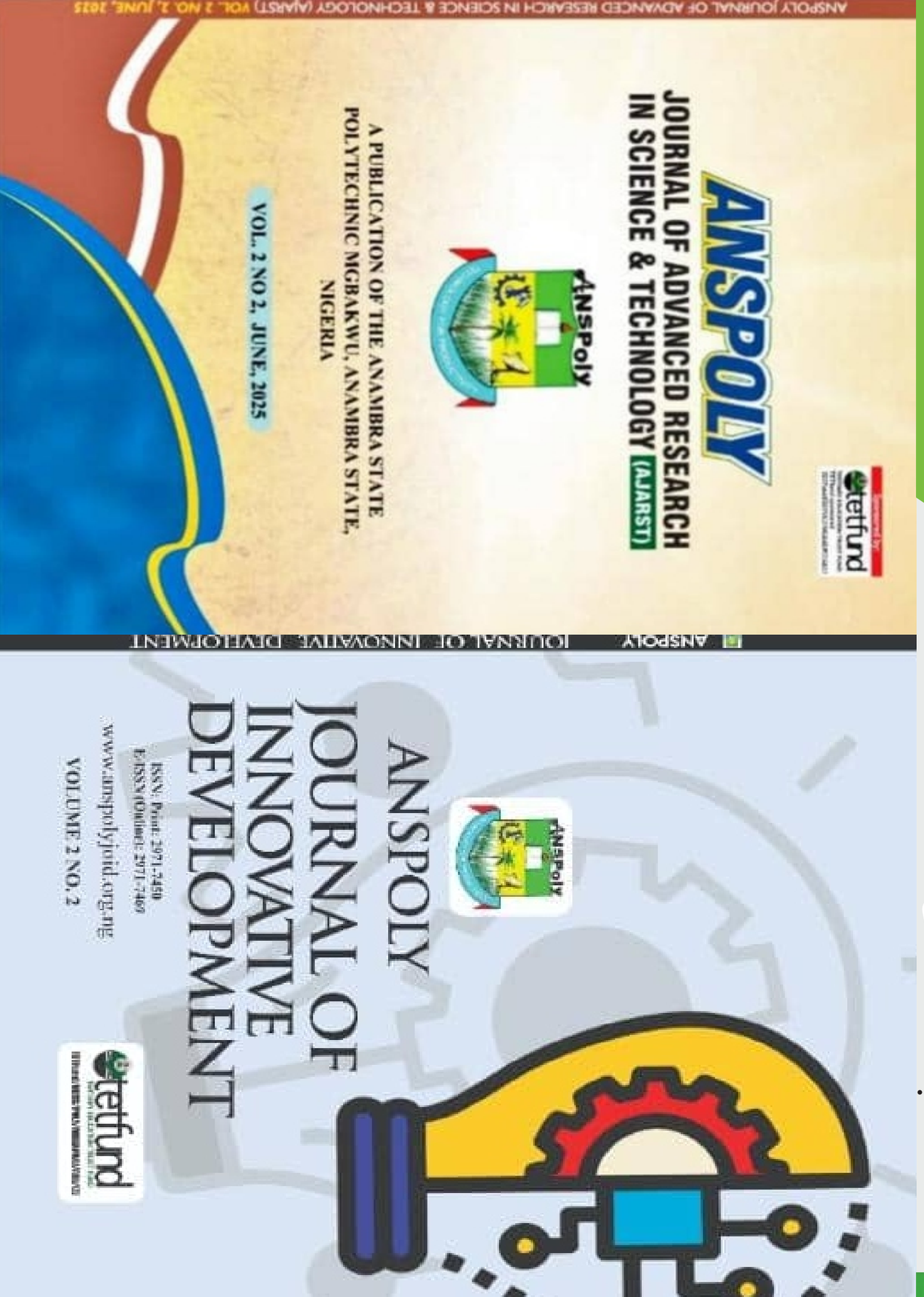


ANAMBRA STATE POLYTECHNIC (ANSPOLY) MGBAKWU

IN COLLABORATION WITH NIGERIAN INSTITUTE OF MANAGEMENT (CHARTERED) ANAMBRA STATE BRANCH

Presents

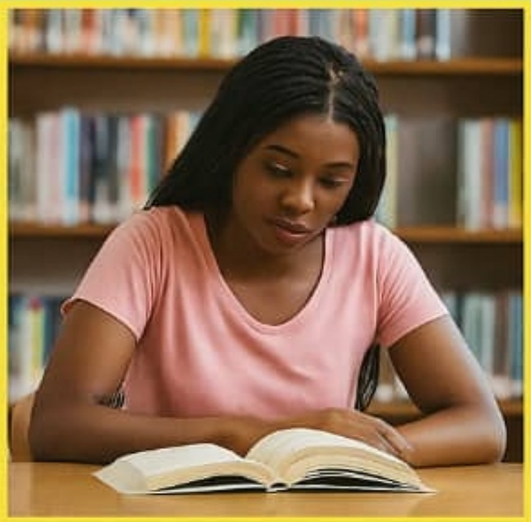
4TH INTERNATIONAL MULTI-DISCIPLINARY HYBRID CONFERENCE 2025

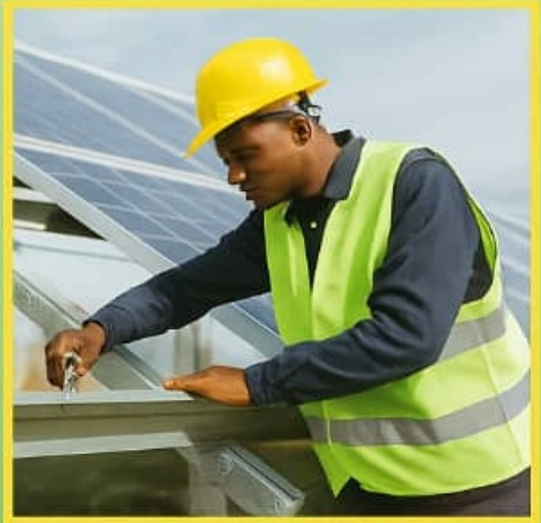
THEME: LEVERAGING ARTIFICIAL INTELLIGENCE FOR TRANSFORMATIVE EDUCATION: PATHWAYS TO SUSTAINABLE DEVELOPMENT

Date: Wednesday 8th - Friday 10th October 2025

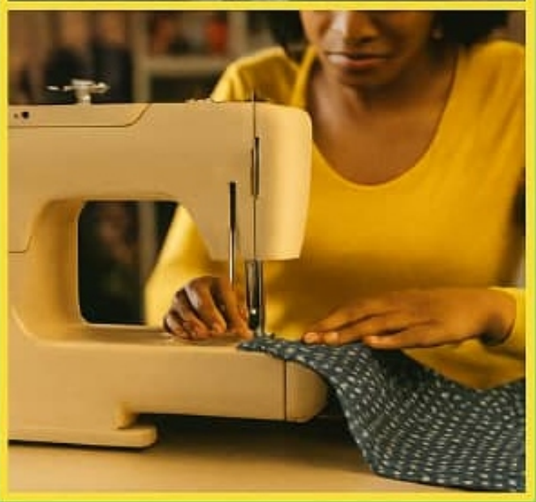
DANIEL EJIKE EWIM
— FOUNDATION —

EDUCATIONAL SUPPORT AND EMPOWERMENT

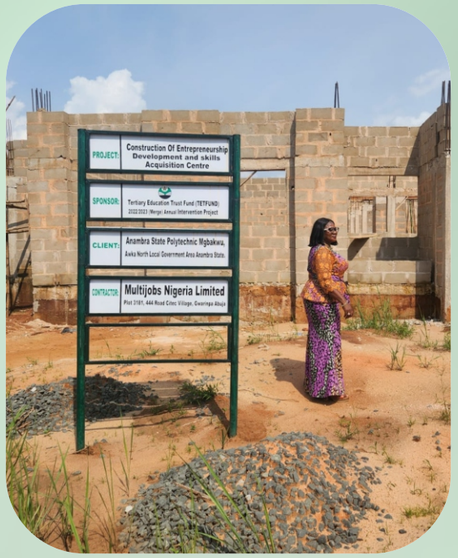


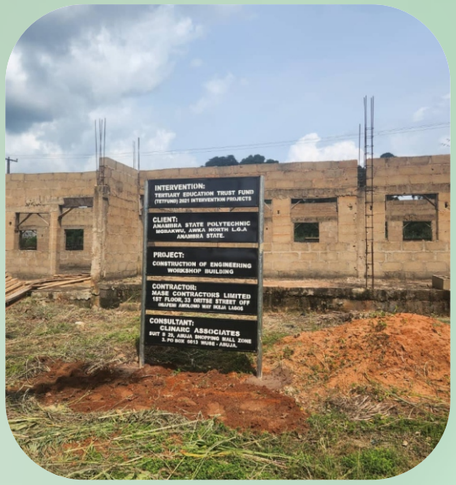


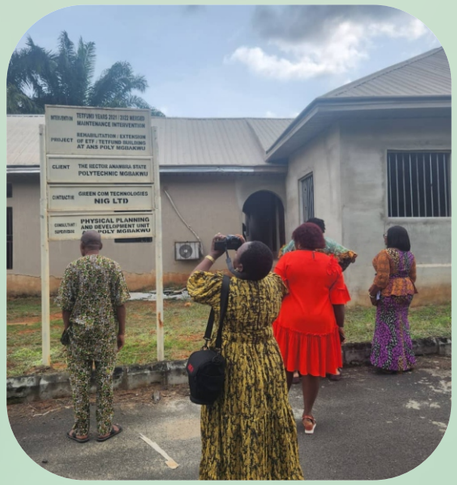
Providing scholarships, educational assistance, and support for start-up businesses.



TETFUND PROJECT INSPECTION BY THE AG. RECTOR







ANSPOLY Ag. Rector and others visited the tefund project site for a site inspection

Programme of Events

DAY ONE - 8TH OCTOBER, 2025

1) Arrival and Registration

DAY TWO - 9TH OCTOBER, 2025

1) Introduction by the Mc
2) Anthem
3) Prayers
4) Recognition Of Guests
5) Opening Remarks By The Chairman
6) Address By Ag. Rector
7) Breaking Of Kolanut
8) Address by the LOC Chairman
9) Address by the Chairman NIM
10) Presentation by the Guest speaker
11) Presentation by the key note speaker
12) Presentation by lead presenters
13) Comments
14) Goodwill Messages
15) Musical Interlude Awards/ Citations
16) Responses
17) Closing Remarks / Group Photographs/ Interview/ Lunch First Breakout Session Technical Sessions

DAY THREE - 10TH 0CTOBER, 2025

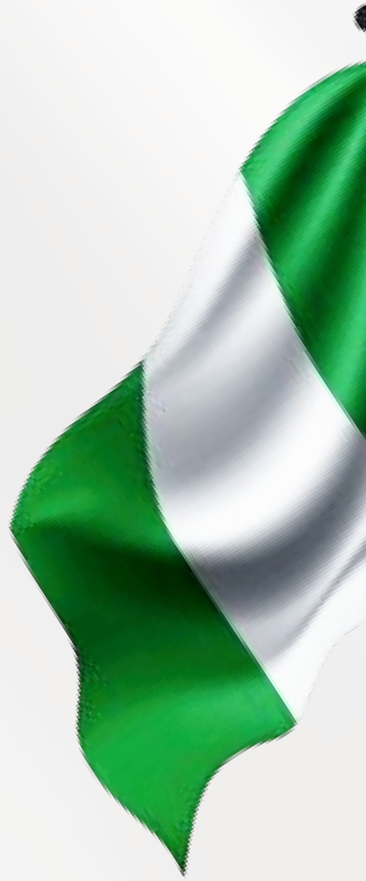
1) Arrival
2) Introduction
3) Breakout Technical Sessions
4) All Conference Luncheon
5) Departure

NATIONAL ANTHEM

Nigeria we hail thee,
Our own dear native land,
Though tribe and tongue may differ,
In brotherhood, we stand,
Nigerians all, and proud to serve
Our sovereign Motherland.
Our own dear native land,
Though tribe and tongue may differ,
In brotherhood, we stand,
Nigerians all, and proud to serve
Our sovereign Motherland.
Our flag shall be a symbol
That truth and justice reign,
In peace or battle honour'd,
And this we count as gain,
To hand on to our children
A banner without stain.
O God of all creation,
Grant this our one request,
Help us to build a nation
Where no man is oppressed,
And so with peace and plenty
Nigeria may be blessed.

NATIONAL PLEDGE

I pledge to Nigeria my Country
To be faithful, loyal and honest
To serve Nigeria with all my strength
To defend her unity
And uphold her honour and glory
So help me God.



ANAMBRA STATE ANTHEM

With all our hearts
We pray and ask
God bless Anambra
God bless the shining light that we bear
We are the only ones to make her brighter
The ones to make her better
The only ones to make Anambra shine
With our sweat and blood, Every breath of our lives
With trust in God
We would lift our homeland high
We believe in togetherness
We'll build a land of progress
Lift the spirit of Anambra
Lift the spirit of Anambra
Lift the spirit of Anambra, State we love.

ANSPOLY ANTHEM

Verse 1
In the heart of Mgbakwu, we rise so high,
A beacon of learning, under the sky.
With hands and minds, we build and strive,
Anambra Poly, where dreams come alive.

Chorus
Anambra Poly, our pride, our flame,Together we shine, in honor and name.With courage and wisdom, we'll lead the way,Anambra Poly, forever we'll stay!

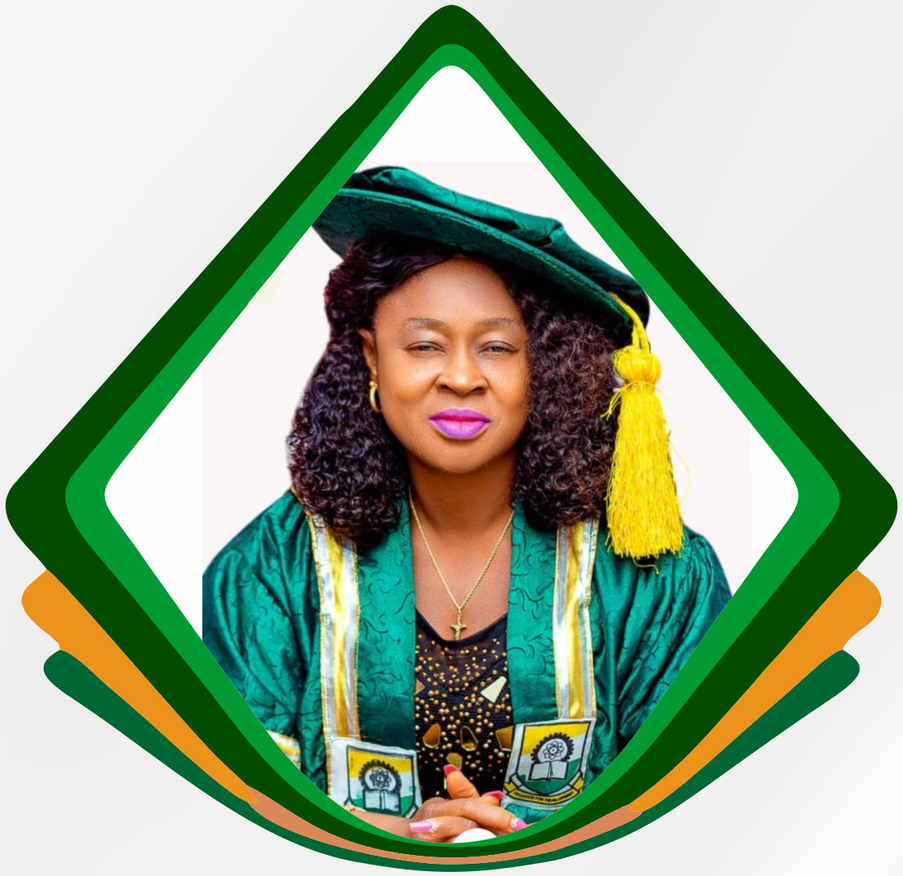
Verse 2
Through knowledge and skill, we shape our land,
Empowered by vision, we take a stand.
For progress and growth, we'll always fight,
Anambra Poly, our guiding light.

Chorus
Anambra Poly, our pride, our flame,
Together we shine, in honor and name.
With courage and wisdom, we'll lead the way,
Anambra Poly, forever we'll stay!

HIS EXCELLENCY PROF. CHARLES CHUKWUMA SOLUDO

EXECUTIVE GOVERNOR OF ANAMBRA STATE

(SPECIAL GUEST OF HONOUR)



PROF. NGOZI CHUMA-UDEH

HON. COMMISSIONER FOR EDUCATION

GUEST OF HONOUR

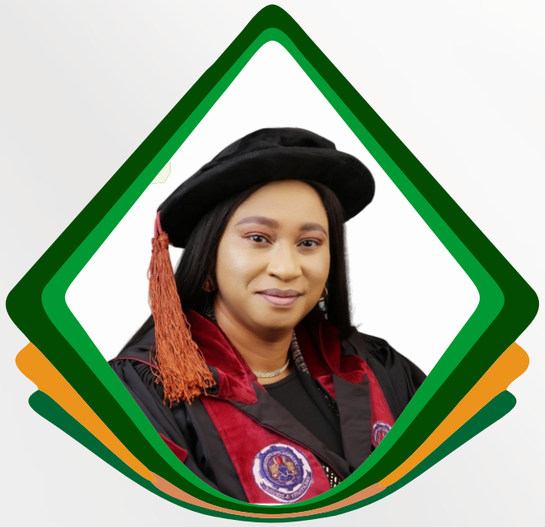
DR NJIDEKA RITA CHIEKEZIE AG. RECTOR,

ANAMBRA STATE POLYTECHNIC MGBAKWU.

CHIEF HOST 1

DCN MARTINS MMONEKE, FNIM
BRANCH CHAIRMAN NIGERIA INSTITUTE OF MANAGEMENT (CHARTERED) ANAMBRA STATE
CHIEF HOST 2

KEY NOTE SPEAKER



DR. CHIOMA IRENE AWUZIE FCSN,FICCON, FCAI, JP,
RECTOR, FEDERAL POLYTECHNIC OKO

GUEST SPEAKER

DR. AKINOLA DOSUNMU
Center of Engineering Education and Gender Studies. Plain City, Ohio U.S.

LEAD PRESENTER 1

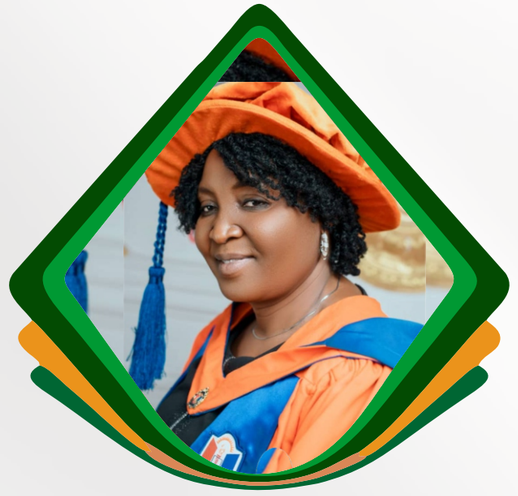
VEN PROF ANAYO NKAMNEBE
Zonal Vice Chairman South-East (NIM)

LEAD PRESENTER 2

DR IKECHUKWU INNOCENT UMEH FNCS, FIPMD

PRINCIPAL OFFICERS OF ANAMBRA STATE POLYTECHNIC

DR. NJIDEKA RITA CHIEKEZIE
AG. RECTOR

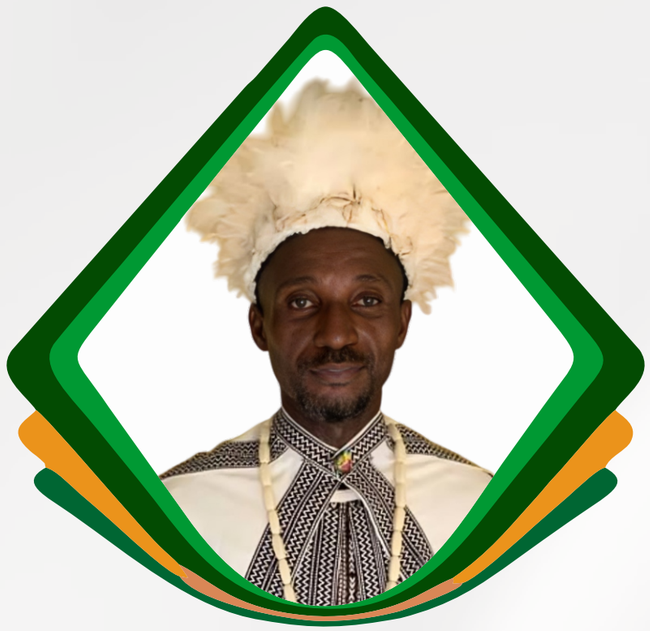


DR. (MRS) UDALLA EDITH NKECHI
AG. REGISTRAR,

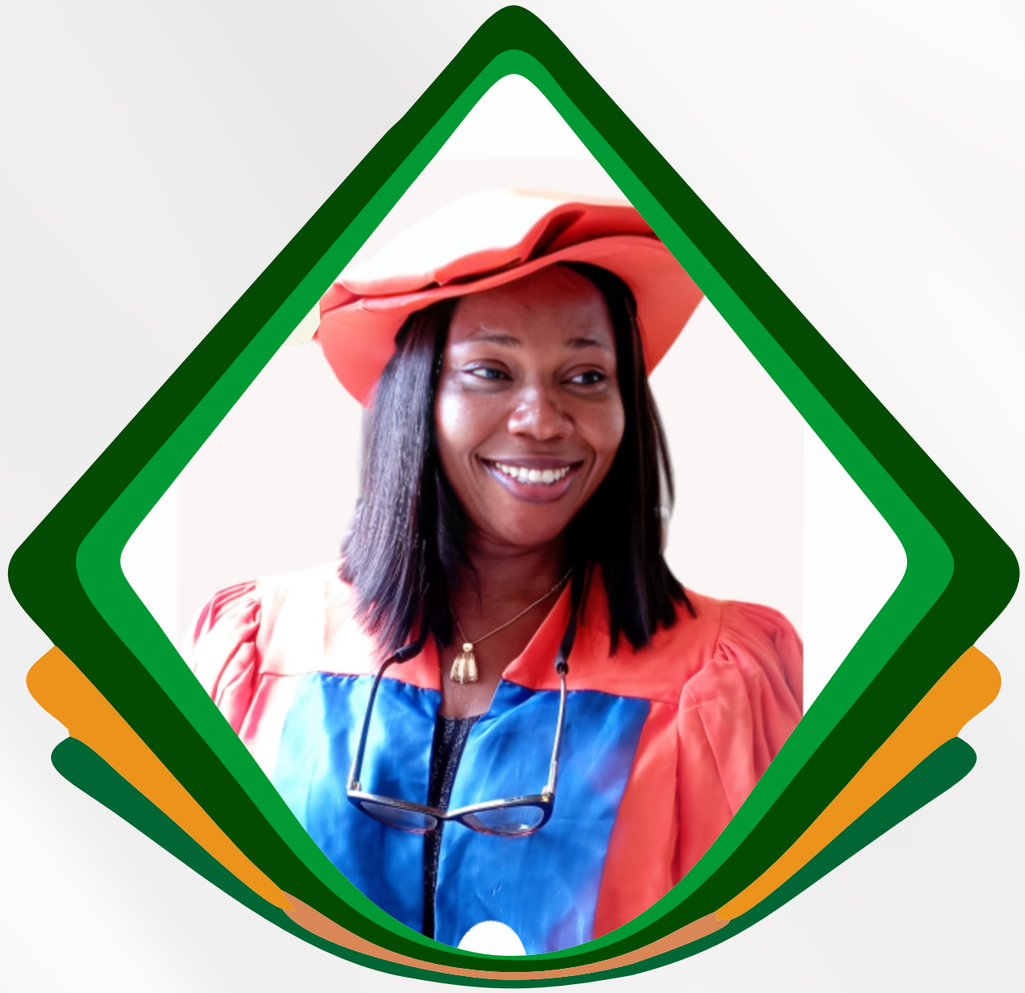
MR CLIFF N. NWOGWUGWU
AG. LIBRARIAN

MR. TOBECHUKWU FRANCIS ONWUGBUFOR
AG. BURSAR

PROF.P.V.C. OKOYE
CHAIRMAN OF THE OCCASION



HRM CHUKA AMEKE
IGWE IFEADIGO I OF ANSPOLY
ROYAL FATHER OF THE DAY



UZONDU CHIKODIRI SCHOLASTICA PH.D (FICP)
CHAIRMAN LOCAL ORGANISING COMMITTEE (LOC)

LOC MEMBERS

UZONDU CHIKODIRI SCHOLASTICA Ph.D (FICP)
CHAIRMAN LOC

DR. EKENE NWANKWO (JP), MNIM
CHAIRMAN PUBLICITY/ PUBLICATION

DR. C.C. ACHONYE
CO-CHAIRMAN FUNDRAISING COMMITTEE

DR. VIVIAN CHIOMA AJAKPO
CHAIRMAN EDITORIAL

MRS MMADUEKWE BLESSING C
LOC SECRETARY

ENGR JOHN NWOYE
HEAD ICT

ENGR ODOGWU UGOCHUKWU CHINEDU
CHAIRMAN LOGISTICS SUBCOMMITTEE

A WELCOME ADDRESS PRESENTED BY THE ACTING RECTOR, DR. NJIDEKA RITA CHIEKEZIE AT THE OPENING CEREMONY OF THE 4TH INTERNATIONAL MULTI-DISCIPLINARY ACADEMIC CONFERENCE OF ANAMBRA STATE POLYTECHNIC, (ANSPOLY) MGBAKWU.

Distinguished Guests,
Esteemed Keynote Speakers,
Dynamic Scholars and Researchers,
Reputable Members of the Academic Community,
Gentlemen of the press
Ladies and Gentlemen,

It is with great pleasure and a profound sense of pride that I welcome you all to the 4th International Multi-disciplinary Academic Conference hosted by our esteemed Institution, Anambra State Polytechnic, Mgbakwu. Your presence here today is a testament to the spirit of intellectual curiosity, collaboration, and innovation that lies at the heart of global academic advancement.

Allow me to begin by acknowledging the monumental strides we have taken since the inception of this conference series. The 1stANSPOLY International Interdisciplinary Conference, held in 2019 with the theme: “Emerging Global Challenges; Sustainable Paradigms for Development”,marked a significant milestone for our Institution. It brought together academics and professionals from across the country and provided a robust platform for cross-disciplinary engagement. That inaugural conference laid the foundation for what has now become a tradition of excellence. Building on that success, the 2ndand 3rdMulti-disciplinary International Academic Conference, held in 2021 and 2024 respectively, exceeded all expectations. We saw an even wider participation of scholars from across the country both physically and virtually. The conferences spurred numerous collaborative research projects, leading to the publication of same in our ANSPOLY journal.

Today, as we gather for the 4thedition, we do so in a world that continues to evolve rapidly, demanding innovative responses to complex challenges. This year’s theme, “Leveraging Artificial Intelligence for Transformative Education: Pathways to Sustainable Development”, reflects our collective aspiration to explore the transformative potential of Artificial Intelligence in education and its impact on sustainable development. In today’s rapidly evolving world, Artificial Intelligence is revolutionizing the way we learn, teach, and interact. This conference provides the platform for us to share knowledge, exchange ideas, and collaborate on harnessing AI’s power to drive education transformation and sustainable development.

We are especially honoured to host such a distinguished gathering of thought leaders, practitioners, and emerging scholars. Your diverse perspectives and contributions will no doubt enrich our deliberations and inspire transformative ideas that go beyond the walls of academia into the realms of policy, industry, and society.

I would like to express my sincere appreciation to the Organizing Committee, our partners, sponsors, and all volunteers whose tireless efforts have made this conference possible. Your dedication continues to uphold the high standards this conference has become known for.
In closing, I encourage all participants to fully engage, share generously, and explore potential collaborations. May this conference not only meet your expectations but exceed them, as we collectively shape the future of academic inquiry and societal development. Once again, welcome to Anambra State Polytechnic, Mgbakwu, the Polytechnic of the moment.
Thank you.

WELCOME ADDRESS BY THE CHAIRMAN, LOCAL ORGANIZING COMMITTEE

Distinguished Ladies and Gentlemen, esteemed scholars, researchers, professionals, and students.
It is with great joy and honor that I warmly welcome you all to the 4th International Multi-Disciplinary Hybrid Conference 2025, hosted by Anambra State Polytechnic (ANSPOLY), Mgbakwu, in collaboration with the Nigerian Institute of Management (Chartered), Anambra State Branch.

Our theme**: Leveraging Artificial Intelligence for Transformative Education: Pathways to Sustainable Development,**
highlights the urgent need to embrace innovation in shaping the future of learning. Artificial intelligence offers us new opportunities to break barriers, enhance access, and reimagine the quality of education in our communities and beyond.
This conference is more than a gathering of minds; it is a call to action. It invites us to examine how AI can be harnessed not as a replacement for human intellect and creativity, but as a tool that empowers educators, inspires students, and bridges gaps in access, equity, and quality
I want to express my sincere gratitude on behalf of the organizing committee to all of the participants, both those who joined virtually and those who were in person, as well as to our partners and sponsors. This conference will be significant and unforgettable because of your dedication, suggestions, and contributions.

I encourage everyone to engage actively in the sessions, share insights generously, and explore opportunities for collaboration across disciplines. Together, we can ensure that the promise of artificial intelligence truly translates into transformative education for our communities, our nation, and the global society.

With great pleasure, I welcome and thank you for being part of this important meeting.
Thanks, and God bless you.

WELCOME ADDRESS BY THE BRANCH CHAIRMAN, NIGERIAN INSTITUTE OF MANAGEMENT (CHARTERED), ANAMBRA STATE, DEACON MARTINS S. MMONEKE, FNIM, AT THE 4TH INTERNATIONAL MULTI-DISCIPLINARY HYBRID CONFERENCE, 2025, ORGANIZED BY ANAMBRA STATE POLYTECHNIC, MGBAKWU IN COLLABORATION WITH THE NIGERIAN INSTITUTE OF MANAGEMENT (CHARTERED), ANAMBRA STATE BRANCH HOLDING AT THE MULTI-PURPOSE HALL, ANSPOLY, MGBAKWU, ANAMBRA STATE, 8TH – 10TH OCTOBER 2025.

Protocol:
It is with great pleasure and a deep sense of humility that I welcome you all to this remarkable 4th International Multi-Disciplinary Hybrid Conference, 2025, jointly organized by the Anambra State Polytechnic, Mgbakwu, and the Nigerian Institute of Management (Chartered), Anambra State Branch.
This year's conference with the theme, "Leveraging Artificial Intelligence (AI) for Transformative Education: Pathway for Sustainable Development in Education", is timely, thought-provoking, and crucial. As we navigate an era of accelerated digital innovation, Artificial Intelligence is no longer a distant concept, it is here with us, reshaping how we generally teach, learn, manage Institutions, and drive educational outcomes. This theme speaks directly to the urgent need for intentional integration of AI into education systems, particularly in emerging economies such as ours.
At the Nigerian Institute of Management (Chartered), our mission to promote excellence in management, leadership, and ethical governance continues to guide our partnerships and programs. We firmly believe that the transformation of any sector, especially education, begins with sound management practices anchored in innovation and strategic foresight.
We are deeply honoured to co-host this academic and professional convergence with Anambra State Polytechnic, Mgbakwu, under the amiable, competent leadership of Dr Njideka Rita Chiekezie, the Acting Rector, who wholeheartedly accepted and embraced this collaboration. The Polytechnic has continued to demonstrate commendable commitment to academic excellence, research innovation, and community empowerment.
To our International and National guests, we say Nnoo nu, meaning welcome to Anambra State, the Light of the Nation. We are thrilled to have you here and look forward to the cross-cultural and cross-disciplinary perspectives you will bring to this gathering.
To the organizing committee, I extend my heartfelt appreciation for your vision, dedication, and hard work in making this conference a reality. Your efforts have created a platform where minds can meet, ideas can flourish, and meaningful collaborations can begin.
I encourage all participants to be expectant, take full advantage of this opportunity to engage deeply in the keynote sessions, breakout discussions, and networking avenues. Let us use this space to share knowledge, challenge paradigms, and pave the way forward for sustainable, tech-driven education systems across Anambra State, Nigeria and beyond.
As we deliberate over the coming days, may our conversations inspire bold action, foster enduring partnerships, and spark the transformative change we wish to see in our educational landscape. The Nigerian Institute of Management (Chartered) Anambra State Branch remained resolutely determined to partner with any Government agency, Tertiary Institution and Organisations for excellent conference and management training.
Once again, on behalf of the Nigerian Institute of Management (Chartered), Anambra State Branch, I warmly welcome you all and wish everyone a fruitful and impactful conference.
Thank you and God bless.

Awards

MR OBINNA SUNDAY EJIANYA (SMOG)

Mr. Obinna Ejianya is a Nigerian-born entrepreneur, ICT expert, media publisher, and philanthropist. He hails from Mgbakwu, Awka North, Anambra State. Educated in Singapore and Australia, he has built a career in ICT, international business, and media.He is the founder of Obix Technology and Global Success International, and the publisher of 9News Nigeria, a leading media platform with wide national and international reach.Beyond business, he is a passionate humanitarian, supporting education, entrepreneurship, and community development. In recognition of his impact, he was honoured as Anambra Media Person of the Year and currently serves as National Vice-President of IPAN.

PROFILE OF DR. CHIOMA IRENE AWUZIE, FCSN,FICCON, FCAI, JP, RECTOR, FEDERAL POLYTECHNIC OKO

Dr. Chioma Irene Awuzie is a renowned scholar, researcher, visionary administrator and distinguished chemist. Born on July 20th 1973 in Enugu, she hails from Ihiala in Ihiala LGA and is married to Ukpor in Nnewi South LGA,both in Anambra State. A specialist in Physical and Materials Chemistry, Dr. Awuzie holds a PhD from Chukwuemeka Odumegwu Ojukwu University, Uli, along with an M.Tech in Production Technology and a B.Sc in Science Technology (Chemistry/Biochemistry) from Nnamdi Azikiwe University, Awka. She is a Fellow of the Chemical Society of Nigeria (FCSN), Fellow Institute of Chartered Chemists of Nigeria (FICCON), and Fellow Institute of Corporate Administration of Nigeria (FCAI). Her contributions to scientific research span over 28 journal articles, 34 conference papers, and 11 authored books in chemistry and related fields. Dr. Awuzie has been recognized globally for her academic excellence, including the Best Paper Presenter Award at the International Conference on Science, Technology, and Management (Oxford, UK, 2015). She is also a recipient of multiple awards for her philanthropic and academic contributions. With over 22 years of teaching experience, Dr. Awuzie, prior to her appointment as rector, was a Chief Lecturer in the Department of Science Laboratory Technology at Federal Polytechnic, Oko. She has played key roles in academic leadership, curriculum development, and interdisciplinary research in chemistry, renewable energy, and sustainable development. Her research contributions include presentations at international conferences across Nigeria, the UK, USA, India, Canada, Thailand, and Cameroon, covering areas like cement production, water sustainability, and cooperative instructional strategies in chemistry education. She has also conducted comparative evaluations of metal contents in edible oils, enhancing food safety awareness. She has attended and presented at over 35 international and national conferences, seminars, and workshops, including the 46th Annual International Conference of the Chemical Society of Nigeria, the TETFUND Research for Impact Workshop, and the International Conference on Renewable Energy in Canada.

Before her appointment as Rector by President Bola Tinubu, she has demonstrated exceptional leadership in academia, serving in various capacities at Federal Polytechnic, Oko, including: - Desk Officer, TETFUND (2018–2025)
– responsible for liaising with TETFUND, securing research funding, and managing institutional projects.
- Coordinator, Technical & Vocational Education and Training (TVET) (2014–2018)
– overseeing skills development initiatives. - Head, Department of Renewable Energy (2014-2018)- Director, Petroleum, Coal & Renewable Energy Unit (2011-2015).
- Director, International Higher Education Academic Organizations (2015-2019)- Chairman, TETFUND ICT Board (2019–2025).
- Managing Editor, Federal Polytechnic Oko International Journal of Science and Engineering (2015–2025)
- Chairman Stalled/Ongoing Projects Committee (2020 -2022)
- Member Affiliation Committee, Federal Polytechnic Oko (2019-2025)
- Secretary Federal Polytechnic Oko Research Committee (2019-2025)- Secretary TETFUND Library Development Committee, Fed Poly Oko (2018-Date)
- Chairman Transition Committee 2018- Member Committee on Continuous Assessment (2014 - 2019)
- Member Committee on Oko Centre for Research and Development Studies (2013-2019)- Member Committee on Strategic Action Plan for the Institution (2013 - 2019)
- Member/Alternate Secretary Constitution of Tenders' Board Committee (2022-2025)- Secretary Committee on a Case of Forged Doctorate Degree (2020)- Member Committee on Failed/Ongoing Projects (2021-2025)
- Secretary Research Grant Committee (2012 -2019) She has played a pivotal role in securing research grants, infrastructure development, and policy formulation within the institution.

Beyond academics, she is a devoted family woman, a mentor to young scientists, and a passionate advocate for sustainable development. Dr. Awuzie's influence in science education and research continues to inspire the next generation of chemists and innovators in Nigeria and beyond.

She is currently the Rector of Federal Polytechnic Oko and has brought massive infrastructural development to the Polytechnic among which are 1) Reactivation of the Polytechnic water factory
2) Reactivation of the Polytechnic bakery
3) Construction of a medical center at Ufuma Campus of the polytechnic
4) Resuscitation of the Polytechnic Printing Press
5) Construction of staff sports club and guest house
6) Establishing and equipping the Skill Development Centre with state of the art facilities for training of manpower
7) Mounting of new programmes and re-accreditation of existing programmes
8) Security upgrade involving construction of security posts, engaging a security services company and installation of security gadgets
9) Digging of borehole for portable water supply
10) Establishing the students work-study aid programme
11) Reduction of school fees 12) Resuscitation of the Polytechnic FM radio

IKECHUKWU INNOCENT UMEH, PhD, FNCS, FIPMD

A biography of Ikechukwu Innocent Umeh, PhD, FNCS, FIPMD

Born on 7th July in the early 1970s at Akoku, then Bendel State of Nigeria, to the family of Sir and Lady M.C. Umeh of Isiaku, Isuofia, Aguata Local Government Area of Anambra State, Nigeria.

Academic Background & Professional Role

Dr. Ikechukwu Innocent Umeh is a **Reader (Associate Professor)** in the Department of Computer Science, Faculty of Physical Sciences at **Nnamdi Azikiwe University, Awka**.

He earned his **Ph.D. in Data Communication and Networks** from the same university in June 2018, complementing earlier degrees (MSc in Computer Science, 2005; BSc in 1999).

Academic Leadership & Institutional Service

- **Pioneer Head of Department**, Information Technology & Computer Science at UNIZIK (since late 2023 to date), overseeing academic programs and faculty development.
- **Global President**, Nnamdi Azikiwe University Alumni Association (from November 2024).
- Previously served as **Postgraduate Coordinator**, Chairman of Departmental Welfare, Head of ICT Unit at Chike Okoli Center for Entrepreneurial Studies, and Pioneer President of Nigeria Association of Computing Students (NACOS) Unizik, -1999, and held leadership roles in community and alumni bodies.

Industry Experience & Certifications

- Founded **PACENT Technologies**, an ICT training and solutions firm, active from **1999 to 2012**, delivering practical ICT training to thousands.
- Certified **Fellow of the Nigeria Computer Society (FNCS)** since 2020 and **Fellow of the Institute of Policy Management & Development (FIMPD)** since 2016.

Research, Publications & Technical Interests

- Research specializations include **Data Communication, Computer Networks, Information Systems, Cybersecurity, IoT, AI**, and **Edge Computing**.
- Authored numerous peer-reviewed papers:
  - "A Comparative Analysis of AI System Development Tools…" (Jan 2025)
  - "Enhancing Cybersecurity in the Age of AI…" (Apr 2025)
  - "Design and Implementation of Security Framework…" (Jan 2024)
- Published books, including **Computer Literacy Made Easy** (2013).

Advocacy & Youth Empowerment

- Founded **DIUSCADI (Dr. Ikechukwu Umeh Students' Career Development Initiative)** in January 2020 to help students transition smoothly from academia to the workforce.
- Hosts the **"Life After School Career Development Seminar (LASCADSS)"** series, equipping undergraduates/ frontliners with practical workshops and networking.
- Recognized with more than **50 merit awards** for contributions in ICT, mentorship, and academic leadership

Professional Memberships & Community Roles

- Active member/ Fellowships: Fellow- **Nigerian Computer Society**, **Computer Professionals Registration Council of Nigeria**, Member, National Technical Committee (NTC), Information and Data Security, **Standards Organization of Nigeria**. Chattered Member **Association of Cyber Security** Practitioners (ACSP). Fellow- **Institute of Policy Management Development** (IPMD).
- Held various community leadership roles (e.g., in alumni associations, ICT committees), highlighting broad engagement beyond the university.

Summary

Associate Professor Ikechukwu I. Umeh (Ph.D., FNCS, FIMPD) is a distinguished academic, ICT professional, and youth advocate. He bridges theory and application through his dual roles at UNIZIK and PACENT Technologies. His research in cybersecurity, AI, edge computing, and mobile apps is complemented by a strong dedication to empowering young Nigerians via DIUSCADI's seminars. In leadership, he serves as HOD and alumni president, underscoring both his academic excellence and commitment to community development.

Goodwill Message

GOVERNMENT OF ANAMBRA STATE OF NIGERIA

OFFICE OF THE HONOURABLE COMMISSIONER

Telegram:

Telephone MOE/HED/MGB./007/V2/135

Our Ref.....

Your Ref.....

Ministry of Education
P.M.B. 5038
Awka

30TH September, 2025 .....20.....

The Rector,
Anambra State Polytechnic (ANSPOLY),
Mgbakwu.

GOODWILL MESSAGE

The Honorable Commissioner for Education and the entire Education family, Anambra State, felicitate with Anambra State Polytechnic (ANSPOLY) Mgbakwu in collaboration with Nigerian Institute of Management (Chartered) Anambra State branch for hosting the 4th International Multi-Disciplinary Hybrid Conference, 2025 from Wednesday 8th to Friday 10th October, 2025. Theme: **Leveraging Artificial Intelligence for Transformative Education: Pathway to Sustainable Development.**

We also express our joy and heartfelt gratitude to all Guest, Sponsors, Keynote Speakers, Lead Presenters, Guest Speakers, Participants and Professionals in the field of Education. This Conference is a testament to Ministry's commitment to fostering multi-disciplinary research in Artificial Intelligence and Sustainable Development in Education and other sectors in Anambra State.

The Ministry with excitement wishes all the participants a peaceful stay and a memorable deliberation.

Prof. Ngozi Chuma-Udeh
Honorable Commissioner.

All replies to be addressed to the Honourable Commissioner

Congratulatory Message

It gives me immense pleasure to congratulate Anambra State Polytechnic, Mgbakwu, in collaboration with the Nigerian Institute of Management (Chartered), Anambra State Branch, on the hosting of the 4th International Multi-Disciplinary Hybrid Conference, 2025. This milestone reflects the institution's unwavering commitment to advancing scholarship, promoting dialogue across disciplines, and providing practical pathways toward sustainable development in Nigeria and beyond.

The theme, *Leveraging Artificial Intelligence for Transformative Education: Pathways to Sustainable Development*, is both timely and academically relevant. The United Nations Educational, Scientific and Cultural Organization (UNESCO) has projected that artificial intelligence (AI) will contribute up to $15.7 trillion to the global economy by 2030, with education and training identified as one of the key sectors to experience transformative impact. Equally, the World Economic Forum (2023) emphasized that 44% of skills required in the workforce will undergo disruption within the next five years, underscoring the importance of integrating AI into education to prepare learners for future demands. By centering this conference on the nexus between AI, education, and sustainability, the organizers have provided a platform that aligns with global priorities and national aspirations.

The sub-themes of this year's conference demonstrate an impressive breadth of vision, covering AI and sustainable development in management, agriculture, applied science, engineering, finance, education, business, health, cyber security, entrepreneurship, and information technology. This multidisciplinary scope recognizes that no single discipline holds the monopoly of knowledge in addressing the Sustainable Development Goals (SDGs). For example, research indicates that AI-driven agricultural innovations can increase crop yields by up to 25% while reducing input costs by 15%, thereby directly contributing to SDG 2 (Zero Hunger). In the health sector, the World Health Organization (WHO) reports that AI applications in disease detection have achieved accuracy rates of over 90% in identifying conditions such as tuberculosis and breast cancer, demonstrating AI's potential to address SDG 3 (Good Health and Well-being).

Education, the focal point of this conference, is equally central to sustainable development. According to UNESCO's 2024 Global Education Monitoring Report, over 244 million children and youth remain out of school worldwide, while many more lack access to quality teaching and learning resources. AI-driven education systems, such as adaptive learning platforms and intelligent tutoring systems, have been shown to improve student performance by as much as 20% compared to traditional methods. By fostering discourse on transformative education, this conference contributes not only to Nigeria's human capital development but also to the global effort to achieve SDG 4 (Quality Education).

I commend the organizers for recognizing the importance of combining theory with practice. The hybrid format of this conference enables both physical and virtual participation, expanding the reach of knowledge dissemination. This approach reflects the inclusive spirit required to address global challenges and provides opportunities for scholars, practitioners, and students across borders to contribute meaningfully.

I extend my warm congratulations to the keynote speakers, paper presenters, and participants for their dedication to scholarship and innovation. May the deliberations of this conference yield actionable recommendations that influence policy, strengthen institutions, and advance sustainable development.

Once again, I congratulate Anambra State Polytechnic and its partners for this remarkable initiative.

Dr. Daniel Ejike Ewim, PhD, FNSE, FNIPES

Goodwill Message

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SEPTEMBER 18, 2025

GOODWILL MESSAGE

THE GOODWILL MESSAGE FOR THE ANAMBRA STATE POLYTECHNIC MGBAKWU, 4TH INTERNATIONAL MULTI-DISCIPLINARY HYBRID CONFERENCE 2025 IN COLLABORATION WITH THE NIGERIAN INSTITUTE OF MANAGEMENT (CHARTERED) ANAMBRA STATE BRANCH

On behalf of the Fellows, Executives and entire members of the Nigerian Institute of Management (Chartered) Anambra State Branch, we heartily extend our appreciation to the amiable Acting Rector, Dr. Njideka Rita Chiekezie, the esteemed Governing Council Members of Anambra State Polytechnic Mgbakwu, as well as our dedicated Exco Member, Dr. Ekene Nwankwo, MNIM.

We specially commend the LOC Chairman of this Conference and her wonderful team for organizing such a remarkable International Conference. We acclaim their choice of a timely Theme and Sub-Themes that resonate across multiple disciplines, so apt in this era where Artificial Intelligence (AI) is at the front burner of all discuss in every field of endeavour.

We are confident that every participant of this conference will gain so much valuable insight that will far exceed their investment of time and resources. This Conference promises to transform businesses, elevate intellectual capacity and enrich the wealth we collectively showcase. We anticipate a pyridine shift in our approaches to doing things and mindsets filled with great ideas generated from this conference.

The resultant effect of this Conference will undoubtedly impact positively on Anambra State particularly, where we anticipate high class of participants and our nation Nigeria in general.
The Nigerian Institute of Management (Chartered) Anambra State Branch stands steadfast in collaboration with you to ensure the flawless realization of the whole objectives of this Conference. We urge all the participants not to be distracted and be committed to harnessing the full potentials of this extraordinary opportunity.
Congratulations on this excellent International Conference.

Dcn Martins Mmoneke, FNIM
Branch Chairman

Lady Promise Nri, MNIM
Secretary

NIM Vision- To be the Source and Symbol of Management Excellence

Abstract

COMPREHENDING SYNCHRONOUS CONDENSERS: THE FOUNDATION OF STABILITY IN POWER SYSTEMS

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Abstract

This paper, comprehending synchronous Condenser; the foundation of stability in Power system explains the general background of a synchronous condenser. It defines synchronous condenser as a large rotating generator that's used to regulate voltage and improve stability in electrical networks. It's also known as a synchronous capacitor or synchronous compensator. It answered the question: what is synchronous condenser? This paper also listed features of the synchronous condenser, working principles, process of excitation and advantages, etc. Some of the advantages/application listed are: A synchronous condenser's voltage regulator controls the amount of reactive power it generates or absorbs to adjust the voltage of the electric power transmission grid; it can be used to improve power factor by drawing a leading current from the supply. Due to its ability in providing inertia, its spinning mass can help with frequency stability, especially in systems like wind and solar that experience frequent fluctuations. Synchronous condensers can be used to strengthen weak networks in remote areas. They are typically installed in substations, and are often used in hybrid energy systems. They're a conventional solution that's been used for decades to regulate reactive power. Result obtained shows that, due to their capacity to produce and absorb reactive power on demand, a Synchronous condensers' adaptability and efficiency make them indispensable instruments for guaranteeing stable and resilient power systems in the future as the world's energy environment changes.

Keywords: synchronous condenser, Synchro-Self-Shifting, HVDC, Excitation, Rotating inertia, Compensator

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THE ROLES CITIZENSHIP EDUCATION COURSE IN AROUSING POLITICAL CONSCIOUSNESS AMONG STUDENTS IN HIGHER INSTITUTIONS IN NIGERIA

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ABSTRACT

The study seeks to describe the level of political awareness, the student had benefited from the course GNS III and GNS121. Citizenship Education I and Citizenship Education II respectively. The course exposed the student about Nigeria Political development from colonial era till present and highlight the need for the student to be actively engaged in political activities in the country and their communities. The course Citizenship Education I and II as outlined by the curriculum approved by the National Bored for Technical Education stipulate topics that make students to have sense of belonging as citizens of the country. The Topics under the curriculum are constitution development, Fundamental Human Right, Rule of Law and Civil obligation and responsibilities etc. The finding of the study revealed that student no matter their interest political activities are not active participant in election process and are easily influenced by politician due to economic hardship. The study recommended that course curriculum should be updated to accommodate other needs of the students. Also student who are exposed to know much about the leaders, their contribution and defects to National development will show more commitment in the course if those leaders perform well.

Keywords: *Citizenship, Political consciousness, Political awareness, civil obligations, Element.*

ARTIFICIAL INTELLIGENCE AND SUSTAINABLE DEVELOPMENT IN PHYSICS EDUCATION IN NIGERIA

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Abstract

This paper explores the intersection of artificial intelligence (AI) and sustainable development in the context of Physics education in Nigeria. As the nation strives to achieve the United Nations Sustainable Development Goals (SDGs), particularly those related to quality education (SDG 4) and industry, innovation, and infrastructure (SDG 9), the integration of AI technologies into Physics education presents transformative opportunities. This study examines how AI tools (such intelligent tutoring system, adaptive learning platforms, and automated assessment mechanism) can enhance teaching effectiveness, improve student engagement, and personalize learning experiences in Physics classrooms. It also considers the challenges unique to the Nigerian educational landscape, including infrastructure deficits, digital literacy gaps, and policy limitations. This paper argues that, when strategically implemented, AI cannot only bridge learning gaps but also promote equitable access to quality education, thus fostering a generation of scientifically literate citizens equipped to contribute to Nigeria's sustainable development. Recommendations are made for policy frameworks, teacher training, and investment in digital infrastructure to ensure the ethical and effective deployment of AI in Nigerian schools.

Key words: Artificial intelligence, physics, sustainable development, Nigeria.

ARTIFICIAL INTELLIGENCE (AI) AND SUSTAINABLE DEVELOPMENT IN AGRICULTURAL ENGINEERING: A SYSTEMATIC REVIEW ON PRECISION AGRICULTURAL TECHNOLOGIES (SMART FARMING)

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ABSTRACT

This study investigates the transformative role of Artificial Intelligence (AI) in promoting sustainable development within agricultural engineering. By applying the PRISMA methodology, we systematically review literatures from 2018 to 2024, focusing on AI applications that align with the three pillars of sustainability: economic viability, environmental stewardship, and social responsibility. The findings reveal that AI technologies; such as smart farming, machine learning, computer vision and predictive analytics are reshaping agricultural practices through precision farming, climate-resilient strategies, and smart resource management. The paper concludes with recommendations for future research and policy frameworks to enhance AI integration in sustainable agriculture.

Keywords: *Artificial Intelligence, technology, sustainability, precision agricultural practices, , smart farming.*

HARNESSING ARTIFICIAL INTELLIGENCE FOR SUSTAINABLE REAL ESTATE BUSINESS PRACTICES IN SOUTHEAST NIGERIA

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Abstract

The intersection of Artificial Intelligence (AI) and sustainable development presents a significant opportunity to transform the real estate business landscape in Southeast Nigeria. This paper investigates how AI technologies can be integrated into real estate business models to promote environmental responsibility, economic resilience, and smarter urban growth. In a region experiencing rapid urbanization, land-use pressure, and infrastructural challenges, AI applications—such as smart valuation systems, energy-efficient building automation, and predictive maintenance—offer innovative pathways toward greener and more efficient real estate operations. Drawing on recent developments in AI-enabled property management, urban planning, and digital finance tools, the study uses qualitative and secondary data from Anambra, Enugu, and Imo States to analyze AI's role in driving sustainable real estate practices. Particular attention is given to how local estate developers, investors, and planning authorities are beginning to adopt or resist AI tools due to infrastructural, cultural, and regulatory constraints. The paper also proposes a model for integrating AI solutions into real estate decision-making tailored to the unique socio-economic and environmental realities of Southeast Nigeria. Ultimately, the study offers strategic recommendations for stakeholders to align real estate growth with Nigeria's broader sustainable development agenda.

Keywords*: Artificial Intelligence, Sustainable Development, Real Estate, Southeast Nigeria, Smart Urban Growth, Property Technology*

ARTIFICIAL INTELLIGENCE IN FLOOD RISK MANAGEMENT: A COMPARATIVE CASE STUDY OF ANAMBRA STATE OF NIGERIA AND THAI NGUYEN, VIETNAM

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Abstract

Floods are a constant and increasing environmental threat to many growing areas, especially in the state of Anambra, Nigeria and Thai Nguyen Province, Vietnam. These areas continuously face flood opportunities that disrupt livelihood, damage infrastructure, and avoid lasting improvement. This suggests how Artificial Intelligence (AI) can assist flood-risk management at each location with the help of early warning systems, dangerous mapping and improvement in predictive analytics. Using a comparative case study method, the paper evaluations the contemporary country of flood control in Anambra and Thai Nguyen and evaluates the capability utility of AI technologies which include gadget getting to know, satellite-based totally far flung sensing, and massive information analysis. Secondary records, authorities' review, and present academic research are synthesized to assess how AI-driven solutions will be regionally tailored in each context. The paper identifies common demanding situations, inclusive of restrained technical infrastructure, facts scarcity, and coverage gaps, which must be addressed for successful AI integration. This dual case has a look at now not handiest highlights the versatility of AI gear throughout distinct geographies however additionally underscores their relevance to attaining the United Nations Sustainable Development Goals (SDGs), mainly SDG 11 (Sustainable Cities and Communities) and SDG thirteen (Climate Action). The paper concludes by way of recommending greater collaboration between researchers, local governments, and technology developers to foster resilient, records-informed environmental governance in each regions.

Keywords*: Artificial Intelligence, Flood Risk Management, Anambra, Thai Nguyen, Sustainable Development, Early Warning Systems*

FROM GLASS CEILINGS TO SMART SYSTEMS: HOW GENDER-INCLUSIVE CORPORATE BOARDS DRIVES AI TRANSFORMATION IN BANKING

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ABSTRACT
The rapid adoption of Artificial Intelligence (AI) is reshaping banking operations worldwide, offering enhanced efficiency, improved customer experience and innovation. However, in many developing economies, particularly Nigeria, women remain underrepresented in strategic decision-making roles, especially on corporate boards, thereby limiting inclusive governance in AI adoption. This study investigates the role of gender-inclusive boards in facilitating responsible AI integration within Nigeria's banking sector with a focus on how board diversity regulatory compliance, and risk management influences AI innovation. Using a cross-sectional survey design, data were collected through structured questionnaires administered to 100 employees of listed Nigerian banks between January and March 2025. The population of the study consist of all 12 commercial banks listed on the Nigerian Exchange Group (NGX). A purposive sampling technique was used to select 5 banks based on size and market capitalization. Multiple regression model was used to estimate the data. The results showed that gender inclusion ($\beta = 0.297$, $p < 0.05$), board leadership ($\beta = 0.331$, $p < 0.05$), regulatory compliance ($\beta = 0.309$, $p < 0.05$) and risk management ($\beta = 0.115$, $p < 0.05$) significantly influence AI adoption, with the regression model explaining 74.1% of the variation in AI uptake across sampled banks. The study also found that women on boards often enhance trust, bring diverse perspectives, and advocate for ethical use of AI technologies. The study concludes that gender diversity on boards enhances banks' capacity to navigate digital transformation responsibly. Therefore, the study recommends targeted training for board members, policy incentives for diversity, and integrated compliance mechanisms to ensure sustainable and inclusive AI-driven innovation in the financial sector.

Keywords: *Gender Diversity, Regulatory Compliance, Risk Management, AI innovation*

AI SUSTAINABILITY IN FINANCE

Samuel Ojuade

Abstract
With the rapid growth in Artificial intelligence (AI), various sectors have experienced a lot of changes. The Finance sector being a field that demands a ton of data, there are questions about whether AI usage is going to be sustainable. This study examines the concerns of AI sustainability in finance and highlights the current issues that are encountered. We analyze the ethical and social concerns such as issues with data privacy, the concerns on ethical standards that govern how data is gathered and sourced, the biases involved when using AI to make financial decisions and finally the importance of transparency in AI financial systems. The findings reveal that AI offers potential for sustainability and provides the capabilities to make well informed and efficient business decisions. However, this cannot be achieved without the effort of regulatory boards, financial institutions and tech developers setting a clear structure and standard.

keywords*: Artificial intelligence (AI), AI sustainability, Finance, AI financial systems, Data privacy*

THE ROLE OF POLICY DRIVEN AI FOR SUSTAINABLE AGRICULTURE

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ABSTRACT
Artificial intelligence (AI) is increasingly central to sustainable agriculture and plant-based innovation across Africa, offering tools to enhance crop yields, optimize resource use, and accelerate the discovery of therapeutic compounds. Despite its transformative potential, unregulated AI deployment raises concerns about cultural erasure, digital colonialism, and legal uncertainty—especially when applied to traditional knowledge systems. AI applications in agriculture now enable the modeling of plant responses, early plant disease detection, and phytochemical synthesis - revealing new possibilities for crop improvement and medicinal plant development. By leveraging ethnobotanical data, AI can support the conservation of indigenous plant species and identify bioactive compounds with therapeutic value. However, such innovations risk appropriating communal knowledge without consent or benefit-sharing if deployed without appropriate safeguards. AI systems trained on indigenous agricultural and botanical knowledge often lack mechanisms for protecting the intellectual contributions of local communities. Nigeria's existing intellectual property laws, designed around individualized innovation, remain inadequate for addressing these collective rights. Drawing from instruments such as the Convention on Biological Diversity, the African Union AI Strategy, and Nigeria's Draft National AI Policy, there is a clear need for a sui generis legal framework that recognizes and protects traditional knowledge as a collective intellectual asset. Additionally, the creation of a national agricultural and ethnobotanical data trust, alongside AI literacy initiatives in extension services, would help bridge the digital divide. Anchoring AI policy in consent, equity, and community ownership ensures that technological progress serves the needs of local farmers and protects both cultural heritage and biodiversity.

Keywords:
AI in Agriculture, Phytochemical Innovation, Traditional Knowledge, Digital Policy, Sustainable Development

AI-DRIVEN CURRICULUM DESIGN IN NIGERIAN POLYTECHNICS FOR INDUSTRY 4.0 SKILLS

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The rapid transformation driven by the Fourth Industrial Revolution (4IR) demands a fundamental reorientation of technical and vocational education systems to equip graduates with industry-relevant skills. This study investigates the potential of integrating Artificial Intelligence (AI) into curriculum design in Nigerian polytechnics to foster adaptive and competency-based education. Adopting a documentary research design, we systematically reviewed 28 policy documents, academic studies, and industry reports published between 2015 and 2024, using thematic content analysis to assess existing curriculum frameworks and AI adoption patterns. Findings reveal that over 80% of current curricula lack explicit alignment with emerging 4IR skill requirements, and none incorporate AI-enabled adaptive learning systems. Evidence from international case studies suggests that AI-powered curriculum design can dynamically align course content with learner profiles, track skill acquisition in real time, and integrate continuous industry feedback. We conclude that AI integration is essential to closing the skills gap between Nigerian polytechnic graduates and labour market needs. The study recommends a tripartite strategy involving the National Board for Technical Education (NBTE), technology providers, and industry stakeholders to co-develop adaptive learning platforms, train educators in AI tools, and institutionalize industry–academia partnerships for innovation-led workforce readiness.

Keywords: *Adaptive Learning, Skills Alignment, Workforce Readiness, Skills forecasting and Edtech innovation*

TITLE: PRACTICAL AI USE POTENTIALS IN DEVELOPING ECONOMIES: A NIGERIAN PERSPECTIVE

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Abstract
Artificial Intelligence (AI) has emerged as a transformative force with immense potential to accelerate development, especially in low- and middle-income countries. This paper explores the practical applications and developmental potential of AI within the Nigerian socio-economic context. As Africa's most populous country and largest economy, Nigeria faces numerous challenges including inadequate healthcare delivery, low agricultural productivity, financial exclusion, and educational gaps. AI technologies offer viable solutions to these issues through intelligent automation, predictive analytics, and personalized services. This study reviews sector-specific use cases including AI-driven diagnostics in healthcare, precision agriculture, adaptive e-learning systems, and financial inclusion mechanisms powered by machine learning. Using a mixed-methods approach encompassing secondary data analysis, stakeholder interviews, and trend projections, the paper estimates that AI could contribute over $15 billion to Nigeria's GDP by 2030. Despite these promising projections, challenges such as poor digital infrastructure, data scarcity, a shortage of skilled personnel, and an underdeveloped regulatory environment persist. The study proposes policy recommendations including the creation of a national AI framework, improved data governance, investment in broadband and electricity infrastructure, and strategic workforce development. The research emphasizes that a structured, inclusive, and ethical approach to AI integration is crucial for maximizing its benefits while mitigating associated risks. Ultimately, Nigeria stands at a strategic juncture where timely and coordinated actions can harness AI's power to drive inclusive and sustainable development.

Keywords: *Artificial Intelligence, Nigeria, developing economies, digital transformation, AI applications, economic development, policy, infrastructure, education, healthcare, agriculture, finance.*

OPTIMIZING BATTERY STORAGE AND RENEWABLE ENERGY INTEGRATION FOR ECONOMIC SUSTAINABILITY IN NIGERIA'S POWER SECTOR

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Abstract
The persistent energy crisis in Nigeria characterized by unreliable power supply, high transmission losses, and overdependence on fossil fuels has intensified the need for sustainable and decentralized energy solutions. Although the country possesses abundant renewable energy (RE) resources, including solar, wind, and hydro, their integration into the national grid has been limited due to variability and a lack of supporting infrastructure. Battery Energy Storage Systems (BESS) offer a transformative solution by addressing the intermittency challenges of renewables, enhancing grid stability, improving power quality, and supporting peak load management. This paper presents a comprehensive analytical study of the economic, technical, and regulatory dimensions of BESS deployment in Nigeria's power sector. It examines the role of storage in grid stabilization, off-grid electrification, and carbon emission reduction, alongside a critical assessment of current barriers such as high capital costs, weak policy frameworks, limited technical expertise, and environmental sustainability concerns. Through detailed case studies including the Lagos Solar Project, Sterling Bank's hybrid system, and the Nigerian Electrification Project (NEP) the study demonstrates the operational viability and socio-economic impact of battery-integrated renewable systems. The paper concludes with strategic recommendations centered on policy reform, public-private partnerships, grid modernization, and investment in local research development and capacity building. It asserts that optimizing battery storage is pivotal not only for achieving energy security and economic sustainability but also for enabling Nigeria's transition to a resilient, low-carbon power system.

Keywords: *Battery Storage, Nigeria Power Sector, Renewable Energy Integration, and environmental Sustainability.*

OPTIMIZATION OF ARTIFICIAL INTELLIGENCE (AI) FOR IMPROVED FINANCIAL LITERACY AMONG POLYTECHNIC LECTURERS IN SOUTHEAST, NIGERIA

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Abstract
Recent report by the Central Bank of Nigeria revealed that, less than 30% adults in Nigeria which might include lecturers possess basic financial literacy, which is due to limited access to financial literacy among others. Considering the recent declined in the standard of living of Nigerian lecturers which have led to high rate of brain drain. The present study examined the optimization of Artificial Intelligence (AI) for improved financial literacy among polytechnic lecturers in Southeast, Nigeria. descriptive survey research design was used. The population of the study consist of the entire lecturers in the entire state and federal polytechnics in Southeast, Nigeria. Total enumeration technique was used for the study because the study used online survey technique via google form which was sent to the ASUP WhatsApp group of each polytechnic. The data collected was analysed using mean and standard deviation for answering the research questions, and t-test, linear regression and ANOVA for testing the null hypotheses that guided the study. The study revealed that, financial literacy level of most lecturers is low as majority of the them have insufficient saving and investment skills. The study also found out that artificial intelligence (AI) has the potentials to improve the financial literacy level of polytechnic lecturers when properly optimized. There was no significant difference in the financial literacy level of polytechnic lecturers based on gender and years of teaching experience (P>0.05). The study recommended that, the polytechnic management should periodically organize financial literacy workshops and seminars for their staff.

Keywords: *Financial Literacy, Artificial Intelligence (AI), Polytechnic Lecturers, Inflation, standard of living.*

ETHICAL AND REGULATORY CHALLENGES OF DEPLOYING AI IN CYBERSECURITY MANAGEMENT: A USA-BASED ANALYSIS

Obulor Olisa

Abstract
The integration of artificial intelligence (AI) technologies into cybersecurity management systems represents a paradigmatic shift in how organizations approach digital threat detection, response, and mitigation. While AI-powered cybersecurity solutions offer unprecedented capabilities in threat analysis, pattern recognition, and automated response mechanisms, their deployment introduces complex ethical dilemmas and regulatory challenges that demand careful examination. This chapter explores the multifaceted landscape of ethical considerations and regulatory frameworks governing AI implementation in cybersecurity within the United States context. Through comprehensive analysis of current regulatory initiatives, industry practices, and emerging governance frameworks, this study identifies critical challenges including algorithmic bias, accountability mechanisms, privacy preservation, and the balance between automated decision-making and human oversight. The research reveals that over 75% of companies now incorporate AI-driven solutions into their cybersecurity defenses, up from just 40% five years ago, yet 58% of respondents report difficulties in establishing governance frameworks to guide AI's ethical use. These findings underscore the urgent need for robust ethical frameworks and regulatory guidance to ensure responsible AI deployment in cybersecurity contexts.

Keywords: *Artificial Intelligence, Cybersecurity Ethics, Regulatory Compliance, Algorithmic Governance, Digital Security Management.*

Smart Infrastructure Monitoring for Sustainable Public Facility Maintenance in Nigeria.

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ABSTRACT
Nigeria's persistent public facility deficit is compounded by a weak maintenance culture, accelerating infrastructure deterioration and undermining returns on public investment. This study explores the potential of smart infrastructure monitoring systems: encompassing sensor networks, predictive analytics, and real-time reporting, to strengthen public facility maintenance in Nigeria. Using a documentary research design, 32 policy documents, peer-reviewed studies, and global case reports published between 2014 and 2024 were systematically reviewed and thematically analyzed to assess existing maintenance frameworks and the applicability of smart monitoring technologies. Findings indicate that more than 85% of current maintenance practices rely on manual inspections and reactive repairs, resulting in high life-cycle costs, prolonged service disruptions, and limited data for planning. Evidence from international best-practice cases demonstrates that continuous condition monitoring and predictive maintenance models can reduce downtime by up to 40% and extend asset lifespan by 20–30%. The study concludes that embedding smart monitoring systems within Nigeria's public asset management framework is essential for enhancing service delivery, optimizing expenditure, and promoting infrastructure sustainability. Recommendations include targeted policy reforms, capacity-building programmes for public works agencies, and public–private partnerships with technology providers to institutionalize proactive, data-driven maintenance practices.

Keywords: *Predictive Analytics, Asset Management, Digital Governance, Infrastructure Sustainability, Service Delivery*

REGULATING THE ALGORITHM: NIGERIAN PUBLIC OPINION ON AI FOR GOVERNMENT SURVEILLANCE VS. SECURITY: AI AND SUSTAINABLE DEVELOPMENT IN CYBER SECURITY MANAGEMENT

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Abstract
Artificial Intelligence (AI) is changing how nations fight crime and protect critical digital assets. In Nigeria, however, the same tools that promise stronger security also raise concerns about personal privacy. This study measures how ordinary Nigerians weigh these competing interests. Using a nationwide survey of over 500 respondents drawn from all six geopolitical zones, the research captures citizens' awareness of AI-enabled surveillance such as facial recognition, mobile data mining, and social-media monitoring, and their trust in government to handle such data responsibly. The questionnaire will assesses four core areas: a. perceived benefits of AI surveillance for curbing cyber-enabled fraud and terrorism, b. fears of misuse or over-reach, c. expectations for transparency and legal safeguards, and willingness to trade certain privacy rights for stronger security. Preliminary descriptive statistics and logistic-regression models will reveal how factors like age, education, region, and prior exposure to online scams shape public attitudes. By mapping the trust, security, privacy triangle, the study offers first-of-its-kind empirical evidence to guide lawmakers drafting Nigeria's emerging AI and cybersecurity regulations. It further proposes a balanced policy framework that links clear oversight, data-protection guarantees, and public-facing accountability tools to sustained citizen support. The findings will help government, industry, and civil-society stakeholders design AI surveillance systems that protect Nigerians without eroding the democratic liberties essential for long-term sustainable development.

Keyword*: AI Surveillance, Privacy-Security Tradeoff, Algorithmic Governance, Cybersecurity*

AN OVERVIEW OF A GRID CONNECTED PHOTOVOLTAIC (PV) SYSTEM; AN ALTERNATIVE ENERGY USE IN NIGERIA

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Abstract
As the world shifts towards renewable energy sources, solar power stands out as a popular choice for sustainable electricity generation. Among the various solar installations, grid connected photovoltaic (PV) systems are particularly beneficial for both homeowners and businesses. They harness sunlight through photovoltaic panels and connect to the utility grid, offering a reliable and efficient energy solution. A grid connected PV system is one where the photovoltaic panels or array are connected to the utility grid through a power inverter unit allowing them to operate in parallel with the electric utility grid. Nigeria's government has created several initiatives to increase the use of solar energy, including: Renewable Energy Master Plan (REMP): This plan aims to increase the share of renewable electricity to 36% by 2030. Solar Naija program: This program aims to install solar home systems for over 5 million homes. World Bank Loan for Solar Mini-Grids: This $750 million loan will develop solar mini-grids in underserved areas of Nigeria. This article delves into the intricacies of grid connected PV systems, exploring their benefits, components, installation process, and their impact on energy consumption.

Keywords: *Photovoltaic Panel, Battery, Inverter, Grid Connection, Net Metering, Net Billing*

AI, INDIGENOUS KNOWLEDGE AND LITERATURE FOR SUSTAINABLE FUTURE

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Abstract
Artificial Intelligence (AI) has emerged as a transformative tool for global sustainable development, yet it often draws from Western epistemologies that overlook indigenous knowledge systems. African literature, deeply rooted in oral traditions, communal values and ecological wisdom, provides an important archive through which AI can engage with indigenous communication methods for sustainability. This paper examines how literature serves as a medium for bridging indigenous knowledge and technological innovation, with focus on Chinua Achebe's Things Fall Apart. Using eco-criticism and digital humanities, the paper argues that insights from the novel can guide AI toward inclusive, culturally grounded and ethically responsible systems that amplify indigenous voices, preserve cultural heritage and foster truly sustainable future.

Keywords: *Artificial Intelligence, Indigenous Knowledge, African Literature, Sustainable Development, Postcolonial Theory*

HARNESSING ARTIFICIAL INTELLIGENCE FOR DISTRIBUTED DENIAL-OF-SERVICE (DDoS) THREAT DETECTION AND MITIGATION TO STRENGTHEN RESILIENCE IN FINANCIAL AND EDUCATIONAL SYSTEMS

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Abstract

The escalating frequency and sophistication of Distributed Denial-of-Service (DDoS) attacks present a critical challenge to the stability of digital ecosystems, particularly within financial and educational systems that depend on uninterrupted online services. This risk is compounded by the relative ease with which such attacks can be launched using readily available tools and the growing cyber skills and experimentation among younger generations, leaving these sectors increasingly exposed. DDoS incidents can rapidly cripple internet-based services and applications, inflicting significant financial losses, eroding digital trust, and disrupting teaching, learning, and research activities, factors that undermine sustainable development goals in finance and education. Conventional security mechanisms, such as packet-filtering firewalls and access control lists (ACLs), which rely on static rules for traffic blocking, have proven inadequate in addressing the evolving scale, distribution, and complexity of modern DDoS threats. This limitation underscores the urgent need for intelligent, adaptive, and scalable defense solutions. To address this challenge, this paper proposes an artificial intelligence (AI) driven framework for real-time detection and mitigation of DDoS attacks, designed to strengthen resilience in financial and educational infrastructures. By integrating advanced machine learning techniques, the framework effectively identifies and classifies anomalous traffic patterns with high accuracy, enabling the proactive deployment of mitigation strategies to minimize disruption. Experimental results demonstrate that the proposed AI-driven approach outperforms conventional methods, reaffirming the potential of intelligent systems to secure critical digital infrastructures, restore digital trust, and contribute to sustainable development in finance and education.

Keywords: *Distributed Denial-of-Service (DDoS), Artificial Intelligence (AI), Machine Learning, Real-time Threat Detection, Financial Systems, Educational Systems, Sustainable Development*

SCALABILITY OF AMBIENT ENERGY HARVESTING (AEH) TECHNOLOGY

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A b s t r a c t

Ambient Energy Harvesting (AEH) presents a transformative approach to powering low-energy devices by utilizing ubiquitous environmental sources such as solar, thermal, kinetic, and electromagnetic energy. This study explores the scalability of AEH technologies, focusing on the efficiency and integration of photovoltaic, thermoelectric, piezoelectric, and radio frequency (RF) harvesting methods. Through a comparative analysis of current innovations and deployment strategies, the research highlights the critical role of Energy Management Systems (EMS) in enhancing energy conversion, storage, and utilization. Findings underscore that scalable AEH solutions depend not only on advanced material design and multi-source integration but also on intelligent EMS frameworks that adapt to dynamic ambient conditions. These insights pave the way for sustainable, autonomous systems in smart cities, IoT networks, and wearable electronics.

Keywords: *Ambient Energy Harvesting, Scalability, Photovoltaic, Thermoelectric, Piezoelectric, RF Energy, Energy Management System, IoT, Smart Devices, Sustainable Power*

Public Expenditure on Education and Economic Development in Nigeria

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Abstract

The study ascertained the relationship between public expenditure on education and economic development in Nigeria from 2014 to 2023. In this study, Human Development Index (HDI) was used as a proxy for economic development. The specific objectives include to determine the relationship between capital expenditure on education and Human Development Index (HDI) and secondly to evaluate the relationship between recurrent expenditure on education and HDI. Data for the study were collected from Central Bank of Nigeria (CBN) statistical bulletin, National Bureau of Statistics (NBS) and World Investment Report (WIR). Data were analyzed using multiple regression analysis. The result indicates that the relationship between capital expenditure on education (CEx) and (HDI) is negative and insignificant with a P-value of 0.483 which is greater than the 5% level of significance adopted. This could be verified with the negative coefficient of 1.77e-06 for the study proving that an increase in capital expenditure on education decreases Human Development Index. It also reveals that the relationship between recurrent expenditure on education (REx) and human development index (HDI) is positive and significant with a P-value (significance) of 0.003 which is less than the 5% level of significance adopted. Likewise, the result of positive coefficient of .0000302 for the study is proving that, an increase in Rex also increases HDI by 0.03%. The study recommends that both federal and the state government should increase capital expenditure on education through building of more educational infrastructures that are of world standard in order to attract international patronage which will invariably increase the HDI of our country.

Keywords: *Capital education expenditure, Recurrent education expenditure, Human Development index.*

ISOLATION OF DISEASE CAUSING ORGANISMS OF KOLANUT AND TYPES OF KOLA BUDS

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ABSTRACT

Isolation and identification of fungi pathogens causing kolanut spoilage across markets in Awka was carried out using standard laboratory procedures. Randomized block sampling method was used in sample collection for this study. Potato dextrose agar was used to prepare innocula for the diseased kolanuts collected. The results of the study in revealed the presence of Aternaria alternata, Fusarium oxysporum, Aspergillus niger and Aspergillus flavus. Aspergillus niger was absent only in kolanut samples from Amansea, thus, having a percentage occurrence of 75%. Aspergillus flavus was present in kolanut samples from all the markets except Nkwo Amaenyi and it had a percentage occurrence of 75%. Alternaria sp. was seen in kolanut samples from all locations, giving it a 100% percentage occurrence while Fusarium oxysporum was seen in samples of kolanut species collected from Nkwo Amaenyi and Amansea respectively and had a percentage occurrence of 50%. The results show that all the fungi pathogens had a progressive but slow increase in pathogenicity from day 4 to the 7th day, although A. flavus had a higher pathogenicity on the fresh kolanut samples when compared with other fungi isolates. The study indicated the disease-causing organisms of kolanut across Awka Markets and prescribed ways of identifying and classifying them.

Keywords: *Isolation, disease, organisms, kolanut, types, buds*

DISEASES OF COCONUT SEEDLINGS AT NURSERY STAGE IN AWKA, ANAMBRA STATE

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ABSTRACT

The Coconut (Cocos nucifera) fruit is a fibrous drupe with multiple uses and is widely disseminated on almost all continents. Coconut production is threatened by diseases causing significant economic losses. This study investigated Diseases of Coconut Seedlings at Nursery Stage in Awka, Anambra State. The study was carried out in two nurseries, one in Oby Okoli and another in Udoka Estate. The medium used for the isolation of pathogens in the samples collected was Sabouraud Dextrose Agar (SDA). Inocula were prepared from unhealthy coconut leaves and nuts that showed symptoms of leaf spot, leaf blight and nut rot. Isolation of fungi was done by agar dilution plate method. Subcultures were prepared using inocula from different organisms in the mixed cultures to obtain a pure cultures. Physical observations revealed bud spot, leaf blight, and nut rot in infected seedlings. Fusarium solani, Rhizopus stolonifer, Phytophthora Okparasitica, and Aspergillus niger were identified as primary fungal pathogens, with Fusarium solani and Rhizopus stolonifer dominating. No bacterial growth was detected, possibly due to inadequate moisture. The study highlights the significance of fungal diseases in coconut production and emphasizes the need for effective management strategies. Integrated Pest Management (IPM) practices, accurate identification of fungal isolates and targeted disease management are crucial for maintaining healthy coconut palms.

***Keywords:** Diseases, coconut, seedlings, nursery, stage, Awka*

CONTROL OF YAM ROTS WITH BOTANICALS: XYLOPIA AETHIOPICA (UDA) AND PIPER GUINEENSIS (UZIZA) SEEDS EXTRACT

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ABSTRACT

The isolation and identification of fungi pathogens causing yam rot across Markets in Awka and the control of this rot using botanicals was carried out using standard laboratory procedures. Randomized block sampling was used in the sample collection for the study. For the in-vitro analysis, potatoes dextrose agar was used to prepare innocula for the four unhealthy yam tubers collected. Aqueous extract of seeds of Xylopia aethiopica and Piper guineensis was used for growth inhibition treatment in the study. The result showed that X. aethiopica (4.80±0.24) inhibited Aspergillus terreus more than P. guineense (4.53±0.21). Fusarium oxzysporum was inhibited more by P. guineense (5.74±0.26) than X. aethiopica (3.86±0.25). Piper guineense also had a higher inhibition rate on Rhizopus stolonifer (4.34±0.26) than X. aethiopica which had (3.75±0.22). The positive control (Grisovid) showed more inhibitory activity than the extracts in general. The study indicated that Xylopia aethiopica and Piper guineensis were able to suppress rot-causing fungi of yam deterioration. The fungitoxic potentials of these extracts on yam rots can provide an alternative to synthetic fungicides since it is less expensive, environmental friendly and easy to prepare.

***Keywords:** Control, yam, rots, botanicals, seeds, extract*

ARTIFICIAL INTELLIGENCE IN THE NIGERIAN BUSINESS ENVIRONMENT: ADOPTION, CHALLENGES, AND FUTURE PROSPECTS

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Abstract

Artificial Intelligence (AI) has emerged as a transformative force in the global economy, changing the way businesses operate, their productivity, and competitiveness. However, the adoption AI and its integration in business, vary by regions due to factors such as differences in regulatory environments, business climates, and infrastructural readiness. Thus, this paper analyzed the historical background of AI, the regulatory environment of Nigeria, and the prevailing business climate that informs its adoption. Grounded on the Diffusion of Innovation Theory, the study employed a qualitative exploratory strategy and founded its results on secondary information gleaned from government policy documents, scholarly books and articles, and industry reports, complemented by case findings from some Nigerian firms adopting AI. The report revealed that while Nigeria has achieved remarkable strides through national digital economy policies and emerging AI regulations, regulatory gaps remain, particularly in areas under data protection, ethical standards, and enforcement capacity. The Nigerian business landscape, founded on entrepreneurial drive, fintech technological innovation, and growing start-up ecosystems, is full of potential for AI integration. Yet, barriers such as weak digital infrastructure, lack of technical expertise, weak policy enforcement, ethical considerations and costly business operations deter large-scale adoption. Despite these limitations, Nigeria's prospects for AI opportunities are bright, with its potential applications in finance, healthcare, agriculture, and logistics to enhance efficiency, innovation, and competitiveness. The study concludes that AI penetration into Nigeria's business environment requires regular regulatory frameworks, improved infrastructure, and targeted capacity-building interventions.

***Keywords:** Artificial Intelligence, Regulation, Business Environment, Adoption, Nigeria*

HARNESSING AI FOR SUSTAINABLE EDUCATION: A PATHWAY TO ACHIEVING NIGERIA'S SUSTAINABLE DEVELOPMENT GOALS

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Abstract

The integration of Artificial Intelligence (AI) in education has the potential to revolutionize the way we teach and learn, promoting sustainable development and achieving Nigeria's Sustainable Development Goals (SDGs), particularly Goal 4 - Quality Education. This paper provides an in-depth exploration of the role of AI in enhancing access to quality education, improving learning outcomes, and bridging the profound educational divide in Nigeria. We conduct a detailed examination of the applications of AI in personalized learning, intelligent tutoring systems, educational data analytics, and teacher augmentation, highlighting their potential to support a sustainable educational ecosystem. The paper also offers a critical and extensive analysis of the multifaceted challenges and limitations of AI in education, including issues of infrastructural deficits, techno-economic disparity, algorithmic bias, data sovereignty, and the critical need for pedagogical reform. By providing a granular strategic framework for leveraging AI's potential while proactively mitigating its risks, we argue that a thoughtfully implemented AI strategy is essential for creating a more inclusive, effective, and sustainable education system for Nigeria's future.

***Keywords**: Sustainable Development Goals (SDGs), Sustainable Education, AI, Personalized learning*

ARTIFICIAL INTELLIGENCE IN LABORATORY PRACTICES: A TECHNOLOGIST'S APPROACH TO EMERGING HEALTH THREATS

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Abstract
Emerging health threats such as COVID-19, Lassa fever, and antimicrobial resistance have highlighted systemic weaknesses in Nigeria's laboratory systems, especially in early detection, data sharing, and outbreak response. As frontline professionals, science laboratory technologists face increasing challenges due to underfunded infrastructure, poor diagnostic turnaround time, and insufficient biosafety protocols. This paper explores how Artificial Intelligence (AI) can be leveraged to revolutionize laboratory practices in response to health emergencies. Drawing on field observations from public laboratories in Anambra State and recent literature, the paper identifies specific areas where AI integration such as automated diagnostics, predictive analytics, and digital biosurveillance can enhance laboratory preparedness and reduce human error. Findings show that only 42% of surveyed laboratories had electronic reporting tools, while 76% of technologists expressed a willingness to adopt AI-based solutions if properly trained. The paper concludes that AI-driven innovations, when combined with professional development and policy reforms, can bridge critical gaps in Nigeria's health surveillance systems. It recommends strategic investments in AI education for laboratory professionals, partnerships with tech companies, and inclusion of SLTs in national digital health policymaking as a pathway toward sustainable and resilient health systems.

Keywords*: Artificial Intelligence, Laboratory Technologists, Public Health, Biosafety, Health Systems, Sustainable Development*

ARTIFICIAL INTELLIGENCE FOR MAPPING AND SCHOOL-BASED CONTROL OF GEOHELMINTHIASIS AND SCHISTOSOMIASIS IN AWKA NORTH, NIGERIA

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ABSTRACT
Neglected tropical diseases such as geohelminthiasis and schistosomiasis remain endemic in rural Nigerian communities, disproportionately affecting school-age children. This study investigated the prevalence and co-infection patterns of these infections among 400 children aged 5–19 years in Awka North Local Government Area (LGA), Anambra State, Nigeria, using a cross-sectional descriptive design. Stool and urine samples were examined through microscopy, Polymerase Chain Reaction (PCR), and Rapid Diagnostic Tests (RDTs) to detect Ascaris lumbricoides, Trichuris trichiura, hookworms, and Schistosoma haematobium. Socio-demographic and behavioral risk factor data were collected via structured questionnaires. The overall infection rate was 70%, with geohelminthiasis accounting for 34.0%, schistosomiasis for 24.0%, and co-infection for 12.0%. The most common co-infection was hookworm + S. haematobium (41.7%), followed by A. lumbricoides + S. mansoni (33.3%). Mean infection intensities were 60 eggs/g for geohelminths and 45 eggs/10 mL for schistosoma. Leveraging Artificial Intelligence (AI) offers transformative opportunities for the control of these infections and for health education in endemic areas. AI-powered image recognition can enhance diagnostic accuracy from field microscopy images, particularly in low-intensity infections. Machine learning models could integrate epidemiological, environmental, and behavioral data from this study to predict infection hotspots and guide targeted interventions. Additionally, AI-enabled mobile platforms can deliver personalized, culturally relevant hygiene and sanitation education to pupils, fostering behavior change. Integrating AI with school-based deworming, WASH interventions, and community engagement aligns with Sustainable Development Goals 3 (Good Health & Well-being), 4 (Quality Education), and 6 (Clean Water & Sanitation), offering a pathway toward sustainable parasite control in rural and riverine Nigerian communities.

Keywords*: Geohelminthiasis, Schistosomiasis, Co-infection, Artificial Intelligence, School-age children, Nigeria, Public health, Sustainable development, Disease mapping, Health education.*

BREAKING DIGITAL BARRIERS: UNDERSTANDING SME RESISTANCE TO AI-POWERED CUSTOMER SERVICE IN NIGERIA'S DIGITAL ECONOMY.

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Abstract
Nigeria's digital economy contributes over 16% to GDP, with Small and Medium-sized Enterprises (SMEs) representing 96% of all businesses. Despite the global success of AI-powered customer service chatbots in reducing operational costs by up to 30% and providing 24/7 customer support, Nigerian SMEs have shown remarkably low adoption rates compared to their counterparts in developed economies, creating a gap in leveraging Information and Communication Technology (ICT) for business sustainability. While international studies highlight chatbot benefits, including improved response times, cost efficiency, and scalability, limited research exists on specific barriers preventing Nigerian SMEs from embracing this transformative technology. This study aims to identify and analyze the primary obstacles hindering the adoption of AI chatbots among Nigerian SMEs. The research problem centers on understanding why Nigerian businesses, despite recognizing the benefits of digital transformation, remain hesitant to implement AI-powered customer service solutions that could enhance their competitiveness and operational efficiency. The study will employ a quantitative surveys of 300 SME owners across Nigeria's six geopolitical zones. Data collection will focus on digital literacy levels, infrastructural challenges, cultural preferences, trust in AI systems, and awareness of available solutions. Statistical analysis will identify significant relationships between demographic factors and adoption barriers, while thematic analysis will provide deeper insights into decision-making processes. The study's original contribution lies in providing evidence-based insights into the specific adoption challenges faced by Nigerian SMEs as findings will inform policymakers developing digital economy strategies, ultimately supporting sustainable business growth and Nigeria's digital development objectives.

Keyword*: SMEs, Artificial Intelligence, Customer Service, AI chatbots*

EVALUATION OF THE MECHANICAL PROPERTIES OF RICE HUSK AND GROUNDNUT HUSK REINFORCED LOW DENSITY POLYETHYLENE COMPOSITES

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ABSTRACT
The application of agricultural wastes as reinforcement agents to polymermatrix has proven over the years to yield significant improvements to the mechanical and biodegradable properties of polymers. This study evaluated the mechanical properties of low-density polyethylene (LDPE) matrix composite reinforced with rice husk fillers (RHF) and groundnut husk filler (GHF) distinctively using a mesh size of 450µm. A 5-30 wt. % of RHF (in steps of 5%) was used to reinforce the LDPE matrix. The mixture was first melted and then blended in an extrusion machine at a temperature range of 120-150 and screw speed of 50 RPM. This process produced RHF-LDPE matrix composite. Same process was repeated to obtain GHF-LDPE matrix composite. The liquid melts were extruded as flat sheets. The sheets were oven-dried at 70 to remove moisture and kept in air tight container for about 40hrs according to ASTM D618 standard. Tensile, ductility, flexural, impact and water absorption tests were carried out on the composite samples according to ASTM standards. Results showed that higher filler contents in LDPE matrix reduced the tensile strength and ductility for both the RHF-LDPE and GHF-LDPE composites. The flexural, impact strengths and flexural modulus increased as the filler percentage is increased for both RHF-LDPE and GHF-LDPE composites. Water absorptivity of the composites increased significantly as the soaking days and wt. % of filler materials are raised. Both composites- RHF/LDPE and GHF/LDPE reached a saturation mixture in 35 and 42days respectively. Hence, RHF and GHF significantly improved the properties of LDPE.

Keywords: *Low-density polyethylene; Mechanical properties; Rice husk fillers, Groundnut husk fillers; Water absorptive test*

THE IMPACT OF FINANCIAL INCLUSION ON POVERTY REDUCTION AND ECONOMIC GROWTH IN MGBAKWU AND ISUANIOCHA COMMUNITIES, AWKA NORTH LGA, ANAMBRA STATE, NIGERIA

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Abstract

Financial Inclusion is a vital mechanism for alleviating poverty and promoting economic growth in developing communities like Mgbakwu and Isuaniocha in Awka North Local Government Area (LGA), Anambra State, Nigeria. This study examines the impact of financial inclusion, with a focus on fintech innovations, on poverty reduction and economic growth in these communities, which have an estimated combined adult population of approximately 119,930. Employing a mixed-methods approach, the research integrates primary data from questionnaires (n=200) and interviews (n=15-20) with secondary from the Enhancing Financial Innovation and Access (EFInA) 2023 survey and Central Bank of Nigeria (CBN) reports, supplemented by qualitative insights from academic literature, and government reports. Participants were selected using stratified random sampling for questionnaires and purposive sampling for interviews to ensure representation of diverse community stakeholders. Findings reveal that fintech, particularly mobile and digital wallets, enhances financial inclusion among the age 18-34 group, fostering entrepreneurship and reducing poverty by improving access to credit and savings. However, barriers such as inadequate digital infrastructure and low financial literacy persist, particularly in these rural communities, limiting broader adoption. While financial inclusion supports short-term economic growth, its long-term impact requires sustained policy interventions. Recommendations include investing in local digital infrastructure, enhancing financial literacy programmes, and strengthening regulatory frameworks to support fintech adoption. This study fills the knowledge on localised financial inclusion impacts in Mgbakwu and Isuaniocha, offering targeted insights for policymakers.

Keywords:*Financial inclusion, poverty reduction, economic growth, fintech, Mgbakwu, Isuaniocha, Awka North LGA, Anambra State, Nigeria, digital infrastructure, financial literacy*

LEVERAGING ARTIFICIAL INTELLIGENCE FOR SUSTAINABLE FINANCIAL INCLUSION AND ECONOMIC GROWTH

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ABSTRACT

Artificial Intelligence (AI) has emerged as a transformative force in reshaping financial systems toward achieving sustainable development goals. This paper examines the relationship between AI adoption, sustainable financial inclusion, and economic growth. By analyzing AI-driven innovations such as automated credit scoring, mobile banking, robo-advisory services, and fraud detection mechanisms, the study highlights their potential in expanding access to finance, lowering transaction costs, and improving risk management. A mixed-methods approach is proposed, combining survey data from financial institutions and end-users with secondary economic indicators to assess the mediating role of financial inclusion in the AI–growth nexus. Preliminary insights suggest that AI significantly enhances financial accessibility and efficiency, thereby fostering inclusive economic growth, particularly in developing contexts. However, the impact is moderated by factors such as regulatory quality, digital literacy, and infrastructure. The study concludes that AI, when strategically leveraged, constitutes not only a technological innovation but also a sustainable pathway to inclusive economic development.

Keywords: ***Artificial Intelligence, Financial Inclusion, Sustainable Development, Economic Growth.***

THE IMPACT OF AI-ENHANCED ENTREPRENEURSHIP EDUCATION ON ENTREPRENEURIAL INTENTIONS AMONG STUDENTS OF ANAMBRA STATE POLYTECHNIC, MGBAKWU

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Abstract

This study investigates the impact of Artificial Intelligence (AI)-enhanced entrepreneurship education on entrepreneurial intentions among students at Anambra State Polytechnic, Mgbakwu. Grounded in the Theory of Planned Behaviour (TPB), the research examines how AI-driven tools, such as virtual learning platforms, predictive analytics, and AI-supported mentorship, influence students' attitudes toward entrepreneurship, subjective norms, and perceived behavioural control. A mixed-methods design was employed, combining a structured questionnaire administered to 90 current and former students, selected through stratified random sampling, with semi-structured interviews conducted with 15 purposively selected participants. Regression analysis revealed a significant positive relationship between AI-enhanced entrepreneurship education and entrepreneurial intentions, while thematic analysis of interviews highlighted how AI tools foster practical skills and confidence. The findings indicate that AI-driven interventions cultivate positive entrepreneurial attitudes, strengthen subjective norms, and enhance perceived behavioural control, thereby encouraging entrepreneurial ventures. The study recommends that Anambra State Polytechnic, integrate AI-powered tools into entrepreneurship curricula, develop AI-based simulation practical training, and establish AI-supported mentorship and funding platforms to promote sustainable entrepreneurial growth, contributing to transformative education and sustainable development.

Keywords: Artificial Intelligence, Entrepreneurship Education, Entrepreneurial Intentions, Polytechnic Education, Anambra State Polytechnic, Theory of Planned Behaviour, Sustainable Development.

UTILITY SURVEY OF FEDERAL POLYTECHNIC OKO, ANAMBRA STATE

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Abstract

Utility surveys are crucial for infrastructure planning, development, and management in institutions, cities, and industries. This study presents a comprehensive utility survey conducted at Federal Polytechnic Oko, Anambra State, Nigeria, being an educational institution, aimed at mapping and documenting underground and above-ground services for effective campus planning. A combination of Real-Time Kinematic (RTK) GPS was employed to detect utilities, while GIS and CAD platforms were used for data integration, analysis, and visualization. The results revealed the distribution of water supply networks, sewer systems, stormwater drains, electrical lines, transformers, streetlights, and telecommunication cables across the campus. This is a pilot study which is intended to generate possible reliable solutions in the next study. The study concludes that a georeferenced utility database is indispensable for sustainable infrastructure management and recommends routine updates and institutional adoption of a Utility Information Management System.

Keywords: *Utility survey, GIS, Sewer systems, infrastructure management.*

PUBLIC EXPENDITURE ON EDUCATION AND ECONOMIC DEVELOPMENT IN NIGERIA

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Abstract
The study ascertained the relationship between public expenditure on education and economic development in Nigeria from 2014 to 2023. In this study, Human Development Index (HDI) was used as a proxy for economic development. The specific objectives include to determine the relationship between capital expenditure on education and Human Development Index (HDI) and secondly to evaluate the relationship between recurrent expenditure on education and HDI. Data for the study were collected from Central Bank of Nigeria (CBN) statistical bulletin, National Bureau of Statistics (NBS) and World Investment Report (WIR). Data were analyzed using multiple regression analysis. The result indicates that the relationship between capital expenditure on education (CEx) and (HDI) is negative and insignificant with a P-value of 0.483 which is greater than the 5% level of significance adopted. This could be verified with the negative coefficient of 1.77e-06 for the study proving that an increase in capital expenditure on education decreases Human Development Index. It also reveals that the relationship between recurrent expenditure on education (REx) and human development index (HDI) is positive and significant with a P-value (significance) of 0.003 which is less than the 5% level of significance adopted. Likewise the result of positive coefficient of .0000302 for the study is proving that, an increase in Rex also increases HDI by 0.03%. The study recommends the need for Nigerian government to increase capital expenditure on education for resuscitation of the standard of living of the citizenry. It also suggests that recurrent expenditure on education should be maintained on the current level or be increased which invariably would raise the HDI,

Keywords: Capital education expenditure, Recurrent education expenditure, Human Development index.

BACTERIOLOGICAL QUALITY ASSESSMENT OF RAW COW MILK SOLD BY CATTLE HERDERS IN ONITSHA AND AWKA, ANAMBRA STATE

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ABSTRACT
Contamination of raw cow milk with pathogenic bacteria is potentially hazardous to human health. This study was conducted to assess the bacteriological quality of raw cow milk sold in Awka and Onitsha, Anambra State. A total of ten (10) samples of raw cow milk were purchased from different cattle herders in Awka and Onitsha and were labeled samples A to J and bacteriological assessment was carried out using spread plate method. The result of the bacteriological analysis on all the samples of raw cow milk showed that Staphylococcus aureus was present in all the samples, presence of faecal coliform was seen in the samples except samples H and I and Salmonella spp. was present in the samples except samples C, D, E and I. The result of total aerobic count and total coliform count in all the samples ranged from $9.4x10^4$cfu/ml to $2.20x10^6$cfu/ml and $1.2x10^4$cfu/ml to $2.3x10^5$cfu/ml respectively. The results from raw cow milk showed poor handling and unhygienic practices of the milking process of cow milk by cattle herders. Hence, there is need for proper educating of the cattle herders on hygienic and safety practices for the healthy life of the consumers.

Key words: *Bacteriological, Cow milk, Assessment, Cattle herders, Quality*

SYNTHESIS, CHARACTERIZATION AND ANTIMICROBIAL ACTIVITIES OF PYRROLIDIN-2-YLIDENE-2,(4-CHLOROPHENYL) SEMICARBAZONE AND ITS PD(II) COMPLEX

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ABSTRACT
A novel Schiff base ligand has been prepared by condensation between 4-chlorophenylsemi- carbazide and 2-pyrrolidone in the presence of glacial acetic acid with aim to elucidating their structures and determining their antimicrobial activities. The ligand and its Paiiadium(II) complex were characterized using GC-MS, UV-Vis., IR, XRD, conductivity, melting point measurements and magnetic studies. The ligand and its palladium (II) complex were tested in vitro anti-bacterial activities against S. aureus, E. coli, K. pneumonia, B. subtilis and for anti-fungal activities againt A. flavus and C. albicans. The ligand and its Palldium (II) complex are pure crystals with space group symmetries of p3$_1$21 and p63/mmc and respective cell volumes of 130.907 and 349.022Å^3. The complex is diamagnetic with square pyramidal geometry. GC-MS results revealed respective m/z values of 256.2 and 498.2 for the ligand and the complex. V(M-N) absorption band was observed at 621cm^{-1} only in the palladium (II) complex of the ligand. Among organisms tested, palladium (II) complex of the ligand proved to be a more potent antimicrobial agent against E. coli, B. subtilis and C albicans. Palladium (II) complex exhibited better antimicrobial activity than the free ligand.

Keywords: *Semicarbazones, chelates, pyrrolidone moiety, Anti-bacterial activities, Anti-fungal activities.*

EMPOWERING THE NEXT GENERATION: AI IN CYBERSECURITY EDUCATION FOR RESILIENT DIGITAL SOCIETIES

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Abstract
In an era marked by rapid digital transformation and increasing cyber threats, equipping the next generation with strong cybersecurity skills is vital for creating resilient digital societies. As reliance on digital infrastructure grows, cybersecurity education has become a vital component of sustainable development in the 21st century. This paper investigates how Artificial Intelligence (AI) can transform cybersecurity education by fostering inclusive, adaptive, and future-ready learning environments aligned with the Sustainable Development Goals (SDGs). It specifically links cybersecurity education to quality education (SDG 4), decent work and innovation (SDG 8–9), and strong institutions (SDG 16), presenting it as a crucial part of transformative learning. AI-powered tools, such as intelligent tutoring systems, real-time threat simulation platforms, and personalised learning analytics, allow educators to deliver dynamic, context-aware instruction. These innovations not only improve technical skills but also build ethical awareness and digital responsibility, preparing learners to navigate increasingly complex digital landscapes. The study employs a qualitative exploratory research approach, supported by a systematic review of literature and thematic analysis, to examine case studies, pedagogical frameworks, and emerging technologies that demonstrate AI's potential to democratise access to cybersecurity knowledge, close skill gaps, and foster a culture of resilience. Ultimately, this paper contends that integrating AI into cybersecurity education is more than just a technological advancement; it is a strategic necessity. By empowering learners with both skills and ethical principles, AI-enhanced cybersecurity education contributes to building informed digital citizens and protects the integrity of tomorrow's interconnected world.

Keywords*: Cybersecurity Education, Artificial Intelligence (AI), Sustainable Development Goals (SDGs), Inclusive Learning Environments, Digital Literacy, Ethical Awareness*

FACTORS INFLUENCING ACCESS TO AGRICULTURAL CREDIT AMONG FARMER'S COOPERATIVE SOCIETY'S MEMBERS IN ANAMBRA STATE

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Abstract

This study examined the determinants of agricultural credits access among members of farmers' multipurpose cooperative societies in Anambra state. The Specific Objectives of the study is to investigate the effect of educational background of cooperative farmers in accessing agricultural credit in Anambra state and to analyzed the size of farm land of cooperative farmers and its effect in accessing agricultural credit in Anambra state, In line with the above objectives, two research questions and two hypotheses were formulated. This study was particularly anchored on the social exchange theory. It was carried out in three agricultural zones in Anambra state, Nigeria. A multi stage random sampling technique was used to arrive at a sample size of twenty four cooperative societies with membership strength of 286 farmers as sample size. The instrument for data collection was a set of structured questionnaire on a 5-point likert-scale Data was analyzed using the multiple regression models. Model results indicated that Educational background of members of farmers multipurpose cooperatives significantly (3.00), t (285) = 23.98, 13.13 and 20.63; and p-values = .000have effect on agricultural credit access and Farmland size significantly (3.00), t(285) = 13.01, 4.88and 12.91; and p-values = 0.000, respectively have effect on agricultural credit access. In line with the findings of this study, it is recommended that there should be a deliberate policy aimed at providing free educative seminars to all illiterate farmers to teach them possible ways and methods of acquiring as well as proper utilization of agricultural credit. Good Policies on land redistribution should be made to make more land available to cooperative farmers, especially the experienced farmers.

Keywords; Agricultural credit, educational background, size of farmland, cooperative societies

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INCLUSION OF ETHNOGRAPHY OF SPEAKING IN L2 SPEAKING SKILL: PANACEA FOR EDUCATION POLICY, IMPLEMENTATION AND REFORM

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ABSTRACT

In Second Language Teaching (SLT) of speaking skills, attention is paid more on performance while little attention is paid in the aspect of social communication performance. More scholars advocate for the inclusion of the culture of the native speakers in ESL without considering what is acceptable in the cultural environment of the ESL learners. This paper examines the cultural correctness in communication while using the Second Language to communicate. This paper uses descriptive research design to explore the relevance integrating local culture in communication skill of ESL learners. The study was anchored on Communicative Theory. The propounder of communication theory assert that the meaning of words is basically determined by the society, that is, the meaning of what is communicated must be said the way the society permits language should be used in various occasions. This work upholds that the social use of language is of great essence in teaching language. This paper adopts the theory of Ethnography of communication (EC) which accounts for actual communication events and occasion in order to understand distinct cultural ad contextual dimensions of communication. This paper explored the opinion of other researchers on this topic to highlight the importance and necessity for the inclusion of ethnography of communication in the learning of speaking skills.

***Keywords**: Second language teaching, communicative theory language, ethnography of speaking*

ARTIFICIAL INTELLIGENCE AND SUSTAINABLILITY IN URBAN DEVELOPMENT IN VOCATIONAL EDUCATION PROGRAM

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Abstract

The study investigated vocational educators' perception of integrating artificial intelligence in Vocational Education programme for improving students' smart waste management skills for sustainable urban development in Anambra State. Two research questions guided the study and two null hypotheses were tested at 0.05 level of significance. The population of the study comprised 238 Vocational Educators in four public tertiary institutions in Anambra State. The entire population was used without sampling. Two structured validated questionnaires were used to collect data for the study. The internal consistency of the instrument was ascertained using Cronbach Alpha reliability method and yielded co-efficient values of 0.87 and 0.88 for clusters 1 and 2 respectively with an overall reliability co-efficient of 0.86 for QIAIVEISSWMS. Furthermore, the application of the Cronbach Alpha reliability for the two clusters yielded coefficient values of 0.96 and 0.85 for clusters 1 and 2 respectively with an overall reliability co-efficient of 0.91 for QSWMSSUD. Mean, standard deviation and paired sample t-test were used to analyze the data. Findings of the study revealed that the integration of AI in Vocational Education programme in tertiary institutions would improve students' AI-enabled waste monitoring skills for sustainable urban development in Anambra State, Nigeria to a high extent. Furthermore, findings of the study revealed that the integration of integration of AI in Vocational Education programme in tertiary institutions would improve students' AI-driven waste sorting and route optimization skills for sustainable urban development in Anambra State, Nigeria to a high extent. It was also revealed that the integration of AI in vocational education significantly improves students' smart waste management skills. Based on these finding it was recommended among others that administrators of Vocational Education programmes should integrate AI into their curricula to equip students with practical skills in IoT enabled waste monitoring, AI driven waste sorting and route optimization.

***Keywords**: Artificial Intelligence, Vocational Education, Smart Waste Management, Skills, Sustainable Urban Development*

DIGITAL TAXATION AND REVENUE MOBILIZATION IN NIGERIA: 2012 – 2024

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ABSTRACT

This study examined the effect of digital taxation on revenue mobilization in Nigeria from 2012 to 2024, focusing on the impact of digital stamp duty and electronic value-added tax (e-VAT) platforms. Using secondary time series data, the study employs multiple regression modeling to investigate how digital tax platforms influence tax revenue performance, with GDP and inflation included as control variables. The results of the Ordinary Least Square Regression reveal that both digital stamp duty and e-VAT have a statistically significant positive effect on revenue mobilization, suggesting that tax digitalization has enhanced the efficiency, transparency, and compliance levels in Nigeria's tax system. The findings align with earlier empirical studies that emphasize the benefits of digital tax reforms but also highlight the need for macroeconomic stability. The study concludes that expanding and strengthening digital tax platforms is essential for boosting non-oil revenue performance and recommends targeted policy support, technological investment, and economic stabilization efforts to sustain these gains.

***Keywords:** Tax digitalization, digital stamp, e-VAT, VAT revenue, and Stamp duty revenue*

ARTIFICIAL INTELLIGENCE AND SUSTAINABLE EDUCATIONAL PERFORMANCE OF STUDENTS IN TERTIARY INSTITUTIONS IN NIGERIA.

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ABSTRACT

The rapid advancement of artificial intelligence has ushered in transformative changes across various sectors especially in the education sector. Artificial intelligence has the potentials to revolutionize higher education by bridging educational gaps, improve academic performance and prepare Nigerian students for a technology driven future. The motivation for the study emanated due to lingering issues and educational concerns bordering on overcrowded classrooms, limited access to quality resources, lecturer shortage, frequent academic disruptions. These challenges have therefore hindered the quality of education in tertiary institutions in Nigeria. To address these abnormalities in the education system, the introduction of AI technologies such as expert systems, virtual assistant and adaptive learning platforms offers solutions to these mitigating challenges by personalizing learning, enhancing access to quality education and improving engagement of students in Nigerian tertiary institutions. Therefore, this research work aimed to investigate how educational performance of students in tertiary institutions in Nigeria could be achieved through artificial intelligence. Specifically, the study aimed to examine how expert systems, virtual assistant and adaptive learning platforms will enhance educational performance of students in tertiary Institutions in Nigeria. Accordingly, the study adopted a descriptive research design using a survey method to source the needed data from the respondents. The target population of the study consist of students from selected tertiary institutions in Anambra State, Nigeria. Partial least square structural equation modelling (PLS-SEM) was used to test the formulated hypotheses of the study at 5% level of significance. The findings of the study revealed that expert systems, virtual assistant and adaptive learning platforms will significantly and positively enhance educational performance of students in tertiary institutions in Nigeria. The study recommended that tertiary institutions in Nigeria should partner with EdTech providers such as uLesson, Moodle in order to develop offline capable platforms which aligns with NUC curricula. The study recommended that tertiary institutions in Nigeria should develop open source virtual assistant for academic queries which could also support local language in Nigeria. The study also recommended that tertiary institutions in Nigeria should implement an open source expert system for course advising and automated grading.

Keywords: Artificial intelligence, educational performance, students, tertiary institutions, Nigeria.

CONSTRUCTION OF TRANSMUTED PROBABILITY MASS FUNCTION OF DISCRETE UNIFORM DISTRIBUTION ON A DEFINED INTERVAL [A,B].

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Abstract

Considering that events occurring at unit intervals may decrease or increase over time, we seek to define a probability distribution function on [a, b] with respect to transmuted probability mass function of discrete uniform distribution property of the values. It is an improvement on well known discrete distribution function.

Keywords: *Probability mass function, Uniform distribution, Expectation, Discrete random variable.*

IMPACT OF ARTIFICIAL INTELLIGENCE ON SUSTAINABLE MANAGEMENT OF AGRICULTURAL COOPERATIVE SOCIETIES IN SOUTH EAST NIGERIA

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ABSTRACT

This study explores the transformative role of Artificial Intelligence (AI) in enhancing the sustainable management of agricultural cooperative societies in South East Nigeria. However, the motivation for the study emanated due to poor financial tracking and scalability issues, inadequate access to real-time data on weather patterns; soil health, market trends leading to suboptimal decision-making; and resource mismanagement. The specific objective of this study is to evaluate the extent to which AI technologies improve operational efficiency and resource management in agricultural cooperative societies in South East Nigeria; assess the impact of artificial intelligence (AI) adoption on environmental and socio-economic sustainability indicators within these agricultural cooperative societies in South East Nigeria. The theoretical framework is anchored on the Technology Acceptance Model (TAM) and Diffusion of Innovations Theory, The target population includes members of agricultural cooperatives in Enugu, Anambra, Imo, Abia, and Ebonyi states. A stratified random sampling technique was used to select 200 respondents from 10 agricultural cooperatives, ensuring representation across demographics. This research employs a quantitative research design, utilizing surveys to collect primary data from agricultural cooperative members in South East Nigeria. Quantitative analysis involved descriptive statistics, correlation, and multiple regression analysis using SPSS software. Findings reveal that artificial intelligence (AI) adoption significantly enhances operational efficiency, resource optimization, and sustainability outcomes. The findings also highlight artificial intelligence (AI's) potential to strengthen cooperative management, enhance food security, and promote sustainable development, while emphasizing the need for infrastructure, training, and inclusive policies to bridge technological gaps. The study provides policy recommendations to foster artificial intelligence (AI) integration, bridging technological divides and promoting equitable development in the region's agricultural cooperatives.

Keywords:
Artificial intelligence, Sustainability, Management, Agricultural Cooperative Societies, South East Nigeria.

ARTIFICIAL INTELLIGENCE IN ENGINEERING TEACHING AND LEARNING: A PATHWAY TO SUSTAINABLE DEVELOPMENT IN NIGERIA

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ABSTRACT

Nigeria's path to sustainable development is intrinsically linked to the capacity of its engineering workforce. However, traditional pedagogical methods in engineering education often struggle to adequately address the complex, interdisciplinary challenges of sustainability. This paper argues that the strategic integration of Artificial Intelligence (AI) into engineering teaching and learning offers a transformative pathway to embed the principles of the United Nations Sustainable Development Goals (SDGs) into the core of Nigerian engineering curricula. Drawing from over a decade of experience as an engineer and academic, this paper proposes a framework for utilizing AI powered tools such as intelligent tutoring systems, predictive modelling for resource management, and virtual reality simulations for green infrastructure design to create immersive, problem-based learning experiences. We explore how AI can personalize learning, bridge infrastructure gaps through virtual labs, and equip students with the data driven decision making skills necessary to design resilient, sustainable solutions for Nigeria's unique challenges in energy, water, waste management, and infrastructure. The paper addresses potential implementation challenges, including digital literacy and infrastructure deficits, and proffers pragmatic strategies for faculty development and institutional adoption. Ultimately, we posit that AI is not merely a technological aid but a fundamental pedagogical tool that can catalyse the evolution of a new generation of Nigerian engineers who are innately sustainability-conscious and globally competitive.

Keywords: Artificial Intelligence, Engineering Education, Sustainable Development Goals (SDGs), Higher Education, Nigeria.

CONTEXTUALIZING E-LEARNING EXPERIENCES WITH INDIGENOUS COMMUNITIES: A PRACTICAL, RESEARCH-BASED APPROACH

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ABSTRACT

During the COVID-19 pandemic, more than 300,000 students in Peru dropped out of the school system. Most of the students were rural Indigenous students. A lack of infrastructure and connectivity, as well as a lack of contextualized and appropriate educational resources, made it virtually impossible for rural students to engage in formal learning. The pandemic has made clear the need and viability for distributed e-learning in rural communities. However, creating e-learning content that is contextualized to support vulnerable students' learning has been a challenge. Little to no research has discussed how to contextualize e-learning to address both its promises and challenges. In this research note, we discuss an initiative to bring together advances in contextualized learning and e-learning to address problems with access to quality materials and curriculum in rural Peruvian schools. We highlight how interdisciplinary collaborations can support innovations and improve educational access for low-income students from remote regions through distributed learning. While research has found significant promise in contextualized education, the processes of engaging in contextualized digital learning and in low-income communities have proven difficult to implement. We discuss the concepts, research base, processes, and technology required to address these needs, as well as the curricular and pedagogical approach we take in this initiative.

Keywords*: Digital learning, contextualized learning, e-learning, Indigenous education*

MACHINE LEARNING-BASED TECHNIQUE FOR SPECTRUM ALLOCATION IN 5G NETWORKS

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Abstract

The exploitative increase in mobile data traffic and the spread of connected devices has increased the pressure on effective spectrum allocation in Fifth-Generation (5G) networks. Conventional, fixed spectrum management strategies are becoming less effective in response to the very dynamic and heterogenous nature of 5G conditions, which commonly results in under-utilization of spectrum, enhanced levels of interference, and diminished quality of service. This study proposes a machine learning-based spectrum allocation technique using a Deep Q-Network (DQN) reinforcement learning model to address these challenges. A publicly available dataset of 5G spectrum usage on the Kaggle platform consisting of 50, 000 records was used and includes such key parameters as Signal-to-Noise Ratio (SNR), Channel State Information (CSI), User Equipment (UE) density, bandwidth usage, traffic demand, and level of interference. The DQN agent was trained to make real-time, context aware spectrum allocation decisions, depending on the current network states, where spectral efficiency, throughput, latency, interference as well as fairness index were used as a metric to assess performance. The experimental findings showed that the proposed model attained spectral efficiency of 4.85bits/s/Hz, 980 Mbps throughput on average, 11ms latency, 8.2dB interference, and a fairness index of 0.93, which was superior in all metrics compared to the traditional methods of statical allocation. These results indicate that reinforcement learning can be effectively used in dynamic spectrum management in 5G networks, which provides a scalable and adaptable solution to the improvement of network functionality and the utilization of resources in next-generation wireless networks.

Keywords: *5G Networks; Spectrum Allocation; Machine Learning; Deep Q-Network (DQN); Reinforcement Learning; Spectral Efficiency.*

BACTERIOLOGICAL QUALITY OF HERBAL MIXTURES SOLD IN AWKA METROPOLIS OF ANAMBRA STATE. NIGERIA.

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ABSTRACT

Herbal mixtures are widely consumed in the world over for therapeutic and health maintenance purposes. However, their quality and safety are often unregulated, raising concerns about microbial contamination. This research investigated the bacteriological quality of 10(ten) herbal mixture samples purchased from various retailers in Awka. The research aimed to determine the bacterial loads, isolate, characterize and identify bacterial species present using standard microbiological methods. The results revealed a significant and concerning level of microbial contamination across most herbal samples, with several exceeding the World Health Organization's (WHO) permissible limits of 10^4 cfu/ml for non-sterile herbal medicinal products. The mean pH values of the samples ranged from 2.93±0.076 to 5.72±0.076. The study identified high bacterial loads, with THBC(Total heterotrophic bacterial count) reaching up to 2.45 X 10^3 log cfu/ml. The presence of coliforms was widespread, with TCC (Total coliform Count) and TFCC(Total faecal coliform count) loads reaching up to 1.99 X 10^3 and 1.88 X 10^3 log cfu/ml, respectively. Furthermore, key pathogens were detected, which include Staphylococcus aureus (up to 1.77 X 10^3 log cfu/ml), Salmonella (up to 1.96 X 10^3 cfu/ml), and Shigella (up to 1.75 X 10^3 cfu/ml). The identified isolates, which include Salmonella spp. and Escherichia coli, were characterized as Gram-negative rods or Gram-positive cocci. In vitro pathogenic profiling confirmed their virulence, whereby all tested strains showed β-hemolysis on blood agar and a positive reaction to the Congo red binding assay. The consistent absence of essential labeling information, such as manufacturing and expiry dates, across all samples further revealed a critical lack of quality control and regulatory oversight. Collectively, these findings showed a significant risk associated with the consumption of these herbal mixtures in Awka, necessitating stricter regulatory oversight and quality control measures for these consumed products.

Keywords: *Herbal mixtures; Bacterial isolates; Awka metropolis; Bacteriological quality.*

CURRICULUM CHANGE AND THE INTEGRATION OF ARTIFICIAL INTELLIGENCE: IMPLICATIONS FOR LEARNING ENVIRONMENT AND STUDENTS' QUALITY OF LIFE IN NIGERIA

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ABSTRACT.

Curriculum change is central to educational reform in Nigeria, particularly with the growing demand to integrate Artificial Intelligence (AI) into teaching and learning. This study investigates the relationship between curriculum change involving AI, the learning environment, and students' quality of life in Nigeria, using Metropolitan College, Onitsha, Anambra State as a case study. The study population consisted of 748 students of 2025 academic session, including 413 junior class students (55.2%) and 335 senior class students (44.8%). A descriptive survey design was employed, and structured questionnaires were distributed to a stratified sample representing 20% of the total population (n = 150). Data were analyzed using descriptive statistics and correlation analysis. Findings indicate that 72% of respondents agreed that AI-driven curriculum reforms improved access to interactive learning resources, while 65% reported enhanced classroom engagement. Similarly, 58% noted that AI-supported learning reduced academic stress and improved motivation, directly impacting students' quality of life. Despite these benefits, 61% of students identified infrastructural limitations, such as poor internet connectivity, as a major barrier, while 54% emphasized inadequate teacher training in AI usage. The study concludes that AI integration in Nigeria's curriculum significantly improves the learning environment and students' well-being, but sustained policy support and resource allocation are essential for success. It recommends increased investment in digital tools, structured teacher training, and student-centered AI applications to maximize educational outcomes and quality of life.

Keywords: Curriculum change, Artificial Intelligence, learning environment, students' quality of life, Nigeria

SUSTAINABLE NUTRITION AND PROXIMATE COMPOSITION OF BREAKFAST FOR SCHOOL-AGED CHILDREN USING LOCALLY SOURCED INGREDIENTS

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Abstract

This research evaluated the proximate composition of locally sourced and formulated breakfast meals for school-aged children, contributing to sustainable nutrition. An experimental design was adopted to produce flours from various locally available foodstuffs, including corn, date, sweet potato, oat, and bonga fish. Three samples of breakfast meals were formulated at different ratios using these composite flours. Standard laboratory analytical method of Association of Official Analytical Chemists (AOAC) laboratory analytical methods were employed to determine the proximate composition of the samples. The results revealed that the samples contained significant amounts of moisture content (7.59-9.72%), dry matter (90.28-92.41%), ash (1.91-2.87%), crude protein (12.91-14.83%), crude fibre (2.15-2.40%), fat (6.31-8.75%), CHO (61.57-68.62%), and energy (384.84-387.65%) respectively. These findings support the use of local ingredients in child nutrition, may better support the nutritional needs of school-aged children, particularly for cognitive development, energy metabolism, and immune function. These findings support the use of local ingredients in child nutrition, aligning with Sustainable Development Goals 2 (Zero Hunger), 3 (Good Health and Well-being), and 12 (Responsible Consumption and Production). Further studies are recommended to examine the health benefits and shelf-life of these breakfast formulations. Further studies are recommended to examine these breakfast formulations' shelf-life.

Keywords: *Breakfast, Composition, locally sourced, Meal, Proximate, School-aged children, Sustainable nutrition.*

DIGITAL INNOVATIONS FOR SUSTAINABLE DEVELOPMENT IN THE TIME OF CRISIS

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ABSTRACT

This research aims to explore the relationship between digital innovations and sustainable development before and during the pandemic, taking into consideration the level of development of countries. The researchers employed both qualitative and quantitative methods, including a critical review of the literature and the analysis of a database of 36 states including FCT Abuja, using various indications such as the global sustainability index, global innovation index, human capital and research, infrastructure, business sophistication, knowledge technology outputs, state innovation performance, and creative output. The investigated State have been categorized into three clusters based on the level of sustainable development and their characteristics before and during the pandemic have been examined. The study also explored the relationship between global sustainability and digital innovation. The results suggest that global action is needed to address structural factors perpetuating inequality and underdevelopment in less-developed States. Hence, this research offers insights into the potential of digital innovations in promoting sustainable development during crises. Policymakers, development practitioners, and scholars interested in sustainable development can benefit from this research to design more effective policies and interventions for different State clusters to understand the impact of the pandemic on sustainable development and development and develop more effective responses.

Keywords: *digital innovations, sustainable development, pandemic, virtual management*

LINKING TRANSFORMATIVE AI LEARNING AND MEMBER ENGAGEMENT TO SUSTAINABLE PERFORMANCE IN AGRICULTURAL COOPERATIVES.

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ABSTRACT

This study examines how transformative AI learning and member engagement shape the sustainable performance of agricultural cooperatives. The research positions sustainable performance as the dependent variable, capturing economic, environmental, and social outcomes, while transformative AI learning and member engagement serve as the independent variables. We conceptualize transformative AI learning as members' and managers' exposure to, proficiency with, and application of AI-enabled tools for production, marketing, and governance. Member engagement is defined as active participation in meetings, committees, co-decision making, and volunteer contributions. Using a cross-sectional survey of cooperative leaders and members complemented by key informant interviews, the study employs partial least squares structural equation modeling to test direct and interaction effects, and explores digital readiness and cooperative size as control factors. The proposed model tests whether AI learning directly improves sustainable performance and whether this relationship is amplified at higher levels of member engagement. Anticipated contributions include a validated measurement framework for sustainable cooperative performance, evidence on the complementary roles of skills development and participatory governance, and practice-oriented guidance on capacity building, change management, and inclusive digital adoption. The findings aim to inform policymakers, apex cooperative bodies, and development partners on scalable strategies that align cooperative modernization with Sustainable Development Goals.

Keywords: *Transformative AI learning, Member engagement, Agricultural cooperatives, Sustainable performance, Sustainable Development Goals (SDGs).*

ARTIFICIAL INTELLIGENCE AS A TOOL FOR SUSTAINABLE DEVELOPMENT IN COOPERATIVE ECONOMICS AND MANAGEMENT

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Abstract

This study investigates Artificial Intelligence (AI) as a tool for sustainable development in cooperative economics and management, with a focus on students in the Department of Cooperative Economics and Management, Nnamdi Azikiwe University, Awka. The population comprised 150 newly admitted students of the 2024 academic session. Using Yamane's (1967) formula for sample size determination at a 5% margin of error, a representative sample of 109 students was selected. A descriptive survey design was adopted, and data were collected using structured questionnaires. Descriptive statistics (percentages and means) and chi-square tests were employed for data analysis. Findings showed that 72% of respondents believe AI enhances transparency and accountability in cooperative management, while 68% agreed it promotes financial inclusion by broadening access to cooperative services. Additionally, 64% reported that AI improves resource management and reduces waste, thereby contributing to environmental sustainability. However, 59% of respondents identified inadequate digital infrastructure and 55% highlighted low technical literacy as major barriers to AI adoption. The null hypothesis, which stated that AI has no significant effect on sustainable development in cooperative economics and management, was rejected at a 0.05 significance level ($\chi^2 = 21.47$, $p < .05$). The study concludes that AI can significantly promote sustainable development in cooperative management if integrated into education and practice. It recommends targeted investment in digital infrastructure, policy support, and training programs to enhance AI literacy and adoption among cooperative stakeholders.

***Keywords**: Artificial intelligence, Sustainable development, Cooperative Economics and Management.*

EXPLORING THE IMPACT OF DIGITAL TRANSFORMATION ON SMALL AND MEDIUM-SIZED ENTERPRISES (SMES) IN SELECTED FIRMS IN ANAMBRA STATE

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Abstract

This study investigates the impact of digital transformation on Small and Medium-sized Enterprises (SMEs) in developing economies, focusing on the challenges, opportunities, and policy implications for SME growth and development. A mixed-methods approach is employed, combining surveys of 300 SMEs with in-depth interviews of 10 business owners in selected SMEs organisations in Anambra State. The findings reveal significant relationships between digital transformation, innovation, and SMEs' competitiveness, improves customer engagement, and increases access to new markets. However, infrastructure constraints, skills gaps, and regulatory barriers hinder digital adoption. This study identifies key drivers of digital transformation for SMEs, including cloud computing, big data analytics, and social media. It also highlights the importance of government support, infrastructure development, workforce development, and workforce training in facilitating digital transformation. Policy recommendations are provided to address the challenges and leverage digital transformation for inclusive economic growth. These include investing in digital infrastructure, promoting digital literacy, and implementing policies that encourage innovation and entrepreneurship. This research contributes to understanding of digital transformation's impact on SMEs in developing economies, informing policymakers, practitioners and scholars.

***Keywords:** Digital transformation, SMEs, developing economies, innovation, policy implications.*

LEVERAGING AI-ENHANCED INTERVENTIONS FOR SUSTAINABLE ACADEMIC ACHIEVEMENT

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Abstract

School phobia and lack of peer acceptance pose significant barriers to academic achievement among secondary school students in resource-constrained settings like Anambra East Local Government Area (LGA), Anambra State, Nigeria. This study investigates how artificial intelligence (AI)-driven interventions can mitigate school phobia and enhance peer acceptance to foster sustainable academic, aligning with Sustainable Development Goal 4 (Quality Education). Grounded in self-determination theory and social learning theory, the research explores AI technologies, including virtual counseling chatbots and social-emotional learning platforms, to address psychological and social challenges. A correlational design was employed with 300 secondary school students in Anambra East, using culturally adapted instruments (School Refusal Assessment Scale, Peer Acceptance Scale, and Academic Achievement Scale). Supervised machine learning models analysed patterns, identifying at-risk students and predicting intervention outcomes. Findings reveal a significant correlation ($r = 0.62$, $p < 0.01$) between AI-mediated peer support and increased academic achievement, with chatbot-based counseling reducing school phobia symptoms by 25%. These scalable AI interventions promote inclusive school environments, offering cost-effective solutions for equitable education. The study advances guidance counseling by providing evidence-based strategies for student mental health and social integration, while aligning with global educational technology trends. Findings are applicable to resource-limited settings worldwide, promoting sustainable academic success. Recommendations include integrating AI-driven counseling tools into school programmes in Anambra East and similar contexts to enhance student engagement and academic outcomes.

***Keywords**: School Phobia, Peer Acceptance, Sustainable Academic Achievement, Artificial Intelligence, Guidance Counselling, Anambra East.*

STRUCTURAL CREDIT RISK MODELS WITH STOCHASTIC DEFAULT BARRIERS AND JUMP CLUSTERING USING HAWKES JUMP-DIFFUSION MODEL

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ABSTRACT

This research derives a closed-form expression for the default probability and the default correlation of firms under a structural model of credit risk. Specifically, the underlying firms are assumed to have the value process driven by a Hawkes jump diffusion model with the continuous parts of the trajectories being driven by correlated Brownian motions, while the jumps being driven by Hawkes processes having general structure of the exciting functions. The proposed framework takes into account the numerically observed facts about the default, i.e., clustering and unexpectedness. Furthermore, the default barriers are assumed to be stochastic in nature and modeled as stochastic processes, affected by common factors reflecting the systematic risk. A sensitivity analysis of default probability and correlation is conducted to investigate the impact of jump risk, clustering and stochastic default barriers. These numerical studies demonstrate that jump clustering increases the default probability but reduces the correlation of defaults.

***Key words:** credit risk, default clustering, Hawke process, jump-diffusion process, stochastic default barriers.*

INTEGRATING ARTIFICIAL INTELLIGENCE AND SYNTHETIC BIOLOGY FOR SCALABLE PRODUCTION OF PLANT-BASED THERAPEUTICS: A SUSTAINABLE APPROACH TO HEALTH AND BIOECONOMIC DEVELOPMENT

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ABSTRACT

Plant-derived therapeutics such as paclitaxel and artemisinin remain cornerstones of modern medicine, yet large-scale production is limited by low yields, endangered sources, and complex biosynthetic pathways. Synthetic biology now enables pathway reconstruction in microbial and plant hosts, while artificial intelligence (AI) accelerates enzyme discovery, pathway optimization, and design–build–test–learn cycles. Together, these tools create programmable platforms for scalable access to high-value compounds. This paper reviews advances in AI-driven synthetic biology for natural products and introduces an Africa-centered framework that embeds indigenous biodiversity into global innovation pipelines. As a case illustration, preliminary metabolomic analyses of Coffea canephora treated with bacterial elicitors (lipopolysaccharides from Pseudomonas fluorescens and surfactin from Bacillus subtilis) reveal elicitor-specific metabolic shifts, including enrichment of phenolics and chlorogenic acid derivatives with pharmaceutical potential. This demonstrates how synthetic-biology-inspired elicitation, coupled with computational metabolomics, can reprogram plant metabolism in a modular way and guide drug discovery pipelines. By integrating African biodiversity with advanced biotechnologies, this strategy not only addresses global production bottlenecks but also strengthens the foundations of a sustainable bioeconomy, advancing health innovation, equitable pharmaceutical access, and international biotechnology priorities. Equally important, embedding AI-enhanced synthetic biology approaches into higher education, training, and interdisciplinary research networks will empower the next generation of scientists, foster capacity building in computational and biotechnological literacy, and create global partnerships that align Africa's biodiversity with sustainable development goals, ensuring long-term international impact.

Keywords: artificial intelligence, synthetic biology, Coffea canephora, metabolomics, phytochemicals, pharmaceutical innovation, Africa bioeconomy.

NUTRIENT AND SENSORY PROPERTIES OF COOKIES MADE FROM YELLOW COCOYAM (*XANTHOSOMA SAGITTIFOLIUM*) AND WHITE CASSAVA (*MANIHOT ESCULENTA*) FLOUR BLENDS ENRICHED WITH *MORINGA OLEIFERA* LEAVES

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Abstract

Cookies are the smallest treats commonly forced into shapes, consumed among all age groups in many countries. Cookies and pastries could be made from flours of local crops. To evaluate the proximate and sensory properties of cookies from composite flour blend of yellow cocoyam, white cassava enriched with Moringa oleifera leaves. Baking ingredients used were purchased from Owerri main market, Imo State, moringa leaves were harvested from polytechnic farm. The cocoyam, cassava and moringa leaves were processed into flour and packed in air tight container before subjection to proximate, mineral, vitamin and sensory evaluation using standard methods of AOAC. The nine-point Hedonic scale was used to evaluate sensory properties of the cookie samples. The cookies produced was enriched with moringa leaves using the standard procedure in the proportion of 100% wheat – A, 60:30:10 –B; 40:40:20 -C and 30:60:10-D percent of cocoyam, cassava and moringa leaf powder respectively. Moisture ranged from 9.15% to 12.03%. There was slight variation in protein content of the cookies. Fat content ranged from 5.08% to 9.02%. Fiber content of the samples was almost comparable (2.32 vs 2.00, 2.68 and 2.56). Carbohydrate content of the cookies was high (78.29% - 87.08%). Mineral content showed significant difference ($P<0.05$) in calcium content. The cookies had significant magnesium content (17.80mg, 22.00mg and 19.44mg) than the control (13.62mg).Phosphorus content was against the control (43.26 vs 52.68mg, 56.27mg and 61.87mg) respectively. Vitamin C content of the cookies slightly varied. Sample D had the highest vitamin A content (0.50µ). Sensory attributes of the cookies showed that the colour score for the samples ranged from 6.15 to 8.10. Sample A and B had comparable score for flavor. Sample A had the highest score for texture (8.35). Samples A and B were more acceptable. Moringa leaves can be used in enrichment of cookies and locally flour blend from staple tuber crops in production of cookies and pastries.

Key word: *Nutrient, Cookies, Flour, Enrichment, Moringa leaves.*

Artificial Intelligence (AI) for Sustainable Development in Multilingual Contexts: Insights from English Usage in Anambra State Religious Settings

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ABSTRACT

*This paper explores the integration of Artificial Intelligence (AI) in education for sustainable development within multilingual contexts, drawing insights from the usage of English in religious settings (Catholic, Anglican, Pentecostal) in Anambra State, Nigeria. In Nigeria, Christian religion plays integral roles in the lives of the people. It helps to inculcate good moral values in the lives of the members of the community through the use of language. The study examines how AI can enhance language education and promote inclusivity in diverse cultural settings. By analyzing English language dynamics in these religious contexts, the research identifies pathways for AI to support sustainable education goals through tailored language learning and teaching strategies. Findings highlight the potential of AI to bridge language gaps, foster cultural sensitivity, and contribute to sustainable development in multilingual educational environments. Implications for AI implementation in similar contexts are discussed.**Keywords**: English Usage, Religious Settings, Catholic, Anglican, Pentecostal.*

IOT-BASED SMART SOIL WATER OPTIONS TOWARDS PRECISE AGRICULTURE FOR SELF RELIANCE IN AFRICA.

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The integration of the Internet of Things (IOT) into agriculture, particularly within the African context, represents a transformative shift towards creating a more sustainable, efficient, and self-reliant agricultural sector. Africa with its vast expanses of arable land, diverse climates, and rapidly growing population, stands on the brink of an agricultural revolution that could not only ensure food security for its people but also set a precedent for sustainable development globally. IOT-based smart agriculture promises to harness the power of advanced technology to address some of the most pressing challenges faced by African farmers ranging from erratic weather patterns and water scarcity to pest infestations and soil degradation. The application of IOT in agriculture opens up avenues for African farmers to become more self-reliant and less dependent on unpredictable external factors. This IOT based Agriculture monitoring system makes use of wireless sensor networks that collects data from different sensors deployed at various nodes and sends it through the wireless protocol. This smart agriculture using IOT system is powered by Arduino, it consists of Temperature sensor, Moisture sensor, water level sensor, DC motor and GPRS module. When the IOT based agriculture monitoring system starts, it checks the water level, humidity and moisture level and it sends SMS alert on the phone about the levels. Sensors sense the level of water if it goes down, it automatically starts the water pump. If the temperature goes above the level then the fan starts. This is all that is displayed on the LCD display module. Finally, in Africa, IOT-based smart agriculture holds immense potential to enhance self-reliance by improving productivity, reducing waste and mitigating risks associated with farming.

Keywords: IOT, Precise Agriculture, Arduino, DC motor, GPRS module

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DEVELOPMENT OF AN AI-POWERED ROBOTIC SYSTEM FOR WASTE SORTING AND RECYCLING IN NIGERIA

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Abstract

An AI-powered robotic system *is a robot that utilizes Artificial Intelligence (AI) technologies to carry out tasks independently or with minimal human intervention. These systems rely on AI to analyze data from sensors, make decisions, learn from past experiences and adapt to changes in their environment, enabling them to perform complex functions autonomously. The increasing volume of waste generated globally coupled with the growing demand for efficient recycling systems has highlighted the limitations of traditional manual waste sorting methods. AI-powered robots offer a promising solution to enhance the efficiency, accuracy and scalability of waste sorting and recycling processes. These robots leverage advanced technologies such as computer vision, machine learning and robotics to identify, classify and sort waste materials in real-time by automating sorting tasks. AI systems can significantly reduce contamination in recycling streams, improve throughput and facilitate the recovery of valuable materials, contributing to a more sustainable waste management ecosystem. This paper explores the integration of AI in robotic waste sorting, focusing on key technologies such as deep learning-based object recognition, robotic arm design and reinforcement learning for process optimization. Additionally, it examines the challenges and opportunities in implementing AI-powered waste sorting solutions, including cost-effectiveness, scalability and the potential for human-robot collaboration. The study also considers the ethical and social implications of deploying AI robots in waste management systems. Ultimately, AI-powered waste sorting technologies offer the potential to revolutionize recycling practices, helping to transition toward a circular economy by increasing recycling rates and reducing the environmental impact of waste.*

Keywords: AI, Computer vision, robotics, Machine Learning, deep learning, reinforcement learning

DEVELOPMENT OF AN AI-POWERED MOVIE RECOMMENDATION SYSTEM

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Abstract

This project focuses on the development of an AI-powered movie recommendation system designed to deliver movie suggestions based on individual user preferences. The system integrates collaborative filtering, content-based filtering, and deep learning algorithms to predict and recommend movies that match the user's taste. It collects both explicit feedback (e.g., ratings, reviews) and implicit feedback (e.g., watch history, search behavior), allowing the system to adapt and refine its recommendations in real time. The proposed system architecture consists of a front-end built using HTML, CSS, and JavaScript to provide a responsive and user-friendly interface, a back-end powered by PHP and Laravel for handling server-side operations, and a MySQL database for managing user profiles, movie metadata, and recommendation data. The modular and scalable framework ensures the system can handle a growing number of users and data efficiently. The project aims to address the limitations of existing movie recommendation platforms by improving the accuracy and personalization of recommendations, offering users a more engaging and dynamic movie-watching experience.

Keywords: *AI-Powered, Recommendation System, Collaborative filtering, Content-based filtering, Deep learning algorithms*

ENERGY CONSUMPTION OPTIMIZATION IN WIRELESS SENSOR NETWORK FOR ENVIRONMENT

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Abstract

Wireless sensor network (WSN) has become increasingly common in several fields of human endeavors requiring information gathering and prediction in both military and civil operation. This work has presented modified energy efficient cluster based routing in wireless sensor network for environment monitoring. The scheme uses hierarchical routing protocol technique which is based on the fact that energy used for long transmission of message is very much greater than energy required for sending message over short range. A WSN was developed using MATLAB C code and with the proposed scheme simulations were carried out to analyze and investigate the effectiveness of the system in terms of optimum range of clusters required to optimize energy of WSN which revealed that the maximum number of cluster is 54. The variation of energy per round against the number of cluster shows that energy consumed per by each sensor node in the cluster is reduced as number of cluster is increased. This indicated that with the modified algorithm there is energy consumption optimization in WSN.

Key words: *wireless sensor network, optimization of energy.*

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