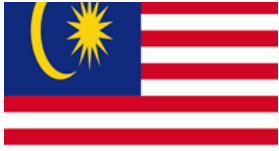


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**International Conference on Arts & Science, Management Studies,  
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**(AMMEL-2026)**

**held at**

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**&**

**University of Malaya, Malaysia,**

**June 04 - 07, 2026**

**Editors**

**Dr.S. Balamuralitharan**

**Dr. Sindhura Kannappan**

**Dr. K. Sujith**

**Dr. Zaira Zaman Chowdhury**



**International Conference on Arts & Science,  
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**International Conference Malaysia-2026**

**International Conference on Arts & Science, Management  
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**First Edition: June 4-7, Year 2026**

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**Edited by**

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# INDEX

<b>S.No</b>	<b>Items</b>
1	Preface
2	About
3	Messages
4	Conference committees
5	Keynote Speakers & Invited Talks
6	List of Papers Presented
7	Abstracts
8	Journal partners
9	Acknowledgements

# PREFACE

Founded in 2013, Chendur Research Foundation (CRF) is dedicated to advancing knowledge through impactful research and academic excellence. The foundation supports innovation across various disciplines by conducting conferences and publishing high-quality research, including papers in Scopus-indexed journals. CRF continues to provide a platform for academicians, researchers, and industry professionals to collaborate and share their ideas.

The International Conference on Arts & Science, Management Studies, Medical Sciences, Engineering and Law (AMMEL-2026) held at Genovasi University College, Petaling Jaya, Selangor, Malaysia & University of Malaya, Malaysia, June 04 - 07, 2026. The aim of this conference is to bring together global experts from academia and industry to exchange knowledge on emerging trends, research advancements, and practical implementations.

AMMEL-2026 features keynote addresses and invited talks by distinguished speakers, along with virtual presentations from researchers around the world. The conference encourages faculty development, alumni engagement, and active participation from young researchers to promote new ideas and strengthen the academic and professional community.

We acknowledge the contribution of the associating institutions, experts, invited speakers, delegates and the conference committee members for their cooperation and excellent support in organizing this conference.

Best Wishes.

**EDITORS**

# ABOUT UNIVERSITY OF MALAYA

The University of Malaya (UM), located in Kuala Lumpur, is Malaysia's oldest and highest-ranking public research university. Renowned for its excellence in education, it consistently ranks among the top 100 globally in the QS World University Rankings and is ranked #1 in Malaysia by U.S. News & World Report.

At a Glance:

- Established: 1905 (as King Edward VII College of Medicine)
- Location: A sprawling 922-acre campus situated in the southwest of Kuala Lumpur.
- Student Body: Over 36,000 students, including a vibrant international community.
- Academic Structure: Features 14 faculties, 2 academies, and 3 institutes, covering fields from medicine and engineering to social sciences and business.

Key Highlights:

- Nation Building: Known for its heavy influence on national leadership, having produced five of Malaysia's Prime Ministers.
- Clinical Excellence: Operates the University Malaya Medical Centre (UMMC), a major teaching hospital offering top-tier medical training.
- Global Recognition: Highly acclaimed for its research output and academic quality across multiple disciplines.

For admissions, program specifics, or more details, you can visit the official Universiti Malaya website

# ABOUT GENOVASI UNIVERSITY COLLEGE

Genovasi University College, located in Petaling Jaya, Selangor, is Malaysia's first and only design thinking-dedicated private university. Established originally in 2012 and upgraded to a university college in 2017, it blends open distance learning with conventional methods to foster creative problem-solving and Industry 4.0 readiness.

## Key Details

- Location: Lot 2A, Jalan 13/2, Seksyen 13, Petaling Jaya, Selangor, Malaysia.
- Core Philosophy: Integrates Design Thinking and innovation into all academic programs, from pre-university up to postgraduate degrees.
- Global Affiliations: It is one of only four Hasso-Plattner Institute (HPI) Certified Design Thinking schools globally.
- Programs Offered: Offers specialized degrees such as MBAs, Bachelor of Commerce, TVET certification, and programs within the School of Complementary, Traditional Medicine, and Allied Health.
- Learning Modality: Focuses on hybrid and blended learning (combining conventional and open distance education) to cater to flexible, real-world professional development.

For more specific information on enrollment, course modules, and admission requirements, visit the official Genovasi University College



**DR.S. BALAMURALITHARAN**

**Message**

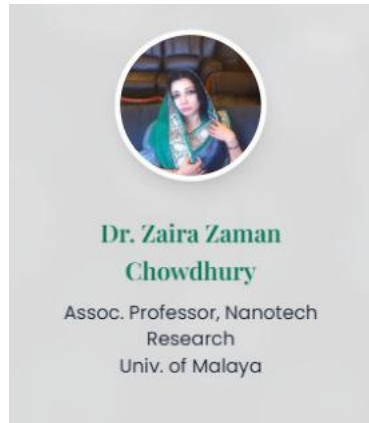
The International Conference on Arts & Science, Management Studies, Medical Sciences, Engineering and Law (AMMEL-2026) held at Genovasi University College, Petaling Jaya, Selangor, Malaysia & University of Malaya, Malaysia, June 04 - 07, 2026. The primary goal of this conference is to bring together experts and researchers from academia and industry to share their knowledge on implementations, to encourage faculty and researchers learn and develop new ideas from world-class excellence and to strengthen the institute through an alumni network. We believe that this conference will be a good platform for the young researchers from various fields.



**DR. K. SUJITH**

**Message**

I am delighted to be part of the International Conference on Arts & Science, Management Studies, Medical Sciences, Engineering and Law (AMMEL-2026) held at Genovasi University College, Petaling Jaya, Selangor, Malaysia & University of Malaya, Malaysia, June 04 - 07, 2026. This esteemed event offers a valuable platform for sharing insights and pioneering ideas that advance the fields of computational mathematics and intelligent engineering. I extend my best wishes to the organizers, participants, and delegates for a highly successful conference, and I hope it becomes a truly enriching and impactful experience for all.



### **Message**

It is with great pride and enthusiasm that I welcome all participants, distinguished speakers, researchers, and professionals to the International Conference on Arts & Science, Management Studies, Medical Sciences, Engineering and Law (AMMEL-2026) held at Genovasi University College, Petaling Jaya, Selangor, Malaysia & University of Malaya, Malaysia, June 04 - 07, 2026, this conference provides a dynamic platform to explore innovative research and emerging technologies in computational mathematics and intelligent engineering. I am confident that the ideas shared and collaborations formed here will inspire meaningful advancements and contribute significantly to the global scientific and engineering community. Wishing everyone a productive and enriching conference experience.

# Conference Committees

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SR University, Warangal,  
Telangana, India



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Manasa Rekha**  
Associate Professor  
Aditya Bangalore Institute of  
Pharmacy Education and Research  
Bangalore Karnataka India



**Dr. Anbazhagan**  
Professor & Head,  
Alagappa University,  
Karaikudi



**Dr. J. Anitha**  
Associate professor,  
Rajalalshmi Institute of  
Technology



**Dr. K. Sujith**  
Dean & Research  
Advisor of Computer Science,  
Annai College, Kumbakonam



**Dr. R. Santhi Devi**  
Associate Professor  
Bharathi Women's College  
Chennai

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Chowdhury**  
NANOCAT, IAS,  
University of Malaya,  
Malaysia



**Subba Rao  
katragadda**  
Johnson & Johnson,  
California , USA



**Dr. Kamal Gulati**  
Associate Professor at Amity  
University, Noida



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School of Computer Science  
and Engineering,  
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**Mr. Settu**  
Lecturer  
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Kadathur



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Adjunct Faculty, SIMATS, Saveetha  
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Post Doctoral Research Fellow,  
Lincoln University College,  
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### Malaysia Tourist Places

#### Batu Caves

Batu Caves is a famous limestone hill and Hindu temple complex near Kuala Lumpur, Malaysia. It is known for its giant golden statue of Lord Murugan and the 272 colorful steps leading to the main cave temple



#### Putrajaya

Putrajaya is a planned city in Malaysia, south of Kuala Lumpur. It is known for its modern architecture, including the pink-domed Putra Mosque, the green-domed Perdana Putra, and the three-tiered Putra Bridge overlooking Putrajaya Lake



#### KL Tower

Kuala Lumpur Tower (KL Tower) is a landmark observation and telecommunications tower in Kuala Lumpur, Malaysia. It offers panoramic city views and features a revolving restaurant.



#### Petronas Twin Towers

The Petronas Twin Towers are iconic twin skyscrapers in Kuala Lumpur, Malaysia. Once the tallest buildings in the world, they are famous for their skybridge and modern Islamic-inspired design.



#### Genting Highlands

Genting Highlands is a popular hill resort in Malaysia, located in the Titiwangsa Mountains near Kuala Lumpur. It is known for its cool climate, theme parks, shopping malls, and entertainment resorts.



#### Langkawi Cable Car

The Langkawi Cable Car (SkyCab) is a popular attraction in Langkawi, Malaysia. It takes visitors up Mount Mat Cincang, offering stunning panoramic views of the rainforest, islands, and the Andaman Sea. The ride is known for its steep ascent and breathtaking scenery.



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## LIST OF PAPERS PRESENTED

ABSTRACT NO.	TITLE
S	<b>Caputo–Fabrizio Modelling of Heat–Mass Transfer in Non-Newtonian Fluid</b>  <b>Dr. Govindan VEDIYAPPAN, Dr. Busayamas Pimpunchat</b>
A1	<b>Survey of Machine Learning Approaches for Parkinson’s Disease Prediction</b>  <b>Ms. Radhika Sreedharan</b>
A2	<b>Geo-Spatial Analysis of Water Availability and Distribution Around Thamaraipakkam Anicut in Thiruvallur District</b>  <b>Mrs.D.Shanbagapriya, Dr. R.Santhi Devi</b>
A3	<b>Reimagining the Blue Economy in the Indian Ocean: Geopolitics, Strategic Chokepoints, and Emerging Security Challenges</b>  <b>Deepika G, Dr. R. Santhi Devi</b>
A4	<b>Nano-Antenna Identification for 5G Wireless Communications Using Elitism–Divergence Harris Hawks Optimization</b>  <b>Dr.Hithaishi P, Prof. Gahan A V, Dr.Manasa P</b>
A5	<b>Boosting Gum Health: CoQ10 and Beta-Carotene vs. Chlorhexidine Gel in Periodontal Therapy</b>  <b>Dr. Brijendra singh</b>
A6	<b>Krushaka Vikas: AI-Driven Futuristic Agriculture System</b>  <b>Prof.Jesmitha S, Dr.Hithaishi P, Prof. Gahan A V, Dr.Manasa P</b>
A7	<b>Nano-Antenna Identification for 5G Wireless Communications Using Elitism–Divergence Harris Hawks Optimization</b>  <b>Dr.Hithaishi P, Prof. Gahan A V, Dr.Manasa P,</b>

	<b>Prof. Jesmitha S</b>
<b>A8</b>	<b>Uniqueness of Complex Delay-Differential Polynomial with Paired Hayman Conjecture</b> <b>Manu H. M, Rajeshwari S, Nagaswara P, Bhuvaneshwari T</b>
<b>A9</b>	<b>A Mathematical Model for Cancer Diagnosis Using Neutrosophic Sets and Topology</b> <b>Dr. C. Selvi, Dr. N. Niranjana</b>
<b>A10</b>	<b>Herbal Medicines Used in the Treatment of Diabetes Mellitus in Seshachalam Forest of Andhra Pradesh, India</b> <b>P. Mahesh, D. Veera Nagendra Kumar</b>
<b>A11</b>	<b>Environmental &amp; Sustainable Governance in Tamil Nadu</b> <b>Dr R. Santhi Devi, Santhanam. U</b>
<b>A12</b>	<b>Integrating ESG Metrics and Artificial Intelligence for Sustainable Financial Risk Management</b> <b>Dr. M. Sankaramuthukumar, Harihara Pandian C, Dr. Yabesh Abraham Durairaj Isravel, Kiran R, Srikanth S, Muthu Dinisha M</b>
<b>A13</b>	<b>Predictive AI and Digital Concerns in Healthcare and Fintech</b> <b>Ms. Vinita Kumari, Dr. Sudhanshu Verma</b>
<b>A14</b>	<b>Values-Based Engagement and Purchase Intention Among Gen Z Consumers</b> <b>Dr. R. Ramesh</b>
<b>A15</b>	<b>A Comprehensive Review of Vision-Based Deep Learning Techniques for Driver Drowsiness Detection</b> <b>Nrusimhadri Naveen, Dr.Aarti</b>

A16	<p style="text-align: center;"><b>Spatio-Temporal Deep Learning for Ecological Monitoring and Desilting Prediction of Pallikaranai Marshland: A Hybrid U-Net &amp; ConvLSTM Approach</b></p> <p style="text-align: center;"><b>Dr. Sandhya P, Arshdeep Singh Kalsi, Amrithesh S. Manon</b></p>
A17	<p style="text-align: center;"><b>Herbal Medicines Used in the Treatment of Diabetes Mellitus in Seshachalam Forest of Andhra Pradesh, India</b></p> <p style="text-align: center;"><b>P. Mahesh, D. Veera Nagendra Kumar</b></p>
A18	<p style="text-align: center;"><b>A Hybrid Intelligent Framework for Demand Forecasting, Inventory Optimization, and Dynamic Warehouse Slotting in Supply Chain Management</b></p> <p style="text-align: center;"><b>Anchal Khare</b></p>
A19	<p style="text-align: center;"><b>Development of Sustainable Adsorbents from Industrial Red Mud Waste</b></p> <p style="text-align: center;"><b>Maruwada Srinivasan, Ramprasad naik Desavathu, Rakesh Roshan Dash</b></p>
A20	<p style="text-align: center;"><b>Development of an Artificial Intelligence-Driven Multi-Omics, Liquid Biopsy, and Pharmacogenomics Platform for Precision Oncology and Personalized Cancer Therapeutics: A Systematic Review and Meta-Analysis</b></p> <p style="text-align: center;"><b>Dr. Mekkanti Manasa Rekha</b></p>

## Caputo–Fabrizio Modelling of Heat–Mass Transfer in Non-Newtonian Fluid

**Dr. Govindan VEDIYAPPAN,**

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**Abstract:** Fractional-order models have emerged as indispensable tools for describing transport phenomena in complex, memory-laden media. This work presents a comprehensive analytical and numerical study of coupled heat and mass transfer in an unsteady, free convective Casson fluid flow over a vertically oscillating infinite plate, governed by the Caputo–Fabrizio (CF) fractional derivative. Unlike the classical Caputo operator, the CF derivative employs a non-singular exponential kernel that eliminates the mathematical singularities inherent in earlier formulations while faithfully encoding the memory and hereditary properties of biological and viscoelastic fluids. The fractional momentum, energy, and species equations are transformed to the Laplace domain, where exact closed-form expressions are obtained for the dimensionless temperature  $T(y, q)$ , concentration  $C(y, q)$ , and velocity  $u(y, q)$  fields. Time-domain solutions are recovered via numerical inversion using the Stiffest algorithm. The roles of the fractional order  $\alpha$ , Prandtl number  $Pr$ , Schmidt number  $Sc$ , thermal radiation parameter  $Nr$ , thermal Gasthof number  $Gr$ , mass Gasthof number  $Gm$ , and Casson parameter  $\beta$  are explored systematically through ten publication-quality figures generated directly from the analytical solutions. A striking time-dependent reversal of the fractional-order effect is documented: at early times lower  $\alpha$  suppresses diffusion, whereas at large times lower  $\alpha$  sustains broader boundary layers through persistent memory retention. The classical integer-order model is recovered as the limiting case  $\alpha \rightarrow 1$ , confirming the mathematical consistency of the framework. Biomedical implications for blood flow modelling, targeted drug delivery, and thermal therapy design are discussed.

## **SURVEY OF MACHINE LEARNING APPROACHES FOR PARKINSON'S DISEASE PREDICTION**

**Ms. Radhika Sreedharan**

Assistant Professor,  
Presidency University, Bangalore  
radhika.sreedharan@gmail.com

**Abstract:** Parkinson's disease (PD) is a debilitating neurological condition that has a significant impact on the health of the elderly worldwide. It affects both mobility and cognitive function. The need to look into innovative diagnostic methods to enhance patient outcomes is highlighted by the lack of a definitive treatment. By using massive repositories of structured data to improve diagnosis accuracy, machine learning (ML) has the potential to completely transform Parkinson's disease (PD) detection. Despite being the neurodegenerative condition with the greatest rate of growth in the world, Parkinson's disease (PD) is still difficult to diagnose early because there are no trustworthy biomarkers. Recent research suggests that retinal microvascular changes, which can be seen by Optical Coherence Tomography Angiography (OCTA), could be useful non-invasive indicators for Parkinson's disease. The critical need for objective, non-invasive instruments to enable prompt detection and intervention is highlighted by the dearth of conclusive diagnostic tests for early-stage Parkinson's disease. The main aim of this paper is to compare different machine learning algorithms to predict Parkinson's disease with a better accuracy.

**Keywords:** Parkinson's, detection, Machine Learning, diagnosis

**GEO SPATIAL ANALYSIS OF WATER AVAILABILITY AND DISTRIBUTION  
AROUND THAMARAIPAKKAM ANICUT IN THIRUVALLUR DISTRICT**

**Mrs.D.Shanbagapriya,**

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**Dr. R.Santhi Devi,**

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Associate Professor,

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**Abstract:** The Thamaraipakkam Anicut, constructed across the Kosasthalaiyar River, plays a crucial role in regulating water resources for irrigation, domestic use, and groundwater recharge in the Thiruvallur District. This study focuses on the geospatial analysis of water availability and distribution in the anicut's surrounding region using Geographic Information Systems (GIS) and Remote Sensing techniques. The study reveals that water availability is significantly higher in areas closer to the river and canal networks, while peripheral regions experience water scarcity, particularly during dry seasons. Land use changes, especially urban expansion and agricultural intensification, have a considerable impact on water distribution and groundwater recharge. The results highlight the importance of the anicut in sustaining regional water balance and emphasize the need for effective water resource management strategies. The integration of geospatial technologies provides a reliable framework for monitoring, planning, and sustainable utilization of water resources in the study area.

**Keywords:** Water Availability, Water Distribution, Remote Sensing and GIS.

**REIMAGINING THE BLUE ECONOMY IN THE INDIAN OCEAN:  
GEOPOLITICS, STRATEGIC CHOKEPOINTS, AND EMERGING  
SECURITY CHALLENGES**

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**Abstract:** The Blue Economy has gained prominence as a pathway for sustainable development through the utilization of ocean resources. However, in the Indian Ocean, this concept is increasingly shaped by complex geopolitical forces and emerging security concerns. The region serves as a critical hub for global maritime trade, carrying a significant share of the world's energy and container traffic through strategic sea routes and chokepoints. This study explores the dynamic relationship between Blue Economy initiatives and geopolitical competition, focusing on strategic maritime infrastructure and trade networks. Case studies such as Hambantota Port and the growing strategic importance of Maldives are analyzed to understand how economic investments intersect with issues of sovereignty, dependency, and regional influence. The roles of major actors like India and China are critically examined in the context of port development, maritime security, and strategic expansion. The paper further incorporates recent geopolitical tensions involving Iran, particularly disruptions around key chokepoints such as the Strait of Hormuz, to demonstrate the vulnerability of Blue Economy systems to conflict and instability. These developments underline the increasing militarization of maritime spaces and the transformation of the Indian Ocean into a contested geopolitical arena. The study concludes that while the Blue Economy offers opportunities for economic growth and regional connectivity, it also presents challenges related to geopolitical rivalry, environmental sustainability, and security risks. It emphasizes the need for cooperative governance, resilient maritime policies, and sustainable development strategies to ensure long-term stability and equitable benefits in the Indian Ocean region.

**Keywords:** Blue Economy, Indian Ocean, Geopolitics, Chokepoints, Maritime Security, Sustainable Development.

## NANO-ANTENNA IDENTIFICATION FOR 5G WIRELESS COMMUNICATIONS USING ELITISM–DIVERGENCE HARRIS HAWKS OPTIMIZATION

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**Abstract:** Fifth-generation (5G) wireless communication technology provides enhanced network capacity, ultra-low latency, extremely high data rates, and improved quality of service. In 5G-enabled devices, nano-antenna design plays a crucial role in ensuring efficient signal transmission, improved channel capacity, and better spectrum utilization. Various techniques have been proposed to enhance antenna performance; however, achieving compact size, cost-effectiveness, improved bandwidth and gain, along with minimal radiation losses, remains a significant challenge. To address these issues, this paper proposes a novel optimization approach called Elitism Divergence Multi-Objective Harris Hawks Optimization (EDHOP) for efficient nano-antenna design. In the proposed method, a population of Harris hawks representing nano-antenna candidates is initially generated. The fitness of each hawk is evaluated using multiple objective parameters, including distance, thickness, width, length, incident light wavelength, and gain. An elitism-based selection mechanism is integrated within the Harris Hawks Optimization algorithm to identify and retain nano-antennas with the best fitness values. Subsequently, the global optimal solution is obtained through iterative position updates of the hawks. The proposed EDHOP technique is implemented and simulated in MATLAB, and its performance is evaluated using several metrics, including heat loss, thermal loss, standing wave ratio (SWR), electric field intensity, and radiation efficiency. Simulation results demonstrate that the proposed EDHOP method significantly improves nano-antenna performance by minimizing heat loss, thermal loss, SWR, and electric field distortion while achieving higher radiation efficiency across different wavelengths.

**Keywords:** 5G Wireless Communication, Nano-Antenna Design, Jensen–Shannon Divergence, Elitism Selection, Harris Hawks Optimization.

## **BOOSTING GUM HEALTH: COQ10 AND BETA-CAROTENE VS. CHLORHEXIDINE GEL IN PERIODONTAL THERAPY**

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### **Introduction:**

Periodontal disease is primarily caused by dental plaque, necessitating effective plaque control to prevent and manage the condition. Chemical plaque control can be used as an adjunct to mechanical methods. Chlorhexidine (CHX) is widely used for its antimicrobial properties, while Coenzyme Q10 (CoQ10) is an antioxidant with potential benefits in periodontal therapy.

### **Objective**

The study aims to evaluate and compare the clinical efficacy of 1% CHX gel and CoQ10 gel in patients with periodontal pockets.

### **Methodology**

A total of 10 patients with PPD of 4-6 mm were selected. Post SRP, Group A received 1% CHX gel and Group B received CoQ10 gel, to be applied twice daily. Clinical parameters, including GI and PPD, were recorded at baseline, 21 days and 45 days.

### **Results**

Both groups showed a statistically significant reduction PPD over 45 days. However, intergroup comparison revealed no significant difference between the two treatments.

### **Conclusion**

Coenzyme Q10 demonstrated results comparable to Chlorhexidine in treating periodontal pocket with the added advantage of no known side effects. This suggests that Coenzyme Q10 could serve as a safe and effective alternative for long-term periodontal therapy.

**KRUSHAKA VIKAS: AI-DRIVEN FUTURISTIC AGRICULTURE SYSTEM****Prof.Jesmitha S,**Assistant Professor,  
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**Abstract:** The agricultural sector in rural India continues to face significant operational inefficiencies, primarily due to the lack of access to real-time environmental data, delayed decision-making processes, and suboptimal utilization of natural resources. These challenges often lead to reduced crop productivity and increased vulnerability to unpredictable climatic conditions. To address these issues, *Krushaka Vikas* proposes an AI-driven smart agriculture system that leverages advanced technologies to enhance farming practices. The system integrates Internet of Things (IoT) devices such as soil moisture sensors, temperature monitors, and humidity trackers to collect real-time field data. This data is transmitted to cloud-based platforms where it is processed and analyzed using machine learning algorithms.

The insights generated enable farmers to make informed decisions regarding irrigation, fertilization, and crop management. Additionally, predictive analytics helps in forecasting weather patterns and potential crop diseases, thereby minimizing risks and losses. The system also promotes efficient resource utilization by automating irrigation and reducing water wastage. Through a user-friendly interface, farmers can easily access recommendations and alerts on their mobile devices. Overall, *Krushaka Vikas* aims to improve agricultural productivity, ensure sustainability, and empower rural farmers with data-driven decision-making tools.

**Keywords:** Smart Agriculture , Internet of Things (IoT), Machine Learning, Precision Farming, Cloud Analytics, Sustainable Farming

## NANO-ANTENNA IDENTIFICATION FOR 5G WIRELESS COMMUNICATIONS USING ELITISM–DIVERGENCE HARRIS HAWKS OPTIMIZATION

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**Abstract:** Fifth-generation (5G) wireless communication technology provides enhanced network capacity, ultra-low latency, extremely high data rates, and improved quality of service. In 5G-enabled devices, nano-antenna design plays a crucial role in ensuring efficient signal transmission, improved channel capacity, and better spectrum utilization. Various techniques have been proposed to enhance antenna performance; however, achieving compact size, cost-effectiveness, improved bandwidth and gain, along with minimal radiation losses, remains a significant challenge. To address these issues, this paper proposes a novel optimization approach called Elitism Divergence Multi-Objective Harris Hawks Optimization (EDHOP) for efficient nano-antenna design. In the proposed method, a population of Harris hawks representing nano-antenna candidates is initially generated. The fitness of each hawk is evaluated using multiple objective parameters, including distance, thickness, width, length, incident light wavelength, and gain. An elitism-based selection mechanism is integrated within the Harris Hawks Optimization algorithm to identify and retain nano-antennas with the best fitness values. Subsequently, the global optimal solution is obtained through iterative position updates of the hawks. The proposed EDHOP technique is implemented and simulated in MATLAB, and its performance is evaluated using several metrics, including heat loss, thermal loss, standing wave ratio (SWR), electric field intensity, and radiation efficiency. Simulation results demonstrate that the proposed EDHOP method significantly improves nano-antenna performance by minimizing heat loss, thermal loss, SWR, and electric field distortion while achieving higher radiation efficiency across different wavelengths.

**Keywords:** 5G Wireless Communication, Nano-Antenna Design, Jensen–Shannon Divergence, Elitism Selection, Harris Hawks Optimization.

**UNIQUENESS OF COMPLEX DELAY-DIFFERENTIAL POLYNOMIAL  
WITH PAIRED HAYMAN CONJECTURE**

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**Abstract:** In this study, we investigate the zero distribution of the functions  $f_n(z)P_m(f)L(g) - a(z)$  and  $g_n(z)P_m(g)L(f) - a(z)$ , where  $L(h)$  represents various differential or shift operators applied to  $h$ . Specifically,  $L(h)$  may include derivatives  $h^{(k)}(qz)$ , the  $q$ -shift  $h(qz + c)$ , the  $q$ -difference  $h(qz+c) - h(qz)$ , or the delay-differential  $h^{(k)}(z+c)$ , where  $k$  is a positive integer and  $c \neq 0$  is a constant. The function  $a(z)$  is a non-zero small function with respect to  $f(z)$  and  $g(z)$ . Additionally, the study explores complex delay-differential polynomials in the context of uniqueness problems. The function  $a(z)$  is considered a non-zero small function relative to  $f(z)$  and  $g(z)$ . Furthermore, the study addresses the paired Hayman conjectures in various forms.

## A MATHEMATICAL MODEL FOR CANCER DIAGNOSIS USING NEUTROSOPHIC SETS AND TOPOLOGY

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**Abstract:** Cancer diagnosis involves significant uncertainty, indeterminacy, and inconsistency due to overlapping symptoms and incomplete clinical data, making traditional mathematical models inadequate for effective analysis. This paper proposes a neutrosophic topological framework for cancer diagnosis based on single-valued neutrosophic sets and score function methodology. In this approach, patient symptoms and clinical attributes are represented using neutrosophic values characterized by truth, indeterminacy, and falsity memberships. A neutrosophic topology is constructed to model the relationships among symptoms and diseases using concepts such as union, intersection, interior, closure, and boundary, enabling effective handling of symptom overlap and ambiguity. The neutrosophic score function is applied to aggregated information to evaluate and rank possible cancer types, and the final diagnosis is determined based on the maximum score value. A numerical example illustrates the applicability and effectiveness of the proposed method. The results show that the framework provides a consistent, reliable, and interpretable approach for medical decision-making under uncertainty.

**Keywords:** Neutrosophic Set, Single-Valued Neutrosophic Set, Neutrosophic Topology, Cancer Diagnosis, Medical Decision Making, Score Function, Uncertainty Modeling, Multi-Attribute Decision Making.

## HERBAL MEDICINES USED IN THE TREATMENT OF DIABETES MELLITUS IN SESHACHALAM FOREST OF ANDHRA PRADESH, INDIA

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**Abstract:** Diabetes is a major human health disorder affecting people from all walks of life across the world. Medicinal plants and natural products, either in the form of pure compounds or standardized extracts, offer immense potential for the discovery of new therapeutic drugs due to their rich chemical diversity. With the growing demand for novel bioactive compounds in drug development programs, interest in plant-based medicines, particularly edible plants, has increased worldwide. Botanical and herbal preparations used in traditional medicine contain a wide range of bioactive phytochemicals. These phytochemicals provide promising opportunities for the development of new anti-diabetic therapies. Among the most important phytochemical groups are alkaloids, glycosides, polysaccharides, phenolics, flavonoids, terpenoids, and steroids. Many medicinal plant species have shown significant hypoglycaemic and antihyperglycemic activities. An ethnobotanical survey was conducted in the Seshachalam Forest to document medicinal plants traditionally used by tribal communities for the treatment of diabetes and its related complications. Information on indigenous medicinal knowledge was gathered from traditional healers and tribal practitioners belonging to the Irula, Yanadi and Sugali community. The study revealed that local medico-botanical knowledge is highly region-specific, and traditional healers continue to depend on native medicinal plants for diabetic treatment. Important plant species identified during the survey include *Annona reticulata*, *Gymnema sylvestre*, *Momordica charantia*, *Syzygium alternifolium*, *Ventilago maderaspatana*, and *Hemidesmus indicus*. The findings highlight the rich diversity of medicinal plants with significant anti-diabetic potential used in tribal healthcare practices.

**Key words:** Diabetes, Medicinal Plants, Phytochemicals, Seshachalam hills.

**ENVIRONMENTAL & SUSTAINABLE GOVERNANCE IN TAMIL NADU****Dr R. Santhi Devi**

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**Abstract:** Tamil Nadu is one of the rapidly developing states in India, facing significant environmental challenges due to urbanisation, industrial growth, population increase, climate change, and resource exploitation. Environmental and Sustainable Governance plays a vital role in balancing economic development with environmental protection and social welfare in the state. Sustainable governance focuses on effective environmental policies, resource management, public participation, and technological innovations to ensure long-term ecological sustainability.

This study examines the environmental governance practices and sustainable development initiatives implemented in Tamil Nadu. The research highlights major environmental issues such as water scarcity, coastal erosion, industrial pollution, deforestation, waste management problems, and climate-related disasters including floods and droughts. Special attention is given to the vulnerable coastal regions of Tamil Nadu, particularly Chennai and other coastal districts, which are increasingly affected by sea-level rise, cyclones, and plastic pollution.

The paper discusses the role of the Tamil Nadu Pollution Control Board, local bodies, government departments, educational institutions, industries, and community organizations in environmental Environmental & Sustainable Governance in Tamil Nadu management and policy implementation. Various sustainable initiatives such as rainwater harvesting, renewable energy development, smart city projects, solid waste management, coastal conservation, afforestation programs, and sustainable urban planning are also examined.

The study further emphasises the importance of public awareness, participatory governance, environmental education, and green technologies in achieving sustainable development goals in Tamil Nadu. It concludes that integrated environmental governance, strong policy implementation, and community participation are essential for creating a resilient, environmentally sustainable, and socially inclusive future for the state.

**Keywords:** Environment, Sustainable, Urbanisation, Pollution and management

## INTEGRATING ESG METRICS AND ARTIFICIAL INTELLIGENCE FOR SUSTAINABLE FINANCIAL RISK MANAGEMENT

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**Abstract:** In recent years, the integration of Environmental, Social, and Governance (ESG) metrics into financial decision-making has gained significant momentum due to increasing awareness of sustainability and responsible investing. Simultaneously, Artificial Intelligence (AI) has emerged as a transformative tool in financial risk management, enabling advanced data analysis, predictive modeling, and real-time decision-making. This study explores the convergence of ESG metrics and AI technologies to enhance sustainable financial risk management practices.

The research examines how ESG factors influence financial risks and how AI-driven models can effectively incorporate these non-financial indicators into risk assessment frameworks. Traditional risk management approaches often fail to capture long-term sustainability risks, such as climate change, regulatory shifts, and social responsibility issues. By integrating ESG data with AI algorithms, financial institutions can better predict, monitor, and mitigate risks while promoting sustainable investment strategies. The study adopts both qualitative and quantitative approaches, analyzing ESG datasets, financial performance indicators, and AI-based predictive models. It highlights the role of machine learning, natural language processing, and big data analytics in improving the accuracy and efficiency of risk assessment. Furthermore, it discusses challenges such as data inconsistency, lack of standardization in ESG reporting, and ethical concerns related to AI implementation.

The findings suggest that the integration of ESG metrics and AI significantly enhances risk management capabilities by providing deeper insights, improving forecasting accuracy, and supporting sustainable financial decision-making. The study concludes that combining ESG principles with AI technologies is essential for building resilient and responsible financial systems in the modern era.

## PREDICTIVE AI AND DIGITAL CONCERNS IN HEALTHCARE AND FINTECH

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**Abstract:** Trust! usually earned with patience and deep diligence and sincere deliberations over multiple issues. But in today's time, when everything is being performed with the help of technology, gadgets and computers, at a breathtaking speed the reliance of consumer on a variety of tools, software, and technology has increased significantly. This over-reliance on tools and technology has definitely reduced the time of transactions but has also eroded the trust quotient. Apparently, healthcare and fintech tools entails the transfer of a large amount of personal and financial data, hence demands a lot of trust. This research examines the ethical and transparency issues in healthcare and fintech tools because it warrants ethical use of AI tools. This research attempted to discuss the over-reliance on multi-integrated tools for faster access of various data-sources and corroding trust of the consumer, because of multiple incidences system failures in recent times and eventual loss of data and trust both.

Predictive AI has raised the concerns regarding algorithmic biasness in governance of AI tools because it's dependent upon past data and is unable to incorporate the human quotient in areas like healthcare of usage of fintech tools.

During addressing ethical considerations and data privacy concerns, this research suggest to enhance data security and privacy in Predictive AI, and the establishment of regulatory measures and partnerships between academia and industry.

It was found after systematic mapping study on privacy and data protection in the usage of Predictive AI tools. The research established that data protection framework should be based on confidentiality, integrity to avail ability principles and the concept of Privacy as a Service to support customer data privacy to enhance compliance with the usage of Predictive tools and methodologies to maximize regarding their impact in the healthcare and fintech sector.

**Keywords:** Transparency, Predictive AI, Data security, Data privacy, Algorithmic biasness, Data protection

## VALUES-BASED ENGAGEMENT AND PURCHASE INTENTION AMONG GEN Z CONSUMERS

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**Abstract:** The contemporary marketing environment has undergone a significant transformation from traditional transactional approaches to value-oriented consumer engagement strategies. Modern consumers, particularly Generation Z, increasingly prefer brands that align with their personal values, ethical beliefs, and social expectations. Factors such as sustainability, ethical business practices, authenticity, emotional connection, and social responsibility have become major determinants influencing their purchasing decisions. In this context, values-based engagement has emerged as an essential marketing approach for organizations seeking to build long-term relationships with young consumers. This study aims to examine the influence of values-based engagement on purchase intention among Generation Z consumers. Specifically, the research investigates the impact of brand authenticity, ethical marketing practices, sustainability orientation, and social media engagement on consumers' intention to purchase products and services. The study adopts a quantitative research design and collects primary data through a structured questionnaire administered to Gen Z respondents. A convenience sampling technique is proposed for selecting respondents from colleges and urban consumer groups. To analyze the collected data, various statistical tools such as percentage analysis, reliability analysis, correlation, regression, factor analysis, and Structural Equation Modeling (SEM) are employed. The study seeks to identify the major factors contributing to values-based engagement and evaluate their relationship with purchase intention. The expected findings indicate that ethical branding, sustainability initiatives, and authentic communication positively influence consumer engagement and purchasing behavior among Gen Z consumers. The study provides valuable insights for marketers and organizations to develop effective value-driven marketing strategies that enhance customer trust, engagement, loyalty, and long-term brand relationships in an increasingly competitive marketplace.

**Keywords:** Values-Based Engagement, Purchase Intention, Gen Z Consumers, Ethical Marketing, Sustainability, Brand Authenticity.

## A COMPREHENSIVE REVIEW OF VISION-BASED DEEP LEARNING TECHNIQUES FOR DRIVER DROWSINESS DETECTION

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**Abstract:** Driver drowsiness is a critical factor contributing to road accidents worldwide, necessitating reliable and real-time detection systems. This review paper presents a comprehensive analysis of traditional and modern approaches for driver fatigue detection, with a primary focus on vision-based deep learning techniques. Conventional methods such as electroencephalography (EEG), steering behavior analysis, PERCLOS, and physiological sensors are examined, highlighting their limitations in terms of intrusiveness, cost, and real-world applicability. The study further explores recent advancements in deep learning, including 2D and 3D Convolutional Neural Networks (CNNs), CNN-LSTM hybrids, and attention-based models for capturing spatial and temporal fatigue cues. Benchmark datasets, performance metrics, and deployment challenges such as occlusion, lighting variability, and model interpretability are also discussed. The review emphasizes the growing importance of scalable, non-intrusive, and explainable AI systems for integration into Advanced Driver Assistance Systems (ADAS), aiming to enhance road safety through early and accurate drowsiness detection.

**Keywords:** Driver Drowsiness Detection, Deep Learning, 3D CNN, Vision-Based Systems, ADAS

**SPATIO-TEMPORAL DEEP LEARNING FOR ECOLOGICAL MONITORING  
AND DESILTING PREDICTION OF PALLIKARANAI MARSHLAND: A  
HYBRID U-NET & CONVLSTM APPROACH**

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**Abstract:** The objective of the proposed research is to design and test a hybrid spatio-temporal deep learning model to perform fine-grained ecological monitoring and siltation hotspot detection and desilting intervention planning in the fast-depleting Pallikaranai Marshland, Chennai, India. The study fills in vital gaps in detecting changes in seasonal wetlands that cannot be filled using the traditional static classification techniques. A novel six-class COCO-based dataset was built using multi-temporal Sentinel-2 Level-1C satellite data of the years 2020–2024. The authors presented a hybrid architecture based on U-Net that extracts multi-scale spatial features and Convolutional Long Short-Term Memory (ConvLSTM) layers to model temporal sequences and was trained on 2020–2023 data and tested using 2024 sequences that it had not previously seen. Three experimental conditions were compared, namely unweighted 50-epochs, class-weighted 50-epochs and class-weighted 200-epochs training. Findings – The highest-performing configuration obtained an Mean Intersection-over-Union (mIoU) of 0.3455 and Pixel Accuracy of 0.5504 when utilizing the 2024 test set. Significant sensitivities were observed between minority ecological classes (silt: IoU: 0.2787 and dry area: IoU: 0.2030) and static CNN baselines, which confirmed the importance of the temporal reasoning in identifying delicate ecological transitions that were relevant to the desilting planning. The model has perfectly represented seasonal water recession patterns, vegetation succession patterns and silt deposition patterns that are similar to the actual hydrological behaviour recorded on the marsh land. This paper is the first attempt to apply a hybrid U-Net + ConvLSTM spatio-temporal model to an urban Indian wetland, which introduces a new manually delivered multi-temporal ecological data and provides a viable alternative to evidence-based desilting and hydrological restoration planning framework. The suggested solution can also be applied to other similar wetland systems both in India and beyond.

**Keywords:** Wetland monitoring, Spatio-temporal deep learning, U-Net, ConvLSTM, Pallikaranai Marshland, Semantic segmentation, Siltation prediction, Remote sensing

A17

## HERBAL MEDICINES USED IN THE TREATMENT OF DIABETES MELLITUS IN SESHACHALAM FOREST OF ANDHRA PRADESH, INDIA

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**Abstract:** Diabetes is a major human health disorder affecting people from all walks of life across the world. Medicinal plants and natural products, either in the form of pure compounds or standardized extracts, offer immense potential for the discovery of new therapeutic drugs due to their rich chemical diversity. With the growing demand for novel bioactive compounds in drug development programs, interest in plant-based medicines, particularly edible plants, has increased worldwide. Botanical and herbal preparations used in traditional medicine contain a wide range of bioactive phytochemicals. These phytochemicals provide promising opportunities for the development of new anti-diabetic therapies. Among the most important phytochemical groups are alkaloids, glycosides, polysaccharides, phenolics, flavonoids, terpenoids, and steroids. Many medicinal plant species have shown significant hypoglycaemic and antihyperglycemic activities. An ethnobotanical survey was conducted in the Seshachalam Forest to document medicinal plants traditionally used by tribal communities for the treatment of diabetes and its related complications. Information on indigenous medicinal knowledge was gathered from traditional healers and tribal practitioners belonging to the Irula, Yanadi and Sugali community. The study revealed that local medico-botanical knowledge is highly region-specific, and traditional healers continue to depend on native medicinal plants for diabetic treatment. Important plant species identified during the survey include *Annona reticulata*, *Gymnema sylvestre*, *Momordica charantia*, *Syzygium alternifolium*, *Ventilago maderaspatana*, and *Hemidesmus indicus*. The findings highlight the rich diversity of medicinal plants with significant anti-diabetic potential used in tribal healthcare practices.

**Keywords:** Diabetes, Medicinal Plants, Phytochemicals, Seshachalam hills.

## **A HYBRID INTELLIGENT FRAMEWORK FOR DEMAND FORECASTING, INVENTORY OPTIMIZATION, AND DYNAMIC WAREHOUSE SLOTTING IN SUPPLY CHAIN MANAGEMENT**

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**Abstract:** Efficient supply chain management requires accurate demand forecasting, optimized inventory control, and intelligent warehouse operations. Traditional approaches often address these functions independently, resulting in inefficiencies such as inaccurate forecasts, excessive holding costs, stockouts, and poor warehouse utilization. This paper proposes an integrated hybrid framework that combines statistical forecasting techniques, artificial neural networks (ANN), inventory optimization strategies, and AI-driven dynamic slotting for warehouse efficiency enhancement. The forecasting component integrates moving average, exponential smoothing, seasonal decomposition, and neural networks to improve demand prediction accuracy. The inventory optimization module incorporates ABC classification, Economic Order Quantity (EOQ), Safety Stock, and Just-In-Time (JIT) policies. Additionally, a dynamic slotting mechanism is introduced to improve warehouse picking efficiency and space utilization.

MATLAB-based simulations demonstrate that the proposed integrated framework significantly improves operational performance. Experimental results show a reduction in forecasting error by approximately 35–40%, inventory holding costs by 34%, stockouts by 66%, and warehouse picking time by more than 40%. The proposed framework provides a scalable and intelligent solution for modern supply chain and warehouse management systems.

**Keywords:** Demand Forecasting, Inventory Optimization, Dynamic Slotting, Artificial Neural Networks, EOQ, Warehouse Management, Supply Chain Optimization, MATLAB Simulation, Time Series Forecasting, AI-based Warehousing

## DEVELOPMENT OF SUSTAINABLE ADSORBENTS FROM INDUSTRIAL RED MUD WASTE

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**Abstract:** Industrial wastewater containing heavy metals has become a major environmental concern due to its harmful effects on human health and aquatic life. The development of low-cost and sustainable treatment methods is essential for reducing water pollution. Red mud, an industrial waste generated during alumina production, has attracted attention as a potential adsorbent because of its rich mineral content and adsorption capability. This study focuses on the development of sustainable adsorbents from industrial red mud waste for the removal of heavy metals from wastewater.

The red mud was processed and modified to improve its adsorption efficiency. Various parameters such as pH, contact time, adsorbent dosage, and initial metal ion concentration were analyzed to evaluate the adsorption performance. Adsorption isotherm and kinetic studies were also carried out to understand the interaction between heavy metal ions and the adsorbent surface.

The results showed that red mud-based adsorbents effectively removed heavy metals such as lead, chromium, cadmium, and copper from contaminated water. The study highlights the potential of converting industrial waste into valuable adsorbent materials, promoting sustainable waste management and environmentally friendly wastewater treatment technologies.

**Keywords:** Red Mud, Adsorption, Heavy Metal Removal, Wastewater Treatment, Sustainable Adsorbent, Industrial Waste, Environmental Remediation, Water Purification.

## **Development of an Artificial Intelligence-Driven Multi-Omics, Liquid Biopsy, and Pharmacogenomics Platform for Precision Oncology and Personalized Cancer Therapeutics: A Systematic Review and Meta-Analysis**

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### **Abstract**

**Background:** Precision oncology has emerged as a transformative approach to cancer management by integrating molecular profiling, liquid biopsy technologies, pharmacogenomics, and artificial intelligence (AI) for individualized therapeutic decision-making. Despite significant advancements, evidence regarding the combined clinical utility of AI-driven multi-omics and pharmacogenomic platforms remains fragmented. This systematic review and meta-analysis aimed to evaluate the effectiveness of integrated AI-based multi-omics, liquid biopsy, and pharmacogenomics approaches in improving cancer diagnosis, treatment selection, therapeutic response prediction, and clinical outcomes.

**Methods:** A systematic literature search was conducted across databases including PubMed, Scopus, Web of Science, Embase, and Cochrane Library from January 2015 to December 2025. Studies evaluating AI applications integrated with genomics, transcriptomics, proteomics, metabolomics, liquid biopsy biomarkers (ctDNA, CTCs, exosomes, and miRNAs), and pharmacogenomics in oncology were included. Data extraction and quality assessment were performed independently by two reviewers following PRISMA guidelines. Meta-analysis was conducted using random-effects models to estimate pooled effect sizes, diagnostic accuracy, treatment response prediction performance, and survival outcomes. Heterogeneity was assessed using the  $I^2$  statistic.

**Results :** A total of 78 studies comprising 42,356 cancer patients met the inclusion criteria. Meta-analysis demonstrated that AI-integrated multi-omics platforms significantly improved biomarker identification accuracy (pooled sensitivity: 0.91; 95% CI: 0.88–0.94) and treatment response prediction (AUC: 0.89; 95% CI: 0.85–0.92). Liquid biopsy-guided AI models showed superior performance in early cancer detection (pooled sensitivity: 0.87; specificity: 0.90) compared with conventional diagnostic approaches. Pharmacogenomic-guided therapeutic interventions were associated with a significant reduction in severe adverse drug reactions (RR = 0.72; 95% CI: 0.63–0.83;  $p < 0.001$ ) and improved progression-

free survival (HR = 0.78; 95% CI: 0.69–0.88). Moderate heterogeneity was observed across studies ( $I^2 = 48\%$ ).

**Conclusion:** The findings demonstrate that AI-driven integration of multi-omics data, liquid biopsy biomarkers, and pharmacogenomic information significantly enhances precision oncology by improving diagnostic accuracy, therapeutic selection, treatment response prediction, and patient outcomes. The development of comprehensive AI-enabled platforms offers substantial potential for advancing personalized cancer therapeutics and facilitating real-time clinical decision-making. Future large-scale prospective studies are warranted to validate implementation strategies and establish standardized clinical frameworks for widespread adoption.

**Keywords:** Precision Oncology, Artificial Intelligence, Multi-Omics, Liquid Biopsy, Pharmacogenomics, Systematic Review, Meta-Analysis, Personalized Cancer Therapy, Biomarkers, Machine Learning.

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