA PET scans, an imaging modality known for its high sensitivity and specificity in prostate cancer detection. DL models, particularly Convolutional Neural Networks (CNNs), U-Nets, and Generative Adversarial Networks (GANs), offer advanced capabilities for interpreting these complex scans, potentially enhancing diagnostic accuracy and aiding treatment decisions. The study used a comprehensive search strategy across PubMed, Scopus, and Science Direct to identify relevant literature. Rigorous screening and eligibility criteria ensured that only studies evaluating DL models applied to metastatic prostate cancer on PSMA PET scans were reviewed. Data were also systematically extracted to capture; key performance metrics, algorithmic strengths, and each studies limitation. The study specifically examined how different DL models perform in key metrics like lesion segmentation accuracy, with certain U-Net variants achieving Dice Similarity Coefficients (DSC) between 0.38 and 0.79. These models show promise in detecting small and otherwise elusive metastatic lesions. Similarly, the aPROMISE platform, designed for automated segmentation and quantification, demonstrates strong inter-reader agreement and reproducibility, demonstrating its dependability for staging and tracking the course of disease.

However, the review identified significant limitations. For instance, Limited data generalizability and algorithmic variations, which are frequently impacted by single-center data sources and specific imaging techniques, cause performance variability in many DL algorithms. These differences restrict its clinical dependability in various healthcare settings. Therefore, standardized evaluation metrics, multicenter studies, and a variety of patient datasets are necessary for future research to solve this problem of limited model generalizability. Extending DL integration with PSMA PET imaging could have significant clinical advantages, but in order to facilitate broad implementation in prostate cancer diagnosis, improvements are needed to address present limitations in accuracy, repeatability, and model interpretability.

KEYWORDS: Deep Learning, Prostate Cancer, Metastasis, PSMA PET, Artificial Intelligence, Diagnostic Accuracy, Machine Learning, Medical Imaging



Evaluation of *Cymbopogon citratus* compounds interaction with selected insecticide resistance biomarkers in *Anopheles gambiae*

CLEANCLAY D. WISDOM^{1,2,3}, *BAJEPAD E. TOBILOBA^{1,2}, AKANNI H. MOSUNMOLA^{1,2},
AJEOGE K. JOSHUA^{1,2}, AZEEZ BLESSING^{1,2}, ADIGUN O. TEMIDAYO⁴, OGUNLANA O.
OLUBANKE^{1,2,3}

¹Department of Biochemistry, Covenant University, Ota, Ogun State, Nigeria

²Covenant Applied Informatics and Communication Africa Centre of Excellence, Covenant University, Ota, Ogun State, Nigeria

³Covenant University Public Health and Wellbeing Research Cluster (CUPHWERC), Covenant University, Ota, Ogun State, Nigeria

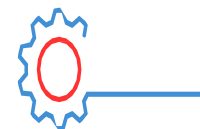
⁴Department of Biochemistry, Faculty of Life Sciences, University of Ilorin, Ilorin, Kwara State, Nigeria

Corresponding Author: tobiloba.bajepadepgs@stu.cu.edu.ng

Abstract

Background: The increasing concern of insecticide resistance in *Anopheles gambiae*, the primary malaria vector, continues to pose a substantial threat to malaria control programs in Africa, especially in Nigeria. Synthetic insecticides such as pyrethroids and carbamates face resistance limitations, disruption of natural biological systems and toxicities to non-target organisms, necessitating alternative control strategies. Many plant compounds from natural sources, such as *Cymbopogon citratus* (lemon grass), provide safer and more effective alternatives, owing to the rich presence of essential oils, demonstrating potential insecticidal effects. **Aim:** Hence, this study sought to perform *in silico* evaluation of the bioactive compounds present in *Cymbopogon citratus* against chitin synthase and L1014F paratype sodium channel, implicated in resistance of pyrethroid insecticide in *Anopheles gambiae*. **Methods:** Essential oils extracted from *Cymbopogon citratus* were separated using the Gas Chromatography-Mass Spectrometry (GC-MS) technique. The identified hit compounds were then respectively docked against a modelled L1014F paratype sodium channel and chitin synthase. The binding affinities were evaluated, clearly reflecting the capacities of some identified compounds to interact with the proteins. **Results:** The results showed that compound II, PubChem 52132-58-8 [Hexadecyl chloroacetate] exhibited a more negative binding energy of -4.209 against chitin synthase compared to Diflubenzuron (standard) which had -4.087. Phyto compounds docked against the L1014F paratype sodium channel did not yield sufficient hits greater than the standard. **Conclusion:** It may, therefore, be concluded that certain compounds present in lemon grass extract possess a high potential for alternative control strategies against *Anopheles* mosquitoes. However, further *in vitro* and *in vivo* studies are recommended for more validation of the virtual data generated for the current evaluation, emphasizing the ongoing research in the field.

Keywords: *Anopheles gambiae*, *Cymbopogon citratus*, Essential oils, Pyrethroids, Synthetic insecticides.



***In silico* analysis of *Jatropha tanjorensis* GC-MS fingerprint interaction with glutathione S-transferase and pyrethroid hydrolase in mosquito**

Cleanclay D Wisdom^{1,2,3}, Ajeoge K Joshua^{1,2*}, Bajepade I Tobiloba^{1,2}, Akanni H Mosunmola^{1,2}, Adigun O Temidayo⁴, Ogunlana O Olubanke^{1,2,3}

¹Department of Biochemistry, Covenant University, Ota.

²Covenant Applied Informatics and Communication-Africa, Center of Excellence (CApIC-ACE), Covenant University, Ota.

³Covenant University Public Health and Wellbeing Research Cluster (CUPHWERC), Covenant University, Ota, Ogun State, Nigeria

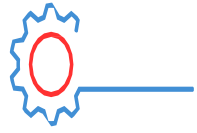
⁴Department of Biochemistry, Faculty of Life Sciences, University of Ilorin, Ilorin, Nigeria

Corresponding author: joshua.ajeoge@stu.cu.edu.ng

Abstract

Background: Insecticide resistance, largely due to enzymatic mechanisms detoxifying insecticide, presents a major obstacle in controlling malaria transmission. The toxicity of available insecticides to humans and other non-target organisms has necessitated the exploration of new approaches, such as plant-based insecticides. **Aim, Materials and Methods:** This study investigated the potential of bioactive compounds from *Jatropha tanjorensis*, identified through GC-MS analysis, as alternative agents for managing mosquito resistance. The interactions between selected active compounds in *J. tanjorensis* and two proteins implicated in insecticide resistance, glutathione S-transferase e2 (GSTe2) (PDB ID: 3ZML) and pyrethroid hydrolase (PH) (PDB ID: 5Y5R), using molecular docking techniques were explored. **Results and Conclusion:** The docking results revealed that all compounds screened exhibited stronger binding affinities with GSTe2 than the standard inhibitor, Butylated Hydroxyanisole. Considerably, strong binding affinities with PH were also identified in several compounds, though less than the co-crystal, suggesting possible inhibitory effects on resistance pathways. Notably, Cinerin II (PubChem CID:5281548) and 2-methyloctadec-7-yne (PubChem CID:118810) showed favorable interactions with GSTe2 and PH active sites, indicating their potential to disrupt detoxification processes in resistant mosquitoes. These findings highlighted *J. tanjorensis* as a promising source of natural compounds for mosquito control, offering an alternative approach to counteract resistance and enhance the efficacy of vector management strategies.

Keywords: *Anopheles* mosquitoes, Glutathione S-transferase (GST), Insecticide resistance, *Jatropha tanjorensis*, Pyrethroid hydrolase.



Pathology Meets AI: Convolutional Neural Networks for Breast Cancer Detection

TITILOPE M. DOKUNMU^{1,3} *FAITH C. NNAJI^{1,3}, GEORGE, OLUWATOBILOBA^{2,3}, MERCY BELLA-OMUNAGBE^{1,3}, & ADEBAYO ENIOLA^{1,3}

¹ DEPARTMENT OF BIOCHEMISTRY, COLLEGE OF SCIENCE AND TECHNOLOGY, COVENANT UNIVERSITY, OTA, OGUN STATE, NIGERIA.

² DEPARTMENT OF COMPUTER SCIENCE, COLLEGE OF SCIENCE AND TECHNOLOGY, COVENANT UNIVERSITY, OTA, OGUN STATE, NIGERIA.

³ COVENANT APPLIED INFORMATICS AND COMMUNICATION - AFRICA CENTRE OF EXCELLENCE (CAPIC-ACE), COVENANT UNIVERSITY, OTA, OGUN STATE, NIGERIA.

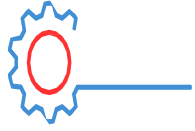
*Corresponding author : faith.nnajipgs@stu.cu.edu.ng

Abstract

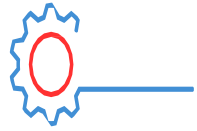
Background: Breast cancer is a leading cause of cancer-related deaths globally. While histopathology imaging is vital for early detection, it is labour-intensive and subjective. **Aim:** This study developed a Convolutional Neural Network (CNN) model to automate the classification of breast histopathology images into cancerous and non-cancerous categories, facilitating early diagnosis. **Materials and Methods:** A dataset of 1,000 breast histopathology images (65.2% cancerous, 34.8% non-cancerous) was used. The CNN consisted of seven layers, including two convolutional layers (32 filters each), followed by max-pooling and dropout layers to reduce overfitting. The dense layer included 256 neurons, with the final output layer designed for binary classification. The model, comprising 682,306 trainable parameters, was trained over 20 epochs. For comparison, the dataset was also tested using traditional models: K-Nearest Neighbours (KNN), Random Forest, Logistic Regression, and Support Vector Machines (SVM). **Results:** The CNN achieved 85% accuracy, demonstrating its potential for automated breast cancer detection. Traditional models outperformed the CNN on this dataset, with SVM and Logistic Regression achieving the highest accuracy of 98.24%, followed by Random Forest (96.49%) and KNN (96.24%). **Conclusions:** CNN-based image analysis shows promise as a diagnostic support tool for breast cancer detection. However, further improvements, including larger datasets and optimization techniques, are necessary for clinical application. Hybrid approaches combining CNNs with traditional models could enhance diagnostic accuracy in future studies.

Keywords: *Breast cancer, Histopathology, Diagnosis, Deep Learning, Convolution Neural Network*

Title of Sub-Theme (Applied Mathematics, Machine Learning and Artificial Intelligence (AI) for sustainability.)



**SUBTHEME: SUSTAINABLE BUILT ENVIRONMENT AND
URBAN DEVELOPMENT**



A Pedagogical Review of Intellectual Property Valuation in Nigeria

*IBISOLA A. SOLOMON^{1,2}, AYEDUN C. ABIODUN², OLOKE O. CLEMENT², ONI A. SAMSON²

¹*Department of Estate Management, Covenant University, Ota, Ogun State, Nigeria.*

²*Department of Estate Management and Valuation, Moshood Abiola Polytechnic, Abeokuta, Ogun State, Nigeria.*

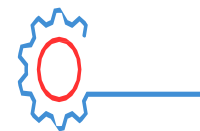
*Corresponding Author: abayomi.ibisolapgs@stu.cu.edu.ng

Abstract

Background: The curricular for the award of degrees on Estate management in the Nigerian Universities and Polytechnics are designed to provide adequate coverage of job requirements for the trainee when they graduate and practice the profession. Inadequate training and experience have been identified as constraints to opinion of valuers' when commissioned to determine the worth of assets either for individual or corporate property owners for various purposes. **Aim, Materials and Methods:** The study examined the curricula of tertiary and professional training institutions offering courses in Estate management in Lagos State with a view to determine the extent at which subject matter of Intellectual Property (IP) valuation are covered in their curricula. In this study, efforts were made to review the curricula of a Federal University – University of Lagos (UNILAG), Federal Polytechnic – Yaba College of Technology (YABATECH), State Owned Polytechnic – Lagos State Polytechnic (LAGOSPOLY) and a private professional training institution – Reals Academy; to determine the extent at which IP valuation are been taught in their institutions using contents analysis. **Results and Conclusion:** Findings showed that none of the reviewed curricula of valuation courses in all the training institutions sampled included valuation of IP in their course contents. The only closely related topic was valuation of goodwill which was available in EST 329 (Valuation II) at HND I of the polytechnic. The study therefore suggested that there should be a review of valuation curricula to include valuation of IP. Professional bodies such as Nigerian Institution of Estate Surveyors and Valuers (NIESV) should intensify efforts on the training of their members on valuation of IP through CPD and workshops. It is also proposed that NIESV in conjunction with ESVARBON should establish special institute for the training of IP Valuers.

Keywords: IP, Valuation, Curricula, Estate Management, NIESV.

Title of Sub-Theme: Sustainable Built Environment and Urban Development



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