ROLE OF ARTIFICIAL INTELLIGENCE IN PLANT SCIENCES

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ABSTRACT

Plants are very important life form on the earth. Plants have been classified into three categories viz. herbs, shrubs and trees. Plant Sciences deals with study of identification, classification and nomenclature of it. Each term identification, classification and nomenclature are broad based on detail knowledge in the subject of Botany. Scientist have been taken much efforts in collection the data of plants and preserved in form of herberium. For the study of plants we are depends on major and local herberia which available suitably. There are variety of plant species and numbers around the globe. The identification of plant species by conventional key methods is time consuming and hectic to the non- expert due to use of particular botanical term and techniques. This creates problem for identification of plant species. Everywhere plants are infected by variety of pathogens producing number of diseases that reduced crop yield. Today there is much interest in identification of plant species and pathogens by automatic process. The availability of modern devices such as digital camera, mobile devices, recognition pattern and artificial intelligence have permitted to express the idea of automated species identification. Artificial intelligence (AI) is refer to simulation of human intelligence in machine permit to perform task especially require human intelligence. The task including learning from experience, problem solving, understanding natural language and decision making. Application of AI in plant sciences had transformed the research method in plant sciences improving the identification and increasing crop yield by detection of diseases and providing diagnosis on it.

***Keywords**: Artificial Intelligence, Botany, identification, plant pathogens and diagnosis.*

USE OF AI IN GRADUATE LEVEL STUDENTS TO ENHANCE THE STUDY OF COMPUTATIONAL MATHEMATICS

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ABSTRACT

Artificial Intelligence (AI) is transforming graduate student education in many ways from being part of personalised learning teacher to recognised smarter tool. AI gives explanation, step – by – step guidance, to save time, to provide instant feedback to students. AI in computational mathematics help the students to remain up -to -date, to match the pace of rapidly changing technology & technique. AI helps the students to be in touch with Mathematical- modelling, Mathematical – software & Machine- learning which were the integral part of Computational Mathematics. The use of AI in the area of research and innovation cannot be ignored but, the extent to which one can involve such tools instead of challenging own capabilities is the question to which each and every one of us using AI is answerable.

***Keywords**: Artificial Intelligence; Computational mathematics; Mathematical- modelling; Machine-learning*

STUDY OF LIPID CONTENT IN CATLA CATLA FINGERLINGS FEED ON SOYBEAN MEAL

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ABSTRACT

The study was aimed to evaluate the efficiency of Soybean meal as a fish food. The Soybean meal was given to catla catla fingerlings which were reared in Late Pushpadevi Patil Arts and Science College Risod fish farm for 110 days. The important water parameter which influences this physiology of fishes were also taken into consideration were properly monitorate throughout the experiment duration. The growth performance and the lipid content of the fish catla catla was studied during study period. The growth of fishes was after every 15 days hence and overall, of 3 reading were made. They growth rate and lipid content of fish were initially low but it increases significantly which provide soybean meal.

***Keywords**: Lipid content soybean meal, catla catla Risod region*

ARTIFICIAL INTELEGENCE UTILITY IN AGRICULTURAL, HERBAL DRUG CONSERVATION

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ABSTRACT

Artificial Intelegence technology will used in various angles in medicinal and aromatic plants , like wise identification of plants, phytochemical tests, and drug analysis. It is applicable in Analytical chemistry. Identification of Plants : If we provided morphological characteristic data it will be easy for identification of plants. . Phytochemical tests: we get the information about chemical contents in different parts of plants. Drug analysis: Artificial Intelegence will be used in drug analysis. It will useful on different diseases as a antidose. Pathogenic identity-: Artificial Intelegence will be used in identification of causal organism in plant diseases. Artificial Intelegence will be used in deciding fruit size, fruit colour,nutritive contents . Artificial Intelegence is beneficial for human being ,like it will help in yhe market strategy , prices of crop yield, schedule of crop, etc.It also give atmospheric information. But we should be used in ethical manner.Artificial Intelligence technology is applicable for crop plants and medicinal . In this field innovative ideas can search new compounds with therapeutic potential, optimize cultivation practices, and ensure product quality and safety with accuracy. It is important to carefully consider its advantages and disadvantages and ensure that it is used in an ethical and responsible manner. It contributing to the progress in new treatments, cosmetics, and food products. Hence Artificial Intelegence will be used in human health and the environment.

***Keywords** : Artificial Intelegence , Phytochemical, Analytical, Ethical, Innovative. Etc.*

SAFEGUARDING DRINKING WATER: AI AND ZOOPLANKTON-BASED EARLY WARNING SYSTEMS FOR WATERBORNE DISEASES PREVENTION

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ABSTRACT

Waterborne diseases remain a major global concern. Proper management of water resources can be improved using Artificial Intelligence (AI) tools such as data analytics, regression models, and algorithms. Achieving the sustainable development goals related to water requires effective communication, measurement, and integration of water's value into decision making. To protect human health, barriers must be in place to prevent or reduce microbial contamination in drinking water sources. Zooplankton play crucial role as bioindicators of water quality, and their monitoring when combined with AI can provide an effective early system for detecting ecological disturbances and potential disease outbreaks. Alongside infrastructure and capacity development, clear policies on applying AI and Zooplankton- based monitoring to water related challenges are necessary to achieve sustainable outcomes. Communities can benefit from such approaches and safe water across ecosystems. Rapid and precise detection of waterborne pathogens, supported by zooplankton surveillance in both drinking and recreational water bodies, is essential to prevent and control water-related illness, especially in resource limited areas. For success, AI- driven solutions and zooplankton based indicators must go hand in hand with infrastructure improvements and policy support. This study primarily emphasizes the role of AI and zooplankton in ensuring safe drinking water and preventing diseases caused by water contamination.

SOLICITATION OF ARTIFICIAL INTELLIGENCE IN AGRICULTURE

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ABSTRACT

The incorporation of artificial intelligence (AI) into the agricultural sector is revolutionizing conventional farming methods and presenting innovative solutions to intricate challenges. The swift progress in data analysis, machine learning, and automation is transforming the industry, especially in the realm of crop enhancement. As the global demand for food continues to escalate, the function of AI has evolved from experimental uses to practical instruments that bolster sustainable agriculture and productivity. Through predictive modeling, real-time monitoring, and decision support systems, AI offers opportunities to improve yields, optimize resource utilization, and tackle environmental limitations. Among the leading AI technologies applied in agriculture are machine learning, robotics, and data analytics, each fulfilling a unique function in promoting crop productivity. Machine learning algorithms assist in classifying soil fertility, selecting crops, and predicting yields by analyzing vast datasets and identifying trends that support informed decision-making. Furthermore, deep learning techniques are frequently utilized for forecasting both crop yields and commodity prices, while robotics and automated equipment have become essential to precision agriculture, facilitating tasks such as targeted planting and harvesting operations. Data analytics, supported by these AI systems, provides real-time monitoring and predictive insights, enabling farmers to optimize resource usage and swiftly adapt to environmental changes. Collectively, these technologies not only enhance decision-making processes but also pave the way for sustainable agricultural intensification.

Keywords: *Artificial Intelligence (AI), Agriculture, Farming methods, Sustainable agriculture, Data analytics, Predictive modelling, Real-time monitoring, etc.*

ADVANCING BIOLOGICAL SCIENCES RESEARCH THROUGH ARTIFICIAL INTELLIGENCE

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ABSTRACT

Artificial intelligence (AI) is transforming biological sciences research by enabling sophisticated data analysis, predictive modeling, and automation in exploring complex biological systems. This study investigates the pivotal role of AI in advancing plant and organismal research, with applications in phenotyping, genomics, and ecological analysis. By integrating machine learning algorithms and computer vision, we process extensive datasets from imaging, genetic sequencing, and environmental monitoring to reveal patterns in growth, stress responses, and biodiversity. AI-driven tools enable high-throughput phenotyping, allowing precise identification of traits and stress tolerance mechanisms essential for agricultural improvement and conservation. Additionally, deep learning models enhance genomic analysis by predicting gene functions and interactions, accelerating trait discovery for sustainable applications. AI-powered ecological models provide insights into organism-environment interactions, supporting conservation strategies amid changing environmental conditions. This multidisciplinary approach, combining AI with biological sciences, optimizes experimental workflows and drives data-informed discoveries, fostering innovative solutions for agriculture, ecosystem management, and biotechnological advancements.

Keywords: *Artificial intelligence, biological sciences, machine learning, phenotyping, genomics.*

STRUCTURAL AND OPTICAL CHARACTERIZATION OF SNO2 THIN FILMS GROWN BY SILAR TECHNIQUE

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ABSTRACT

Tin dioxide (SnO_2) thin films, valued for their excellent optical transparency and electrical conductivity, are critical for applications in optoelectronic devices and AI-enhanced sensing systems. This study investigates the synthesis of SnO_2 thin films via the Successive Ionic Layer Adsorption and Reaction (SILAR) technique, a versatile and cost-effective method for controlled film deposition. The films were characterized using X-ray diffraction (XRD), scanning electron microscopy (SEM), and UV-Vis spectroscopy to assess their structural, morphological, and optical properties. XRD analysis verifies the formation of tetragonal SnO_2 with high phase purity, while SEM reveals uniform surface morphology and tunable film thickness. UV-Vis spectroscopy demonstrates a wide optical bandgap, ideal for applications in transparent conductive oxides and photodetectors. By employing machine learning algorithms, we optimize SILAR deposition parameters to enhance film quality, correlating processing conditions with structural and optical performance. This multidisciplinary approach, integrating materials science and artificial intelligence, highlights the potential of SnO_2 thin films for advanced optoelectronic and intelligent sensing applications, paving the way for efficient and scalable material development.

Keywords: *Tin dioxide, SILAR technique, thin films, structural properties, optical bandgap.*

ROLE OF ARTIFICIAL INTELLIGENCE IN ADVANCING MATHEMATICAL RESEARCH

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ABSTRACT

Artificial intelligence (AI) is revolutionizing mathematical research by enhancing theorem proving, pattern discovery, and computational efficiency in exploring complex mathematical structures. This study investigates the pivotal role of AI in advancing pure and applied mathematics, with applications in number theory, geometry, and optimization. By integrating machine learning and symbolic computation, AI processes vast datasets from mathematical models, simulations, and conjectures to identify novel patterns and relationships. AI-driven tools, such as neural networks and automated theorem provers, accelerate the verification and generation of proofs, tackling previously intractable problems. In applied mathematics, AI optimizes algorithms for solving differential equations and large-scale optimization problems, enhancing computational efficiency in fields like cryptography and data science. Additionally, AI-powered analysis of mathematical structures supports the discovery of new conjectures and simplifies complex calculations. This synergy of AI and mathematics streamlines research workflows and drives innovative discoveries, advancing both theoretical insights and practical applications.

Keywords: *Artificial intelligence, mathematical research, machine learning, optimization.*

ADVANCEMENT IN PLANT TAXONOMY RESEARCH THROUGH ARTIFICIAL INTELLIGENCE

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ABSTRACT

Artificial intelligence (AI) is revolutionizing plant taxonomy research by enhancing the accuracy, efficiency, and scope of species identification, classification, and evolutionary analysis. This study explores the transformative impact of AI in plant taxonomy, leveraging machine learning, computer vision, and big data analytics to process complex morphological, genetic, and ecological datasets. AI-driven tools, such as deep learning models, enable automated identification of plant species through high-resolution imaging, facilitating rapid and precise taxonomic classification even in diverse or understudied ecosystems. Machine learning algorithms enhance phylogenetic analysis by predicting evolutionary relationships and integrating genomic data, improving the resolution of taxonomic frameworks. Furthermore, AI-powered ecological modeling supports the understanding of species distribution and adaptation, aiding in the conservation of rare or endangered plants. By streamlining data processing and enabling high-throughput taxonomic workflows, AI fosters innovative discoveries in plant diversity, evolution, and biogeography, offering scalable solutions for biodiversity research and conservation.

Keywords: *Artificial intelligence, plant taxonomy, phylogenetics.*

AI-DRIVEN OPTIMIZATION OF LITHIUM FERRITE FOR ADVANCED TECHNOLOGICAL APPLICATIONS

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ABSTRACT

Lithium ferrite ($Li_{0.5}Fe_{2.5}O_4$), a spinel ferrite with unique magnetic and electrical properties, holds significant potential for applications in AI-driven intelligent systems, such as neuromorphic computing and smart sensors. This study focuses on the synthesis and comprehensive characterization of lithium ferrite nanoparticles, utilizing X-ray diffraction (XRD), scanning electron microscopy (SEM), transmission electron microscopy (TEM), and vibrating sample magnetometry (VSM) to analyze its structural, morphological, and magnetic properties. By integrating machine learning algorithms, we optimize the synthesis parameters to achieve tailored crystallite size, particle morphology, and magnetic behavior, enhancing the material's suitability for energy-efficient, brain-inspired computing architectures. XRD analysis confirms the phase purity and spinel structure, while SEM and TEM reveal uniform nanoparticle morphology with controlled size distribution. VSM measurements demonstrate tunable magnetic hysteresis, critical for in-memory computing applications. Leveraging AI-driven predictive modeling, we explore the impact of synthesis conditions on lithium ferrite's performance, accelerating the design of high-performance materials. This multidisciplinary approach highlights the synergy between lithium ferrite and AI, offering a scalable framework for developing next-generation intelligent technologies.

Keywords: *Lithium ferrite; artificial intelligence; nanoparticle synthesis; magnetic properties.*

REVIEW ON EFFECT OF WATER POLLUTION ON ANOPHELES BREEDING HABITATS

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ABSTRACT

Water pollution due to uncontrolled release of chemical pollutants is an important global problem. Its effect on medically important insects, especially mosquitoes, is a critical issue in the epidemiology of mosquito-borne diseases. In order to understand the effect of water pollutants on the demography of Anopheles stephensi, colonies were reared in clean, moderately and highly polluted water for three consecutive generations at 27 °C, 75% RH, and a photoperiod of 12:12 h (L:D). The demographic data of the generations of An. stephensi were collected and ana lysed using the age-stage, two-sex life table.Female adult longevity in moderately polluted (9.38 days) and highly polluted water (9.88 days) were significantly shorter than those reared in clean water (12.43 days), while no significant difference in the male adult longevity was observed among treatments. Reviews of this study showed that An. stephensi can partially adapt to water pollution and this may be sufficient to extend the range of mosquito-borne diseases.

***Keywords**: Global water pollutants, Anopheles stephensi, Malaria vector, Life table, Adaptation*

STUDY OF POSSIBLE ROLE OF ARTIFICIAL INTELIGENCE IN ABUNDANCE AND DIVERSITY OF SPIDER SPECIES

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ABSTRACT

Artificial Intelligence (AI) is rapidly transforming arachnological research, offering powerful tools to study the abundance and diversity of spider species with unprecedented efficiency and precision. Given the vast diversity of spiders over 50,000 species and the complexity of their ecological roles, traditional manual identification and observation methods are often time-intensive and challenging. AI, particularly machine learning and deep learning algorithms like Convolutional Neural Networks (CNNs), is now employed for rapid and accurate species identification from images and videos, even helping non-experts and citizen scientists contribute more effectively to biodiversity databases. Beyond taxonomy, AI is crucial for uncovering intricate ecological patterns. For instance, computer vision can analyse videos of prey capture and web structures to infer dietary ecology, offering insights into how different spider guilds (e.g., orb-web builders, stalkers) impact arthropod communities and pest control in agro-ecosystems. Machine learning models are also being developed for predicting spider population dynamics and occurrence based on time-series data and environmental parameters, which is vital for conservation and ecological management. Furthermore, AI techniques are applied to decode complex spider communication—such as the subtle vibrations used for courtship and territorial defence by analysing vast datasets of vibration patterns, furthering our understanding of their social dynamics and behaviour. This integration of AI allows researchers to explore large datasets and tackle long-standing questions about spider biology, providing a robust foundation for biodiversity monitoring.

Keywords: *Artificial Intelligence, Biodiversity, Monitoring, Spiders, Taxonomy.*