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Accepted Papers

Discuss How AI and ML Can Optimize Lifecycle Management Practices within Pharmaceutical Companies, From Development to Post-market Surveillance

Jahnavi Vellanki, Industry Researcher, Brownsburg, IN 46112, USA

ABSTRACT

Artificial Intelligence and Machine Learning are revolutionizing pharmaceutical lifecycle management, maximizing drug discovery, clinical trials, manufacturing, supply chain, regulatory compliance, and pharmacovigilance. Predictive analytics by leveraging AI improve the selection of drug candidates, reduce late-stage failures, and enhance clinical research capabilities. AI-driven intelligent manufacturing gained the achievement in real-time quality assurance, predictive maintenance, process optimization, and AI-fueled supply chain management streamlines accurate forecasting and inventory management. AI enhances the performance of compliance with regulations using automated documentation, detection of adverse drug reactions, and real-time verification. AI-assisted post-market surveillance deploy the advantage of safety monitoring and risk detection. While these advances are promising, issues of data privacy, algorithmic bias, ethics, and regulatory hurdles continue to hamper progress. Explainable AI (XAI) for transparency, integration of blockchain with AI for secure data handling, and AI-based personalized medicine for patient-tailored treatment are research areas where future efforts are needed. Conquering these challenges will make it possible for AI to lead innovation, efficiency, and ethical development in pharmaceutical lifecycle management.

Keywords

Artificial Intelligence, Machine Learning, Drug Discovery, Regulatory Compliance, Pharmacovigilance, Personalized Medicine.

The Universe as a Grand Computational System

Matthew Stanley Leibel, Independent Researcher, Canada

ABSTRACT

The Grand Computational System proposes a unifying framework in which mass, gravity, time, and consciousness emerge from a quantum information processing substrate. Rather than treating spacetime as a static background and mass as intrinsic, this model views the universe as a dynamic computational engine, where energy is processed through entropy-driven interactions and encoded into spacetime via structured photonic emissions. Key to this theory is an observer-based correction to the Bekenstein Bound, asserting that information is encoded only across the observer-accessible plane, not the full 2D boundary. A case study using a 1 kg steel cube introduces a square root correction to photon emission data, allowing a derivation of Einstein's equation ($E = mc^2$) [Einstein, 1905] from quantum information principles and thermodynamics. Mass is reconceptualized as structured light, and inertia as resistance to information restructuring. Gravity emerges not as a force, but as a computational constraint that adjusts

spacetime curvature to optimize information flow. Black holes are framed as nodes of information restructuring, resolving the information paradox by treating Hawking radiation as an encoded, non-thermal emission. Time arises from quantum update cycles, and its directionality is tied to entropy accumulation. Consciousness is modeled as a non-local interaction between the brain and the quantum information field, with subjective experience emerging from entangled informational states. The theory unifies classical and relativistic physics through information and entropy, offering testable predictions in quantum computing, gravitational anomalies, and consciousness studies.

Keywords

In essence, this framework recasts reality as a holographic, self-regulating quantum information system governed by entropy, light, and observation.

Light-Based Operating Systems (LBOS)

Matthew Stanley Leibel, Independent Researcher, Canada

ABSTRACT

This paper introduces OLBOS — the Observable Light-Based Operating System — a unified framework that reconceptualizes mass, light, time, space, and observation as interdependent expressions of a single recursive process. Contemporary physics treats these elements as distinct, often requiring separate domains of theory: general relativity for spacetime, quantum mechanics for light and matter, and thermodynamics for entropy. OLBOS dissolves these boundaries by revealing all structure and experience as the result of light recursively folding through a holographic boundary — a boundary that is the observer. In this model, spacetime is not a passive arena but the reflective surface of observation itself. Light, when projected and reflected through this surface, forms stable recursive loops, giving rise to mass. Time emerges not as an absolute dimension but as the computational rhythm of these recursive updates — the sequencing of state changes. Observation imposes a geometric constraint that filters total structure through dimensional compression, allowing only a square-root projection to be perceived. The classical identity - is reinterpreted here not as a conversion, but as a recursive encoding function, with mass as structured light and energy as its potential unfolding. This framework has profound implications for fundamental physics, the nature of time, blackbody radiation, and the emergence of consciousness — all seen now as recursive operations within a self-observing light-based system.

Reconnoitring Nanotechnology's Impact on Taste Enhancement in Food and Beverage Products

Sivarethinamohan1, P. Aranganathan2, S.Sujatha3 and Siddhant Vinayak Agarwal4, 1, 4Symbiosis Centre for Management Studies, Bengaluru campus, Symbiosis International (Deemed University), Pune, India, 2Gnanam School of Business, Thanjavur, Tamilnadu, India, 3Department of Civil Engineering, K.Ramakrishnan College of Technology, Trichy, Tamilnadu, India

ABSTRACT

This paper establishes that nanomaterials appear to play a substantial role in the enhancement of cybersecurity in financial transactions. The finance industry increasingly depends on digital platforms to maintain sensitive data for storage on an encrypted cloud storage solution, such as a password manager. Arrays of nanomagnets could as well be utilized for ultra-high density data storage on a hard disk or for fast and dense nonvolatile solid memory. Besides, the unique properties of nanomaterials at the nanoscale are attractive to provide solutions to the existing challenges in cybersecurity. The paper engages specifically with nanomaterials for applications that include nanomaterial-based encryption, nanosensors for fraud detection, nanomaterials in biometric authentication, nanocoatings for secure data storage, and nanotechnology in secure hardware development. A brief about the prospects and advances in each of these fields is provided, along with case studies and research examples. The paper concludes by recognizing the

limitations and challenges to implementing nanomaterials for improved cybersecurity in finance and elucidating newer trends and developments that may stand as future scope directions.

Keywords

Fraud detection, Biometric authentication, Data storage, Secure hardware development, Nanosensors, Encryption, Regulatory compliance.

Building Emotional Resilience: Understanding, Developing, and Applying It Across Contexts

Sarath Perera, Sri Lanka

ABSTRACT

Emotional resilience is the capacity to adapt to stress, adversity, and challenging circumstances (Goleman, 1995). This article explores its definition, the science behind its development, and its significance in personal, educational, and psychological contexts. It provides practical strategies for fostering emotional resilience through activities, examples, and classroom applications, emphasizing the collaborative roles of educators, parents, and psychologists.

Keywords

Emotional Resilience, Psychology, Mental Wellbeing.

IOT-d Riven Smart Healthcare S Ystems : a Ddressing S Ecurity, Interoperability, and Sustainable Implementation

Farheen Fathima A. H., Independent Researcher, Former Associate Software Developer, EMIS Health, Chennai, India

ABSTRACT

IoT-driven smart healthcare systems have the potential to revolutionize patient care through real time monitoring, personalized treatment, and improved operational efficiency. However, critical research gaps remain in security, interoperability, and sustainable implementation. This paper identifies insufficient exploration of AI-driven data optimization, rural connectivity frameworks, and longitudinal device performance as key barriers to scalable adoption. Empirical evidence from recent trials indicates a 58% failure rate in emergency alert synchronization when integrating legacy systems and a 41% breach reduction achieved by employing zero-trust security architectures. To address these issues, we propose adopting standardized communication protocols, edge computing frameworks, and robust zero-trust security architectures. This paper further outlines a comprehensive methodology to evaluate the current state of IoT healthcare, identifies primary research gaps, and offers targeted solutions to overcome implementation challenges.

Keywords

IoT healthcare, interoperability, edge computing, cybersecurity, rural connectivity, AI-driven optimization, biosensors.

Cost-effective Bioinformatics using Serverless Cloud Architectures

Olivier Gatete, Senior Lecturer, Texila American University, Zambia

ABSTRACT

Cloud computing has become essential in bioinformatics due to its scalability and flexibility. This study explores the use of serverless architectures to reduce the cost and complexity of genomic data analysis. We design and implement a serverless pipeline using AWS Lambda to execute key bioinformatics tasks—quality control, alignment, and variant calling—triggered through object storage events and orchestrated with AWS Step Functions. Performance and cost metrics are compared against a traditional virtual machine (VM)-based setup using whole-exome sequencing data. Results show that serverless architectures can significantly lower operational costs and simplify deployment without sacrificing performance for moderately sized datasets. This research highlights the potential of serverless computing as a cost-effective, scalable solution for bioinformatics workflows in both research and clinical settings.

Keywords

Serverless Computing, Bioinformatics Pipeline, Cloud Architecture, Genomic Data Analysis, Cost Optimization

The Role of Genetics in Mental Health: a Multidisciplinary Per Spective

Kevin D Johnson, Ministry of Human Services and Social Security

ABSTRACT

Mental health disorders represent a significant public health concern globally. With the increasing burden of psychiatric conditions such as depression, schizophrenia, and bipolar disorder, there is a growing interest in understanding the genetic underpinnings of these illnesses. This paper explores the role of genetics in mental health through an interdisciplinary bioscience lens, emphasizing recent genome-wide association studies (GWAS), the heritability of psychiatric conditions, and gene-environment interactions. Integrating insights from genetics, neuroscience, and psychology, this research underscores the necessity of a holistic approach to psychiatric genetics. Understanding genetic contributions not only aids early diagnosis and personalized treatment but also shapes public health strategies to reduce stigma and improve mental healthcare delivery.

Keywords

Genetics, Mental Health, Psychiatric Disorders, GWAS, Gene-Environment Interaction, Heritability.

Sub-saharan Africa's Nutrigenomics: A Document Review of Present Data, Difficulties, and Prospects for Policy

Samuel Danley and Daniel, Laban Modibbo Adama University, Yola, Nigeria

ABSTRACT

Nutrigenomics, the study of gene diet interactions, holds transformative potential for addressing the dual burden of malnutrition and non-communicable diseases in Sub-Saharan Africa (SSA). Despite SSA's unparalleled genetic diversity and complex dietary landscapes, the region remains underrepresented in global genomics research. This document review synthesizes current evidence on nutrigenomics in SSA, focusing on genetic variations that influence nutrient metabolism, emerging research hubs, and pioneering studies. It identifies critical challenges including limited funding, infrastructural gaps, and the disconnection between indigenous diets and genomic data. The paper underscores ethical, legal, and

societal concerns that must be addressed to ensure equitable application of genomically-informed nutrition. Highlighting opportunities for policy alignment, research capacity building, and integration of traditional food systems, the review advocates for a regionally grounded, ethically sound, and equity-driven approach to nutrigenomics. By investing in Afrocentric genomics and embedding findings into public health and agricultural policies, SSA can pioneer culturally relevant precision nutrition strategies that improve health outcomes.

Keywords

Nutrigenomics, Sub-Saharan Africa, gene–diet interaction, public health nutrition, genomic diversity, policy integration, Afrocentric diets, personalized nutrition, ethics in genomics, precision agriculture.