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Exploring Insights for Creating Post Covid-19 Education Systems Resilience: Insights From Rwanda and Kenya

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ABSTRACT

The COVID-19 pandemic has exposed the vulnerabilities of global education systems, highlighting the need for resilience, equity, and effectiveness in the face of crises. The rapid shift to remote learning has accelerated the adoption of education technology, but also exacerbated existing inequalities. To address these challenges, this research explores the intersections of technology, infrastructure, collaboration, and community engagement in transforming education systems. Focusing on the African context, this study aims to identify context-specific strategies for building resilience and strengthening education systems. The research addresses the knowledge gap in existing literature, which lacks context-specific case studies from Africa. Through a comprehensive analysis, this study provides insights into the complex challenges facing education systems and offers recommendations for leveraging technology, infrastructure, collaboration, and community engagement to transform education systems. The findings emphasize the need for a multi-stakeholder approach, collective action, and shared responsibility among various stakeholders to mitigate pandemic and natural disaster disruptions.

Challenging the Dominant Knowledge Systems Through Critical Curriculum Studies Education

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ABSTRACT

There are already dominant ideas that influence our education, policies, and practice. These dominant societal knowledge systems still produce inequalities in our education and society. Using Postcolonial Theory, the study focused on colonial rule's impact on colonized societies, cultures, and identities and explored how colonialism's effects continue to shape the world in contemporary times. This study sought to critique the dominant knowledge narratives perpetuating social injustice. It has amplified the voices and experiences of those often silenced or marginalized by the dominant knowledge narratives. The study has also identified how the dominant knowledge system has produced inequality and marginalization and suggested more inclusive, equitable, and socially just knowledge through a curriculum studies approach.

Enhancing L2 Literacy Through Digital Storytelling: a Modern Approach With Canva

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ABSTRACT

This paper explores digital storytelling as an innovative method to enhance second language (L2) literacy skills, focusing on reading and writing. Digital storytelling combines multimedia elements like text, images, and audio to create engaging, interactive learning experiences.

Grounded in constructivist theory, it encourages active participation, collaboration, and meaningful language use. By integrating tools like Canva, learners aged 11–16 in EFL contexts (e.g., Bangladesh, China) can improve vocabulary, grammar, and narrative skills through creative story creation. Studies show significant improvements in writing performance, critical thinking, and motivation, though challenges like technology access and digital literacy gaps exist. Recommendations include teacher training and inclusive strategies to address these barriers. Overall, digital storytelling bridges linguistic and cultural gaps, fostering language proficiency while equipping learners with essential digital skills. Its benefits in engagement, creativity, and skill development make it a valuable approach for modern L2 education.

KEYWORDS
Digital storytelling, Second language literacy, Multimedia learning, Language acquisition, Canva integration

Migrating From MySQL to Hyperledger Fabric: a Framework for Modernizing the Water Billing System of Ginatilan, Cebu Philippines

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ABSTRACT
This research presents a structured framework for migrating the water billing system of the Municipality of Ginatilan, Cebu, from a traditional MySQL-based client-server architecture to a private blockchain environment using Hyperledger Fabric. Motivations for this migration include the need for enhanced security, transparency, and data integrity in public utility management. The framework outlines a step-by-step process involving data modeling, smart contract development, architectural redesign, and system integration. A detailed case study of Ginatilan's water billing system demonstrates the practical application of this framework, addressing challenges such as data consistency, performance optimization, and scalability. The research concludes with a comparative analysis evaluating the efficiency, security, and transparency of the blockchain-based system relative to the original MySQL setup. The findings provide actionable insights for other municipalities and public utility providers considering similar modernization efforts through blockchain technology.

Keywords
MySQL Migration, Hyperledger Fabric, Water Billing System, Private Blockchain, Public Utility Management, Smart Contracts, Data Security and Transparency.

Research on the Capacity of Applying Blockchain at High-end Hotels in Vung Tau City

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ABSTRACT
This study aims to evaluate the awareness of hotel managers in Vung Tau city towards the possibility of applying blockchain technology using the TAM model. Three methods are used: description, analysis and explanation. Field data were collected using a survey form through a questionnaire targeting random samples of department managers and their assistants in two random samples selected from 5-star hotels and 4-star hotels. stars in Vung Tau city. Field data were analyzed using the SPSS program. Hotel managers and their assistants have a very strong positive perception towards adopting blockchain technology due to its many unique applications, along with some natural concerns. The results confirm the need to apply blockchain technology because it will create a significant revolution and fundamental change in the hotel sector in Vietnam in general, Vung Tau in particular as well as in the world. This study is one of the first studies to mention the adoption and application of this very urgent new technology "Blockchain"

in the hotel sector of Vietnam in general and Vung Tau city in particular. Blockchain will certainly create a significant competitive advantage for hotels in Vung Tau city.

Keywords
Blockchain, distributed ledger, nodes, hotel management, Vung Tau city.

Evaluating the Opportunities and Obstacles of Blockchain Technologyin Saudi Arabia: a Case Study of STC Pay in Modern Applications

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ABSTRACT
This researchaims to evaluate the opportunities and challenges related to blockchain technology, focusing on its implementation within STC Pay. The study examines blockchain technology's principles, benefits, and obstacles in Saudi Arabia. User feedback was collected via a questionnaire distributed to 100 participants for a comprehensive analysis. The analysis covers various aspects, including participant information, opportunities of blockchain technology, obstacles and challenges, solutions and strategies, and general feedback. The research provides valuable insights into how blockchain technology is transforming modern applications and highlights the barriers that must be addressed for successful adoption. It underscores significant challenges associated with blockchain technology and proposes effective ways to enhance STC Pay. The results emphasize the importance of clear communication and strategies.

Keywords
Blockchain Technology, Digital Payments, STC Pay, Saudi Arabia, Scalability, Privacy Concerns, Regulatory Compliance, Interoperability Challenges, Security, Transparency, Operational Efficiency.

Co2 Emission Awareness and File Download Consent

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ABSTRACT

The growing use of client-side technologies for file downloads requires mechanisms to inform users about CO2 emissions, especially when downloading large files or streaming media. This paper proposes a method to validate file sizes using the HTTP HEAD method and warn users of carbon emissions before downloading. Client-side scripts send a HEAD request to retrieve the file size and region information, calculate emissions, and display a dialog to users, allowing them to decide whether to proceed. This approach reduces resource consumption and educates users about the environmental impact of their internet activities.

Keywords

Carbon Emission, Content Download, Mobile Data, Sustainable Practices, Browser Functionality.

Co2 Emission Awareness and File Download Consent

Scalable Binary Cur Low-Rank Approximation Algorithm

ABSTRACT

Large-scale matrices arising in applications such as social networks and genomics often exhibit low-rank structures that traditional decomposition techniques, like Singular Value Decomposition, cannot efficiently handle due to their high computational cost. In this paper, we present a Scalable Binary CUR Low-Rank Approximation Algorithm designed to overcome these limitations by leveraging parallel processing and a novel blockwise adaptive cross algorithm. Our approach selects representative rows and columns through a binary parallel selection process, constructing a CUR decomposition that approximates the original matrix with significantly reduced complexity. Numerical experiments on Hilbert matrices and synthetic low-rank matrices demonstrate that our algorithm achieves near-optimal accuracy while offering substantial improvements in computational efficiency. Furthermore, scalability analysis indicates that the proposed method effectively utilizes multi-core architectures, paving the way for efficient processing of extremely large datasets.

Keywords
Low-Rank Approximation; Multicore; Scalable algorithm.

Topic Mining Based on Fine-Tuning Sentence-Bert and LDA

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ABSTRACT

Applying the Sentence-BERT model to the field of e-commerce products, presenting consumers with key information on fine-grained attributes of the products. This study will combine the fine-tuning of the Sentence-BERT word embedding model with the LDA model. Firstly, fine tune the Sentence-BERT model in the specific field of e-commerce, converting online comment text into a more semantically informative set of word vectors; Secondly, the vectorized word set is fed into the LDA model for topic feature extraction; Finally, focus on the key features of the product through keyword analysis under the theme. This study combines other word embedding models with LDA models and compares them with commonly used topic extraction methods. The results of this model improve the granularity and accuracy of topic segmentation, and achieve good topic consistency.

Keywords
Sentence-BERT,LDAmodel,Topic extraction.

The Impact of Artificial Intelligence on Project Managers and Scrum Masters: A Review and Evaluation Study

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ABSTRACT

Artificial intelligence has taken a central role in various industries in the past decade as the importance of data has been at the forefront of all business decisions and policies. However, the increasing introduction of AI is proposed to alter entire project management enterprises as online platforms and applications have arisen, providing users with AI emotional intelligence, project management, and organizational tools. Bots are able to create reports, provide analysis, and facilitate headway by generating prioritized tasks and delegating to individuals through teamwork recommendation engines. However, the potential for AI to completely automate project management and Scrum Master tasks and remove job opportunities has yet to be comprehensively discussed. (Auth et al.2021)(Najdawi and Shaheen2021)(Josyula et al.2023).

Automatic Speech Synthesis for Arabic Language using the Generated Schemes Method

Chegrani Lamari, Guerti Mhania, Boudraa Bachir, Algeria

ABSTRACT

The purpose of this work is to generate units of language using in the speech synthesis of Arabic language based on concepts of schemes to generate syllables of sequence of Arabic language. The aim of this study is to develop a spoken communication aid system for the visually impaired in the Arab world. We can generate basic units; verbs, names and particles. We can also generate all speech in different levels (syllable sequence, word sequence and sentence or text sequence) depend on different generated schemes.

Arabic Online Metaphor Sentiment Classification using Semantic Information

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ABSTRACT

In this paper, I discuss the testing of the Arabic Metaphor Corpus (AMC) [1] using a newly designed automatic tools for sentiment classification for AMC based on semantic tags. The tool incorporates semantic emotional tags for sentiment classification. I evaluate the tool using standard methods, which are F-score, recall and precision. The method is to show the impact of Arabic online metaphors on sentiment through the newly designed tools. To the best of our knowledge, this is the first approach to conduct sentiment classification for Arabic metaphors using semantic tags to find the impact of metaphor.

Synthetic Personas: Enhancing Demographic Response Simulation Through Large Language Models and Genetic Algorithms

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ABSTRACT

Understanding diverse demographic groups presents a significant challenge in market research. In this paper, we introduce a novel system that integrates large language models with genetic algorithms to create synthetic personas capable of generating feedback that approximates real-world human responses. Our experimental evaluation demonstrates that synthetic personas not only exhibit age-differentiated technology usage patterns consistent with documented trends but also benefit from genetic algorithm optimization, which improves response accuracy from 60.4%

to 78.5% on training questions and from 62.6% to 68.8% on hidden questions—outperforming human estimators. Moreover, the optimized personas achieve a 51.1% better correspondence with actual income distributions compared to random profiles. This approach makes it possible to rapidly generate feedback without requiring participants, facilitates iterative follow-ups, and systematically enhances demographic representativeness.

Elliptical Mixture Models Improve the Accuracy of Gaussian Mixture Models With Expectation-maximization Algorithm

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ABSTRACT
This paper presents a comparative analysis of Gaussian Mixture Models (GMMs) and Ellipti- cal Mixture Models (EMMs) for clustering multi-dimensional datasets using the Expectation-Maximization (EM) algorithm. EMMs, which accommodate elliptical distributions' covariance structures, exhibit a su- perior ability to handle complex data patterns, particularly datasets characterized by irregular shapes and heavy tails. By integrating R's statistical tools into Python, this study enhances computational flexibility, making it easier to fit elliptical distributions. Empirical results using metrics like Weighted Average Purity, Dunn Index, Rand Index, and silhouette score show that EMMs substantially improve clustering accuracy under certain conditions, outperforming GMMs in handling data complexities common in real-world sce- narios. This research emphasizes the potential of EMMs as an alternative to traditional GMMs, offering a robust yet equally accessible approach for clustering in machine learning applications.

Enhancing Naive Bayes Algorithm with Stable Distributions for Classification

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ABSTRACT
The Naive Bayes (NB) algorithm is widely recognized for its efficiency and simplicity in classi- fication tasks, particularly in domains with high-dimensional data. While the Gaussian Naive Bayes (GNB) model assumes a Gaussian distribution for continuous features, this assumption often limits its applica-bility to real-world datasets with non-Gaussian characteristics. To address this limitation, we introduce an enhanced Naive Bayes framework that incorporates stable distributions to model feature distributions. Stable distributions, with their flexibility in handling skewness and heavy tails, provide a more realistic representation of diverse data characteristics. This paper details the theoretical integration of stable distri-butions into the NB algorithm, the implementation process utilizing R and Python, and an experimental evaluation across multiple datasets. Results indicate that the proposed approach offers competitive or superior classification accuracy, particularly when the Gaussian assumption is violated, underscoring its potential for practical applications in diverse fields.

Workload Characterization for Resource Optimization of Big Data Analytics: Best Practices, Trends, and Opportunities

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ABSTRACT

As distributed processing environments grow in complexity, accurate performance prediction models are essential to optimize system efficiency and resource allocation. However, modern computing workloads typically exhibit a wide variety of characteristics, which hinders optimized resource config- urations. Diverse approaches have been suggested to tackle the challenge of workload characterization, employing various parameters for performance modeling in the process. To expand on this objective, this paper introduces a 5+1 layer classification model designed to enhance the accuracy of predictive models by classifying and reflecting on relevant modeling parameters. We conducted a systematic literature review to identify and analyze the role of six key layers: Big Data Framework, Performance, Hardware, Data, User Application, and Virtualization. Our findings reveal that while the Big Data Framework and Performance Layers are foundational, predictive accuracy improves when combined with complementary layers, especially the Data Layer, which highlights the impact of data characteristics such as size and distribution. The Hardware Layer provides critical insights into system limitations, while the emerging Virtualization Layer reflects the increasing importance of virtualized, potentially cloud-based environments. The proposed 5+1 layer classification model offers a structured approach to capture and explain the complexity of distributed analytical workflows, providing a nuanced framework for performance modeling. This layered classification model aims to support the development of more robust, adaptable, and generalizable prediction models for use in cloud-based systems.

Keywords
Big Data Analytics, Performance Modeling, Resource Management, Cloud Computing.

Digital Twins in Pedagogy: Bridging AI, Cognitive Variance, and Individuated Learning

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ABSTRACT

Education is in crisis. Traditional, standardized models fail to accommodate the diverse cognitive, emotional, and aspirational needs of modern learners, leaving students disengaged and unprepared for an increasingly complex world (Moeller et al., 2018)[1]. Reports indicate that nearly 75% of students express a lack of motivation in their studies, reflecting a systemic failure to foster engagement and intrinsic curiosity (Langan & Harris, 2022)[2]. This paper proposes a radical reimagining of education through AI-driven Digital Twin Learning Systems (DTLS)—dynamic, adaptive, and deeply personalized learning companions that evolve alongside each student. These digital twins function as intelligent, generative entities, continuously integrating machine learning, big data analytics, and real-time adaptive feedback to create individuated learning experiences that optimize engagement, mastery, and self- actualization (Arslan et al., 2024)[3]. Unlike static educational platforms, digital twins leverage large-scale data mining and predictive modeling to analyze cognitive, behavioral, and emotional patterns across thousands—eventually millions —of learners (Betts et al., 2023)[4]. This allows for real-time clustering of students into dynamically evolving learning categories, optimizing pathways that ensure both personal relevance and broad pedagogical efficacy. As students interact with their digital twin, AI-driven recommender systems dynamically adjust instructional content, sequencing, and assessment strategies, anticipating learning needs rather than merely responding to them (Hancock et al., 2024)[5]. The generative design of these digital twins extends beyond content curation. Each twin is seeded at onboarding with diagnostic assessments—spanning cognitive, psychometric, and emotional intelligence data—defining its initial aesthetic and functional state (de Vries et al.,

2022)[6]. Over time, this evolving digital identity transforms visually and structurally, encoding learning milestones and personal growth into an interactive representation of the student's unique intellectual and creative trajectory. This visualized self-actualization offers an intrinsic motivation system, turning education into a deeply engaging, self-directed experience rather than a passive compliance exercise (Yeager et al., 2015)[7]. This paper explores the failures of traditional education, the AI and data-driven infrastructure behind digital twins, and the transformative impact of generative learning systems on student engagement and knowledge acquisition. It provides a blueprint for an intelligent, scalable, and human-centered educational future, where learning is no longer confined to rigid, one-size-fits-all models but instead evolves as dynamically as the learners themselves (MIT, 2024)[8].

Keywords
Digital Twin Learning Systems (DTLS), Individuated Learning, AI-Driven Education, Generative Learning Models, Cognitive-Adaptive AI, Personalized Knowledge Systems, Algorithmic Pedagogy, Data-Driven Learning Evolution, Predictive Educational AI, Cognitive Twin Technology, Dynamic Learning Trajectories, Real-Time Feedback Systems, Gamified Intelligence, AI-Powered Self-Optimization, Decentralized Learning Networks.

Chaos Theory and Stochastic Modeling for Adaptive Counter-drone Defense: a Non- Linear Framework for UAV Threat Mitigation

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ABSTRACT
The escalating sophistication of drone technology necessitates advanced defense systems capable of adapting to the unpredictable nature of adversarial Unmanned Aerial Vehicles (UAVs). This paper introduces a nonlinear framework for counter-drone defense, leveraging chaos theory and stochastic modeling. By modeling UAV flight paths as chaotic systems, this framework proposes a dynamic approach for detecting, predicting, and disrupting drone swarms. The methodology integrates chaotic attractors, fractal analysis, Lyapunov exponents, and stochastic control, laying the foundation for enhanced jamming, spoofing, and interception efficiency. This paper outlines the theoretical basis, simulation setup, and analytical tools required to implement and evaluate this framework, providing a structured approach for future research and practical applications in counter-drone technology.

Keywords
Chaos Theory, Stochastic Modeling, UAV Defense, Counter-Drone Measures, Electronic Warfare, Nonlinear Dynamics, Framework, Methodology, Simulation Setup.

Stable Distribution Naive Bayes Achieves Higher Accuracy Than Traditional Naive Bayes Classification

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ABSTRACT
This study evaluates the performance of the Stable Distribution Naive Bayes Classifier on the well-known IRIS dataset, comparing it against the traditional Naive Bayes Classi-fier. The Stable Distribution Classifier, well-suited for data with heavy tails and skewness, consistently achieves superior accuracy, especially when handling outliers and non-standard samples. This study conducted 18 feature combinations of Iris Versicolor and Iris Virginica across varying parameter configurations (α, β), demonstrating the stable model's robustness under constrained sample sizes. A significant technical contribution involves integrating R's specialized stable package into Python, enabling the direct application of professional fitting and PDF functions for precise

analysis. Representative results from key feature combinations further illustrate its practical advantages. Additionally, five additional datasets—Wine, Social Network Ads, Diabetes, Electrical Grid Stability Simulated, and Vehicle Silhouettes—further demonstrate the Stable Distribution Classifier's broad applicability across diverse domains. This research further confirms that the Stable Distribution Naive Bayes Classifier is a robust and accessible alternative, offering enhanced predictive performance over models traditionally based on Gaussian distribution assumptions.

Technological Schemes and Control Methods in the Reconstruction of Parallel Gas Pipeline Systems Under Non-stationary Conditions

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ABSTRACT
The management systems for the operational processes of existing parallel gas pipelines under non-stationary conditions are inefficient and technically complex. Additionally, the outdated elements, which are physically worn and do not meet the requirements of modern control technologies, fail to react quickly enough and only report problems after a significant amount of gas is lost to the environment. For this reason, it is crucial to develop new technological schemes that adopt modern control methods in the reconstruction phase of existing pipeline systems in order to eliminate negative outcomes. In this work, based on the analysis of the mathematical model of non-stationary gas flow in parallel gas pipelines, an algorithm based on machine learning technology was developed for the information database of the control and management point of technological processes. The developed algorithm can be recommended for solving engineering technology problems related to the prediction of technical maintenance and management of emergency situations in pipelines. Additionally, in order to ensure the continuity of gas supply to consumers during emergency situations, an empirical formula for determining the locations of connecting pipes in real-time mode based on the analysis of data from pressure sensors was derived. The application of this formula at the central control point allows for the implementation of a remote activation system for the connecting pipes. The analysis reveals that the pressure variations at the beginning and end of the parallel pipeline are directly dependent on the activation time of the automatic valves. This serves as the basis for obtaining information at the control point regarding the activation of the valves on the pipeline.

M.E.M.S. which Allows the Extraction of Energy from the Vacuum in Accordance with Emmy Noether's Theorem

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ABSTRACT
This theoretical work corresponds to the hope of extracting, without contradicting the theorem of EMMY NOETHER's invariants, an energy present throughout the universe: the spatial quantum vacuum. Without being an impossible perpetual motion, it is theoretically conceivable to maintain with the vacuum energy a continuous periodic vibration of a piezoelectric structure. This vibrating structure generates an electrical power peak during a fraction of the vibration period.They are obtained by automatically controlling the action of an attractive Casimir force deforming a piezoelectric bridge, by an opposite so repulsive and ephemeral Coulomb force. Two

automatic switches distribute the mobile electrical charges, to create an ephemeral and repulsive Coulomb force. Electronics without any electrical power supply, then transform these periodic power peaks into a usable continuous voltage. We also present an original micro-technology to realize these electronics, and to control the very weak interfaces between the Casimir electrodes and the Coulomb electrodes.

Keywords

Biomass Energy: Harnessing Nature's Power for Sustainable Development & Climate Change Mitigation

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ABSTRACT
Biomass energy, derived from organic materials such as plant matter and animal waste, presents a significant opportunity for sustainable development and climate change mitigation. As a renewable energy source, biomass can reduce dependence on fossil fuels, lower greenhouse gas emissions, and promote energy security. This paper explores the potential of biomass as a tool for achieving Sustainable Development Goals (SDGs) while addressing climate change challenges. It examines various biomass conversion technologies, their environmental impacts, and socio-economic benefits. Furthermore, the integration of biomass into national energy policies is discussed to highlight its role in fostering a circular economy and enhancing rural livelihoods. The findings underscore the importance of strategic investments in biomass technologies and infrastructure to maximize their contributions to sustainable development.

Keywords

Wave Optics of Chromosomes for the Remote Transfer of the Bioholographic Analogue of Aspirin

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ABSTRACT
Current medical treatment, including chemical pharmaceuticals, EMP treatments, mRNA therapies, and genetic engineering via cutting and pasting DNA snippets do not take into consideration the Structural Damage in Chromosomes they cause by excessive chemicals, electromagnetic fields and homologous nucleotides, all of which break the precisely calibrated geometry of a chromosome. And the Structural Damage of Chromosomes is the major cause of all diseases. The extreme cases of the Structural Damage in Chromosomes are turbo cancer, AIDS, sterilization and prion disease as the ultimate case of encephalopathy. Thus, the urgent task of biological science and technology is to address the issue of the Structural Damage in Chromosomes. This task includes the necessity of creating the fundamental theory of how the structure of a chromosome operates, and the biotechnology that corrects and enhances the structure of chromosomes. In this paper, I introduce my fundamental theory of Wave Optics in Chromosomes, and the biotechnology of Bioholography for the correction of the structural

damage in chromosomes. Specifically, I introduce the theoretical and technological paradigm of the Remote Transfer of the Bioholographic Analogue of Aspirin (aka Haspirin), including the results of the clinical trials conducted by my company Wave Genome LLC at the Moscow State Bauman Technical University in 2017. Haspirin clinical trials had verified and confirmed my fundamental theory of Wave Optics in Chromosomes.

Keywords
wireless optogenetics, computational biophysics, structural genomics, scalar waves, bioholography.