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EVALUATION OF DIFFERENT SUBSTRATES FOR ECONOMICAL MASS MULTIPLICATION OF *TRICHODERMA*, A BIOCONTROL FUNGAL AGENT

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ABSTRACT: Isolation of 32 fungal cultures was carried out from rhizospheric region of *Dalbergia sissoo* from different soil samples. The soil samples were collected from different sites of Seoni, Sagar and TFRI, Jabalpur. Out of 32 fungal culture isolates, 15 fungal isolates were identified as *Trichoderma* species. Among the fifteen *Trichoderma* isolates, *Trichoderma harzianum* was identified as fast-growing species based on their growth rate. The morphological and taxonomical characterization was also applied in order to differentiate the isolated *Trichoderma* species. Laboratory conditions were optimized for the growth of *T. harzianum* using cheaply and readily available agricultural waste for mass multiplication and low-cost development of these useful fungi. With the use of, vegetable waste, other organic waste material and assessment of their availability as substrates for mass multiplication *Trichoderma harzianum*, evaluated an effective and cheap production methodology that can be easily adopted.

Keywords: *Fermentation, fungal agent, substrate, Trichoderma, waste*

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INTRODUCTION

Trichoderma species are filamentous fungi that multiply on various substrates such as soil, decayed wood, and it colonizes roots (Grondona *et al.*, 1997). Due to their diverse metabolic activity and very aggressive competitiveness, nature helps them to succeed in their habitats (Barari, 2016). considering morphological characteristics such as conidia, they form mainly compact pustules which are in green color shades, grey, or brown (Sriram and Savitha, 2015).

A genus of fungi belonging to the Hypocreaceae family has been named *Trichoderma*. It is found everywhere, in the soil, rotting wood, plants and oceans. The majority of these species are opportunist, avirolytic and symbiotic. Against certain pathogenic fungi of cruciferous plants, they may be useful biocontrol agents according to Harman *et al.*, (2004). For example, *T. asperellum* (T-34) and *T. harzianum* (SQR-T307) are found to be effective bio-control agents against *F. oxysporum* (Corrales *et al.*, 2010; Yang *et al.*, 2011). The occurrence of tomato wilt is reduced by the presence of isolated *T. asperellum*, according to Cotxarrera *et al.* (2002). *T. gamsii* 6085 is often used in a competitive test against *F. subtilis* and *F. graminearum*, a rice field pathogen which implies

(42)

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Decolourization of Spent Wash using Bacteria *Pseudomonas putida*

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Keywords

Decolourization, spent wash, bacteria, culture conditions, fermentation, sugar plants

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ABSTRACT

With extremely high BOD, COD, and other harmful organic and inorganic elements, spent wash is among the most complicated and time-consuming wastewaters. Because of the presence of several water soluble, colouring chemicals and recalcitrant primarily melanoidins, distillery effluent maintains a very dark brown hue even after anaerobic treatment. The aim of the study includes standardising several criteria for the extraction of melanoidin pigment as well as the isolation and identification of bacteria from natural sources. Methods: *Pseudomonas putida*, a melanoidin-decolorizing bacterium, was isolated in a lab setting using the serial dilution technique, and the culture conditions were improved at different incubation temperatures, times, pH levels, carbon sources, and nitrogen sources. On 120 hours, or the fifth day of culture, the optimal decolorization (86.05%) of melanoidins were accomplished at pH 5 and 37 °C. Based on the results of optimising the culture settings, it was discovered that the chosen bacterial strain needs 1.5 gm of extra carbon (Dextrose) and 1.5 gm of supplementary nitrogen (Ammonium sulphate) in order to decolorize. After bacterial treatment, dextrose and ammonium sulphate are supplied to the effluent, which is both cost- and environmentally-friendly. By using bacterial strain *Pseudomonas putida*, this method of biological treatment successfully decolorizes melanoidin from distillery effluent.

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India's Trade Policy and GVCs: An Insight on Recent Policy Changes for Selected Sectors

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Abstract

In this article, we examine the global value chain involvement of six Indian manufacturing sectors and explore the nature of their participation in light of recent changes to India's trade policy. Our analysis covers the past few decades and aims to inform the development of India's new trade policy. We conclude by discussing the effectiveness of different policies in enhancing India's competitiveness and generating quality employment, cautioning that protectionism alone may be detrimental to India's goals of becoming a manufacturing center and creating better job opportunities for its workforce, especially as some global value chains are reshaped in the wake of the pandemic.

Keywords- Exports, Free Trade Agreements, Global Value Chain, High Performing Sectors, India's Trade Policy.

1.Introduction

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Embedding SDG 12 in consumer behavior.

A survey towards knowledge, attitude and perception for sustainable consumption

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Abstract

Sustainable development has become a global issue. As a result, there has been a growing awareness about environmental issues related to human consumption. Consumer behaviour has a direct influence on the environment, regardless of whether the consumer is concerned about the environment or not. The continuous excessive use and quick depletion of resources pose a threat to humanity as a whole. One strategy to address this issue is to continue to educate and propagate sustainable practices, particularly among younger generations. Thus, it becomes necessary to carry out this investigation or study among young people. A questionnaire was used to collect the response of 348 respondents. Random and convenient sampling method was used for data collection. For data analysis, significant statistical tools of factor analysis, correlation, and t-test were used to bring out substantial results .The current study used the KAP (Knowledge, Attitude, and Practise) survey to investigate sustainability in order to explore how the Sustainable Development Goals (SDGs) can be incorporated into consumer behaviour. In simple terms, it assesses the respondent's "knows," "feels," and "does" about the issues. Most people are aware of sustainable products, and the main obstacles to sustainable consumption are the lack of sustainable alternatives. It was found that awareness of consequences, perceived environmental responsibility and environmental criteria while making a purchase decision are important variables to influence consumers for sustainable consumption.

Keywords: Sustainable Development Goals (SDGs), Consumer Behaviour, Sustainable Consumption.

Karen Kennedy,
mosaic 'dragon seat'
with Ngataringa taniwha,
Ngataringa Reserve,
Devonport, New Zealand.

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"URBANIZATION AND SUSTAINABLE CLIMATE CHANGE: EXPLORING THE IMPACT OF URBAN EXPANSION ON ENVIRONMENT.

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ABSTRACT

This research paper aims to investigate the intricate relationship between urbanization and climate change with a specific focus on the impact of urban expansion on global warming. Urbanization is a rapidly growing global phenomenon and its effects on the environment particularly in terms of contributing to climate change are of significant concern. The paper will review existing literature on the subject and analyze data to understand the various ways in which urban expansion influences global warming. Additionally, the research will explore potential mitigation strategies and policy implications to address the adverse effects of urbanization on climate change. By shedding light on this critical issue the study seeks to contribute to a better understanding of the complex interplay between urban development and environmental sustainability ultimately aiming to inform evidence-based decision-making for a more sustainable urban future.

Keywords: Urbanization, Sustainable Climate, Global Warming, Urban Expansion

REVIEW OF LITERATURE

- **Muntasir Murshed (2018)** Found from previous research the effects of urbanization on climate change in Bangladesh, a country that has a history of being vulnerable to natural calamities. Specifically addresses the effects of urbanization, and other control variables, on the emission of selected greenhouse gases and on the average annual temperature change in Bangladesh. Hat urbanization is found to have a causal effect on greenhouse gas emissions and temperature change in the long run. In contrast, a unidirectional causality is also found to be running from urbanization to carbon dioxide emission in the short run. In light of the regression model estimates it is found that initially urbanization leads to a fall in greenhouse gas emissions and reduces the temperature change, but the relationship eventually gets reversed with time whereby urbanization is found to trigger climate change in Bangladesh.
- **Daniel Argüeso Jason P. Evans Lluís Fita Kathryn J. Bormann (2013)** In her research on climate change and urbanization reveals that there has been a proliferation of global agreements and support generated from the international level, however, the capacity, data, and finance at the city level to effectuate change is variable. Solutions vary say by city, country, and region. In high-income countries, improving urban spaces is critical for reducing global greenhouse emissions and there is great potential for multiple benefits from upgrading urban areas—increased mobility, more reliable energy sources, and reduced vulnerabilities to disaster while transitioning to a low-carbon economy powered by cities. Engaging local communities and adopting ecosystem-based approaches to adaptation in urban and peri-urban areas have further potential to attain sustainable development for cities.
- **Nishi Bhuvandas Vanita Aggarwal (2012)** Describe the impact Urbanization refers to a general increase in population and the amount of industrialization of a settlement. It includes the number and extent of cities. It symbolizes the movement of people from rural to urban areas. Urbanization happens because of the increase in the extent and density of urban areas.
- **Wayne C. Zipperer, Robert Northrop, and Michael Andreu (2020)** show in this study This deforestation significantly affects both hydrologic systems and territorial habitats. Hydrologic ally, urbanization creates a condition called urban stream syndrome. The increase in storm runoff, caused by urbanization through the addition of impervious surfaces, alters stream flow, morphology, temperature, and water quantity and quality. In addition, leaky sewer lines and septic systems as well as the lack of sanitation systems contribute significant amounts of nutrients and organic contaminants such as pharmaceuticals, caffeine, and detergents. Planning with nature is not new but it has only recently been recognized that human survival is predicated on coexisting with biodiversity and native communities. How and if cities apply recommendations for sustainability depends entirely on the people themselves.
- **Eugenia Kalnay (2003)** Analysed that the most important anthropogenic influences on climate are the emission of greenhouse gases1 and changes in land use, such as urbanization and agriculture However, it has been difficult to separate these two influences because both tend to increase the daily mean surface temperature3,4. The impact of urbanization has been estimated by comparing observations in cities with

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Challenges and Opportunities in Intellectual Property Rights (IPR) in the Age of Generative AI: Balancing Innovation and Protection

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Abstract: ***The advent of Generative Artificial Intelligence (AI) has ushered in a new era of innovation, fundamentally altering the landscape of Intellectual Property Rights (IPR). This research paper aims to explore the intricate balance between fostering AI - driven creativity and safeguarding individual intellectual contributions. Generative AI, with its capability to produce original content, ranging from literary works to scientific research, poses a significant challenge to traditional notions of IPR, which are predicated on human ingenuity and individual creativity. The paper delves into the current legal frameworks governing IPR and examines their adequacy in addressing the complexities introduced by AI - generated content. It highlights key instances where AI has independently created works that could potentially qualify for copyright, raising questions about authorship and originality in the digital age. Furthermore, the paper explores the ethical and economic implications of AI in the realm of IPR, considering both the potential for AI to democratize content creation and the risks of undermining human creativity. The research adopts a multidisciplinary approach, drawing insights from legal studies, technology, and ethics, to propose a revised model of IPR that accommodates the unique characteristics of AI while protecting the rights and incentives of human creators.***

Keywords: Intellectual Property Rights (IPR), Generative Artificial Intelligence (AI), Copyright Law, AI - Driven Innovation, Ethical Implications in AI

1. Introduction

In the rapidly evolving digital landscape, the advent of Generative Artificial Intelligence (AI) has marked a transformative era in the realm of creativity and innovation. This technological leap forward presents both unprecedented opportunities and significant challenges for Intellectual Property Rights (IPR). The intersection of AI with IPR raises critical questions about authorship, originality, and the very nature of creativity [4, 37]. As AI systems become increasingly capable of generating artistic works, literary compositions, and even scientific research, the traditional boundaries of IPR are being redefined [3, 5].

The core of IPR has always been to protect and incentivize human creativity and innovation. However, the emergence of AI as a non - human creator challenges this paradigm [23]. The legal frameworks that currently govern IPR were not designed to accommodate the creative outputs of AI, leading to a legal and ethical conundrum [25, 27]. This paper seeks to explore the complexities introduced by generative AI in the context of IPR. It delves into the legal ambiguities, ethical considerations, and the potential need for policy reform to balance the protection of human creators with the innovative capabilities of AI [11, 34].

Moreover, the economic implications of AI in the domain of IPR cannot be overlooked. AI's ability to enhance creativity and generate novel content opens new avenues for market expansion and business models, yet it also poses risks of undermining the economic value of human - generated intellectual property [15, 28]. This paper aims to provide a comprehensive analysis of these challenges and opportunities, offering insights into how IPR can evolve in the age of generative AI to foster an environment where innovation and protection coexist harmoniously.

1.1 Overview of Intellectual Property Rights (IPR)

Intellectual Property Rights (IPR) are legal rights that provide creators protection for their inventions, literary and artistic works, symbols, names, and images used in commerce. These rights are crucial in fostering an environment where creativity and innovation can flourish. IPR is typically categorized into patents, copyrights, trademarks, and trade secrets, each serving a unique function in protecting different forms of intellectual creation [40].

Patents protect inventions, allowing inventors exclusive rights to their creations for a limited period, typically 20 years. This exclusivity incentivizes innovation by providing inventors the opportunity to monetize their inventions [1]. Copyrights, on the other hand, protect original artistic and literary works, including books, music, and software. Copyright law grants authors exclusive rights to their works, thereby encouraging creative expression [7].

Trademarks protect symbols, names, and slogans used to identify and distinguish products or services in the market. This protection helps businesses build brand identity and consumer trust, which is essential in a competitive marketplace [12]. Lastly, trade secrets encompass formulas, practices, processes, designs, instruments, or patterns used for business purposes. The law protects undisclosed trade secrets to maintain competitive advantages and stimulate business innovation [35].

The evolution of IPR has been influenced by the need to balance the rights of creators with the public interest. This

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BRAHMAGUPTA: MATHEMATICIAN OF ALL TIMES

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'Brahmagupta is one of the greatest scientists of his race and the greatest of his time'
*- **George Sarton***

Abstract: Development of a robust knowledge of one's own cultural history, language and tradition builds a cultural identity and self-esteem in learners. It is a crucial skill that not only promotes contentment of self but also instils pride for the nation.
Identifying this, preservation and promotion of India's heritage is placed as high priority in NEP 2020. It has included the legacy and ancient wisdom of India in every discipline to be imbibed by the first-hand learners. *For a country with outstanding contribution in mathematics in ancient times revisiting Indian mathematical legacy will go a long way to help learners enjoy the subject.*
In this paper the author throws light on the life and works of Brahmagupta - one of the greatest Indian mathematicians of all times. The paper is based on the research directed through available reliable sources depicting mathematical results since Pre-Vedic times.

Keywords: Brahma-Sphuṭa-Siddhanta, Khanda-Khadyaka

Introduction: Whether be it the archeological remains of the Harappan civilization, differently shaped fire altars of the Vedic age or the ancient temple architecture, they distinctively authentify the glorious heritage and culture of India. They also stand for the mathematical genesis of India.
The beginnings of mathematics in India can be traced to constructional geometry- the basis and inspiration for the whole of Indian mathematics whose chronology spans from Pre-Aryan, Vedic to the Classical age. Mathematical works were orally transmitted until the 5th century. Thereafter they were transmitted both orally and in manuscript form. Flipping through the pages of Indian history we come across many ancient Indian mathematicians whose results are unparalleled even today. Brahmagupta was one such mathematician who was pronounced as *Ganaka-Chakra-Chudamani*- the gem of the circle of mathematicians by mathematician Bhaskara II.

Biography: Brahmagupta (598-668 BC) was born in Bhillamala (presently Bhinmal in Rajasthan) during the reign of the Chavda dynasty. Those times it was a centre of learning for mathematics and astronomy. His schooling is from *Brahma-Paksha* one of the four major schools of Indian astronomy during that period.
In the year 628 BC, at the age of 30, he composed an astronomical treatise the *Brahma-Sphuṭa-Siddhanta* - 'correctly established doctrine of Brahma'. It is in Sanskrit verse form and without mathematical notations.The book consists of 24 chapters with 1008 verses Primarily

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RESEARCH ARTICLE | DECEMBER 15 2023

Eight extraordinary pythagorean triangles

Mita Darbari ; Prashans Darbari

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Eight distinctive triangles which satisfy Pythagorean equation and comply with the condition that sum of their three sides is a dodecic number are unearthed. For this, software Mathematica was applied and method of analysis was used. Various remarkable observations related to these triangles are perceived. A possible application of these triangles is suggested.

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RESULTS IN b-METRIC SPACES ENDOWED WITH THE GRAPH AND APPLICATION TO DIFFERENTIAL EQUATIONS

SATYENDRA KUMAR JAIN, GOPAL MEENA*, LAXMI RATHOUR, LAKSHMI NARAYAN MISHRA

ABSTRACT. In this research, under some specific situations, we precisely derive new coupled fixed point theorems in a complete b-metric space endowed with the graph. We also use the concept of coupled fixed points to ensure the solution of differential equations for the system of impulse effects.

AMS Mathematics Subject Classification : 54M20, 54E35, 47H09.
Key words and phrases : Coupled fixed point, b-metric space, contraction.

1. Introduction

Fixed point analysis is most useful tools in applied sciences. It is also applicable to show the existence of the solution of differential or integral equations. Bhaskar and Lakshmikantham [4] used coupled fixed point to show the existence of solution to differential equations. This result motivates many scholars to this subject. Graphs have been used by some authors in recent years to develop new varieties of fixed point theory. Jachymski's paper [13] is one of the best research on fixed point with graphs. For the more detail study in this emerging field, we can go through the papers [1, 2, 5, 7, 8, 9, 10, 12, 14, 15, 16, 17, 18]. Alfuraidan and Khamsi [4] recently employed some coupled fixed point results in the directed graph.

Definition 1.1. [3] A map $\sigma : P \times P \to R^+$ on the set P is such that

(i): $\sigma(\mu,\nu) = 0$ if and only if $\mu = \nu$,
(ii): $\sigma(\mu,\nu) = \sigma(\nu,\mu)$,
(iii): $\sigma(\mu,\nu) \leq j[\sigma(\mu,w) + \sigma(w,\nu)]$ for all $\mu,\nu,w \in P$,

where $j \geq 1$, then (P,σ) be a b-metric space.

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Best Proximity Point and Existence of the Positive Definite Solution for Matrix Equations

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Abstract. In this research, $\alpha-\psi-\theta$ contraction has been defined to find the best proximity point in partially ordered metric spaces. Proper support for the result has been given in the form of a suitable example. The third part is fully devoted to the positive definite solution of matrix equations.

1. Introduction and Preliminaries

The concept of the best proximity point was introduced by Basha [5] with the help of the Banach contraction principle. It may be impossible to find a fixed point for two non empty subsets $L, M \subseteq W$ and a mapping $S : L \to M$ (for example, when $L \cap M = \phi$). However, it is very interesting to find a point $x \in L$, where x and Sx are as close as possible; in other words, find an $x \in L$ which minimizes $\varrho(x, Sx)$. Such optimal approximate solutions are called "best proximity points for S." Letter on many Mathematicians [1–3, 6, 9, 10] established best proximity point results. In 2014, idea of θ contraction introduced by Jleli et al. [8] and defined generalization of Banach contraction. In this paper, we define $\alpha-\psi-\theta$ contraction and establish the best proximity point in partially ordered metric spaces. Moreover, as a consequence of the result, a fixed point result and the existence of a positive definite solution to matrix equations have been given.

In the whole paper, complete metric space and the best proximity point are abbreviated as CMS and BPP, respectively. The subsequent symbols used in our results are:

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Key words and phrases. best proximity point; matrix equations; positive definite solution.

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Advances in Bioresearch

ORIGINAL ARTICLE

The effect of aqueous leaf extract of *Phyllanthus emblica* on Biochemical parameters of catfish, *Clarias batrachus*

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ABSTRACT

The objective of the current study was to estimate the effect of leaf extract (aqueous) of Phyllanthus emblica on biochemical parameters, i.e., total serum protein, albumin, and globulin, of Clarias batrachus. Fish of average weight (80–120 g) were randomly divided into three groups (n = 7) control and treated with 2% and 5% of leaf extract (aqueous) for up to 30 days. After treatment, serum was collected 7, 15, and 30 days later. A two-way ANOVA was used for statistical analysis, which revealed that significant differences in the values of total serum protein and albumin were obtained due to differences in dose concentration (p<0.05). The differences in globulin values obtained due to both dose concentration and duration were non-significant. The results suggested that the aqueous leaf extract of Phyllanthus emblica may help stimulate the immune potential of Clarias batrachus fish and may be useful in aquaculture when used as a natural immunostimulant.

***KEY WORDS**: Clarias batrachus, Phyllanthus emblica, aqueous leaf extract, biochemical parameters.*

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INTRODUCTION

Fish is an important source of animal protein in our diet. It contains all important vitamins, minerals and trace elements in appropriate amounts. Enhancing fish yield was essential to supplement the protein food needs of this country. India produced 108 million tons of fish in 2016, the third highest in the world after China and Indonesia. According to FAO, India's share in global production of fish is 7%, second to China (2018). Fishes are not only an important delicacy for human being, but they are broadly used for different biological experiments [3].

Clarias batrachus has been found in many continents, successfully adapted itself and found all over Asia and Africa. *Clarias batrachus* is considered as a medicinal fish and rich in nutritional value, found in different parts of India, mostly in Tripura and West Bengal. In some Indian states like Bengal and Tripura intensive culture of *Clarias batrachus* have better prospects towards income resources, generation of employment and ensuring dietary enhancement in the normal diet among the people [4].

The importance of medicinal plants and herbs to people's health and the health of society has always been proven. Numerous scientific studies on conventional herbal treatments for various diseases have been conducted recently, which has sparked an increase in the use of alternative drugs and therapeutic modalities [5].

Phyllanthus emblica L. is commonly known as Indian gooseberry. ***Emblica officinalis*** is a synonym of ***Phyllanthus emblica***. It (amla) belongs to the family Euphorbiaceae as a strong rejuvenating aromatic plant and has been extensively used from a medicinal perspective and as an edible plant. All plant parts, including the leaves, flowers, seeds, bark, roots, and fruits, are utilised for therapeutic purposes in Ayurveda. It is reported as a good dietary source of vitamin C, amino acids, and minerals [6]. It consists of a number of secondary metabolites like alkaloids, glyceroids, tannins, glyceroids, flavonoids, saponins,[7].

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An in vitro study of cytotoxicity of organophosphate insecticides (Imidacloprid, Profenofos, Dichlorvos) and natural products (Neem oil and Dashparni ark) on human peripheral lymphocytes by MTT and Trypan blue assay

Research Article

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Abstract

Human population of India is increasing very fast. Everybody needs food to survive. Agricultural products must be boosted by adding adequate fertilisers and using appropriate insecticides. Organophosphates are one of the most frequently used insecticides. Their overuse leads to the contamination by agricultural runoff. The insecticides may enter drinking water as well. Since organophosphates are acetylcholinesterase inhibitors, they can be dangerous for human health. Hence, a toxicity study by MTT and Trypan Blue Assay of three common insecticides (Imidacloprid, Profenofos, Dichlorvos) and two natural products (*Dashparnik ark* and *Neem* oil) on lymphocytes was taken up. It was found that at 4 hours of incubation at 1mM Imidacloprid showed the greatest drop in viability followed by Dichlorvos and the least harm was caused by Profenofos. For 18 hours of incubation, the same trend was observed, but the decrease and increase were more pronounced. In the case of Profenofos and Dichlorvos the viability percent rises above that of the control. It was probably due to the defense mechanism involving the P450 detoxification pathway of the cells. The damage to the cells was of lesser magnitude when organic insecticides were used. *Neem* nano-drop emulsion showed a significant fall in viability at 2mg/ml. *Dashparnik ark* produced very little damage, but at higher concentration it boosted the viability. Apparently, the extract of leaves fermented in cow urine and cow dung was less damaging than that of other insecticides. Thus, organic insecticides are safer to use because they are ecofriendly and do not harm non-target organisms.

Keywords: Cytotoxicity, Lymphocytes, Insecticides, *Dashparni ark, Neem.*

Introduction

It is well known that the global population is continuously increasing. The global population was 7 billion in 2010 but is expected to reach 9 billion in 2045.(1) The population increase is even steeper in India. Indian population is currently 1.4 billion and is projected to exceed 1.5 billion in 2050.(2) To feed a continuously increasing population, an increase in food grain and crop production is necessary. Intense efforts have to be made to increase production of food grains seasonally. The agricultural sector contributes a major share (22.19%) to the gross value added (GVA) of the GDP of the country (46.4 lakh crore). So, an increase in agricultural production will also give a boost to the economy of our country.

Insecticides have been used for a long time to reduce crop losses, and many types of insecticides have been used in the agricultural industry by almost all types of farmers. The indiscriminate and frequent use of insecticides has resulted in soil and water pollution. This is mainly due to agricultural runoff. If humans are overexposed to these chemicals, they suffer from several ill effects, primarily because most of the insecticides used are organophosphates, which are acetylcholinesterase inhibitors. As such, they hinder nerve impulse transmission, and the target has to suffer the consequences. Therefore, it was thought beneficial to study their toxicity on human peripheral blood lymphocytes in vitro. Some organic insecticides are reportedly less toxic, so in this study, the cytotoxicity of the chemical insecticides has been compared with that of *Neem* oil nano-particle emulsion and *Dashparni Ark.*

Profenofos

Organophosphates are the most widely used group of pesticides globally. Profenofos is a very

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BIOSCIENCES BIOTECHNOLOGY RESEARCH ASIA, December 2023. Vol. 20(4), p. 1461-1465

Study of Antimicrobial Quality of Tobacco Leaves Extract (*Nicotiana tabacum*) on *Aeromonas hydrophila* and *Escherichia coli*

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Tobacco is a perennial herb and its belong to family Solanaceae. Tobacco leaves have some antimicrobial substance such as alkaloids, phenol and some essential oils. The leaves extract of this plant show some microbial Quality and influence on both gram positive and gram negative bacteria. The aim of this work to determine the effectiveness of tobacco (Nicotiana tabacum) leaves extract in inhibiting on Aeromonas hydrophila and Escherichia coli. The antibacterial test performed on Mueller Hinton Agar (MHA) media. Test result indicate the leaves extract of tobacco showed positive result in Aeromonas hydrophila. Tobacco extract can inhibit Aeromonas hydrophilla growth and a clear zone are found, in case of E. coli it showed negative result in both the cases. Tobacco extract cannot inhibit E. coli growth and the diameter of the inhibitory zone is not clear. The result shown that tobacco leaf extract can be source of an active antimicrobial substance.

Keywords: Aeromonas hydrophila; E coli; Tobacco extract.

India is known for its Rich biodiversity region and have 91,000 animal's species and 45,000 plant species. As aqueous extract of medicinal plant has potential for antimicrobial activity for various microorganism[1]. *Tobacco* is one of the perennial herbs and its belong to family Solanaceae. In total sixty species of *Nicotiana* few are homegrown to Australia, America in which *Nicotiana tabacum*, is use for commercial production. Exposure of *Tobacco* caused cancer and many disease in human but one of the good thing of *Tobacco* leaves have some antimicrobial substance such as alkaloids, phenol and some essential oils. The medicinal value of tobacco plant is known to 1492 to till now. *Tobacco* tea was used to kill intestinal worms, as well as for headaches, and used as an antiseptic. *Tobacco* in known for cigarette smoking and it is continuing common practices in our society and it causes blood coagulation and increase cardiovascular disese[2]. The leaves extract of this plant shows some antimicrobial Quality and influence on both gram positive and gram-negative bacteria.

Nicotine is the most important and active substance in *tobacco* product but clinical value is limited because it causes multiple negative effect. In many study it is found that nicotine has microbial viability on microbes and inhibitory effect on the growth of some microbes such as *Aeromonas hydrophila and E.coli* .

Aeromonas hydrophila is a gram-negative pathogen and usually found in fresh and brackish

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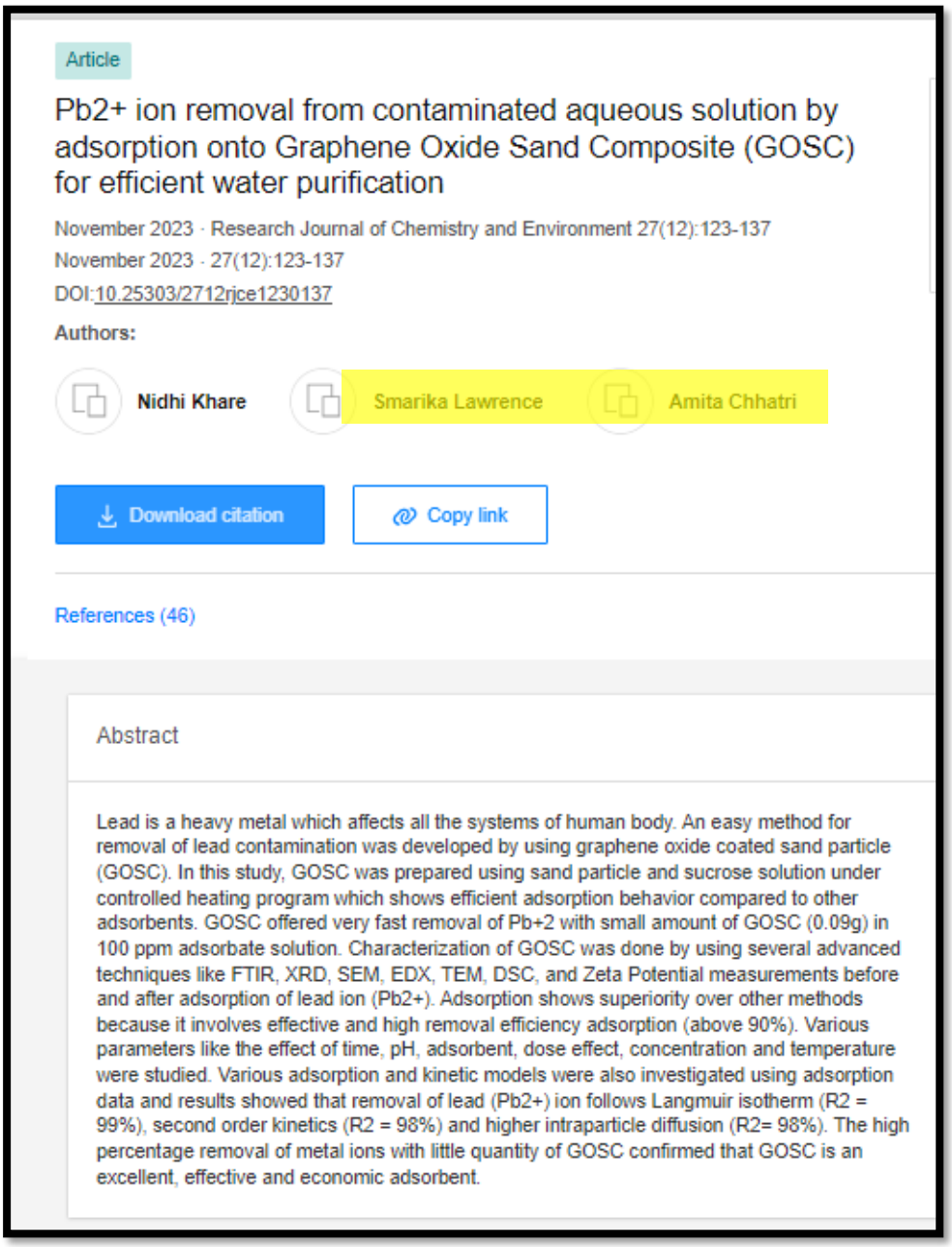

Article

Pb2+ ion removal from contaminated aqueous solution by adsorption onto Graphene Oxide Sand Composite (GOSC) for efficient water purification

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Nidhi Khare Smarika Lawrence Amita Chhatri

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Abstract

Lead is a heavy metal which affects all the systems of human body. An easy method for removal of lead contamination was developed by using graphene oxide coated sand particle (GOSC). In this study, GOSC was prepared using sand particle and sucrose solution under controlled heating program which shows efficient adsorption behavior compared to other adsorbents. GOSC offered very fast removal of Pb+2 with small amount of GOSC (0.09g) in 100 ppm adsorbate solution. Characterization of GOSC was done by using several advanced techniques like FTIR, XRD, SEM, EDX, TEM, DSC, and Zeta Potential measurements before and after adsorption of lead ion (Pb2+). Adsorption shows superiority over other methods because it involves effective and high removal efficiency adsorption (above 90%). Various parameters like the effect of time, pH, adsorbent, dose effect, concentration and temperature were studied. Various adsorption and kinetic models were also investigated using adsorption data and results showed that removal of lead (Pb2+) ion follows Langmuir isotherm (R2 = 99%), second order kinetics (R2 = 98%) and higher intraparticle diffusion (R2= 98%). The high percentage removal of metal ions with little quantity of GOSC confirmed that GOSC is an excellent, effective and economic adsorbent.

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Analysis Of The Anti-Oxidant And Cell Cytotoxicity Properties Of Stevia Rebaudiana Extract By Using In- Vitro Model

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Abstract

Leaves of *Stevia rebaudiana* are rich source of sweet glycosides of steviol. The major glycoside, stevioside, diterpenoid glycoside--is used in India and various countries as a food sweetener for diabetic patients. Its medical use is also reported in various ailments like heart, liver, pancrease etc. Besides this it is also being used against obesity, stomach burn and to lower uric acid levels in blood. In present study the leaf extract with various extract were tested for immunomodulatry properties. We performed MTT assay to check the cell viability and cytotoxicity in peripheral blood mononuclear cell (PBMC) and also calculated the Trolox equivalent values to assess the antioxidant properties of Stevia *rebaudiana*. . Percent cell viability values of cells were found to be more than 50 percentages with increase in concentration. At higher dose all these extract showed significant inhibitory effects on proliferation. The aqueous extracts shown the maximum value of Trolox equivalent with 1:16 dilution. It means with the increase in the concentration of extract there is substantial increase in antioxidant property or we can assume antioxidant is dose dependent. But in same time cell viability gets reduced with increase in concentration.

Keywords: stevia rebaudian, antioxidant, MTT assay, Soxhlet extractor

Introduction

Stevia is a natural sweetener and sugar substitute derived from the leaves of the plant species Stevia rebaudiana, native to Brazil and Paraguay (**Arumugam *et al***). Stevia belongs to *Asteraceae* family and is related to ragweed and daisy. It is commonly called as candy leave in its native place – Texas, New Mexico, and Arizona. For hundred of years, Brazilian and Paraguans have been using Stevia rebaudiana as sugar in their food. Stevia has natural sweetening and medicinal properties used for diabetes, helps in weight control, help to reduce blood pressure, stevia does not cause allergy and reduces the risk of pancreatic cancer (**Ajami**

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POLICIES AND SCHEMES: A TOOL FOR WOMEN'S ECONOMIC EMPOWERMENT IN INDIA

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ABSTRACT

Empowering women is an important issue in developing countries. Although women are an integral part of any society, their participation in decision making through their active contribution in economic activities is shallow. Women empowerment and economic development and plans and policies are interconnected. To reduce the inequality between women and men, various schemes and policies have been implemented by the government which can play an important role in the development of women, on the other hand, empowering women can benefit women empowerment. This paper explores the policies and schemes for economic empowerment of women in India and also, we will take a deep dive into various government schemes for women in India that are part of the government's broader initiatives for the care and security of women in our society. These schemes are focused on providing women with financial assistance, healthcare, education, and skill development, among other things.

Key words- *Women empowerment, Economic Development, Policies and Schemes.*

INTRODUCTION

Women Empowerment alludes to expanding the profound, political, social, instructive or monetary quality of people and groups of ladies. Women Empowerment In reliant on a wide range of variables that incorporate geological area (urban/country) instructive status social

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A STUDY OF EDUCATIONAL INTEREST OF UNDERGRADUATE STUDENTS IN RELATION TO THEIR GENDER

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ABSTRACT

A student's educational interest is to ascertain what they are excellent at and what kind of schooling would bring out and support their innate abilities. It is a method of exerting pressure on the learners to create a conductive learning environment, which includes selecting courses that will prepare them for the future, choosing subjects related to potential careers, and so on. Interest in education is crucial as it influences the choice of career paths. People need to know which educational paths are in demand for their future careers in order to make informed decisions about their careers. According to Hidi and Renninger, three factors contribute to the development of interest: knowledge, positive emotion, and personal value. As individuals learn more about a topic, they become more skilled and knowledgeable. The researchers aim to study the educational interest of the college going students of Jabalpur in relation to their gender. The researchers have taken samples from B.Com. and B.A. students of St. Aloysius Autonomous College and the sample comprised of 50 students (25 male & 25 female). The researchers has used Dr. S. P. Kulshrestha's test of Educational interest as a tool to collect the data. As a result we found that there is no significant difference between Male and female Students in relation to Educational Interest.

Keywords : *Educational interest, undergraduate students.*

PUNE RESEARCH ISSN 2454 - 3454
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GENDER SENSITIZATION: UNDERSTANDING CHALLENGES AND PROMOTING EQUALITY

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ABSTRACT

Gender sensitization is a crucial aspect of promoting inclusivity and equality in society. This research paper explores the significance of gender sensitization in addressing the challenges faced by individuals of diverse gender identities and advocating for gender equality. By synthesizing existing literature and empirical research, this paper aims to provide insights into the importance, challenges, and strategies for promoting gender sensitization. Gender sensitization plays a vital role in raising awareness about the impact of gender on individuals' experiences, opportunities, and interactions within society. It involves challenging stereotypes, biases, and inequalities to create a more equitable and respectful environment for people of all genders. By fostering empathy, understanding, and respect for diverse gender identities and expressions, gender sensitization contributes to creating a society where everyone can fully participate and thrive. Despite its importance, gender sensitization faces several challenges that hinder its effectiveness and impact. These challenges include resistance to change, lack of awareness, limited resources, and institutional barriers. Addressing these challenges requires targeted strategies and interventions, including education, media engagement, community mobilization, and policy advocacy. Effective gender sensitization initiatives integrate education and training on gender issues into various sectors, including education, workplaces, healthcare, and policymaking. By providing individuals with the knowledge, skills, and tools to challenge gender norms and promote equality, gender sensitization empowers individuals to become agents of change within their communities. Community engagement is also essential for fostering grassroots support for gender sensitization initiatives. By engaging communities in

TECHNICAL ARTICLE

The influence of reviews and ratings on consumer purchase decision

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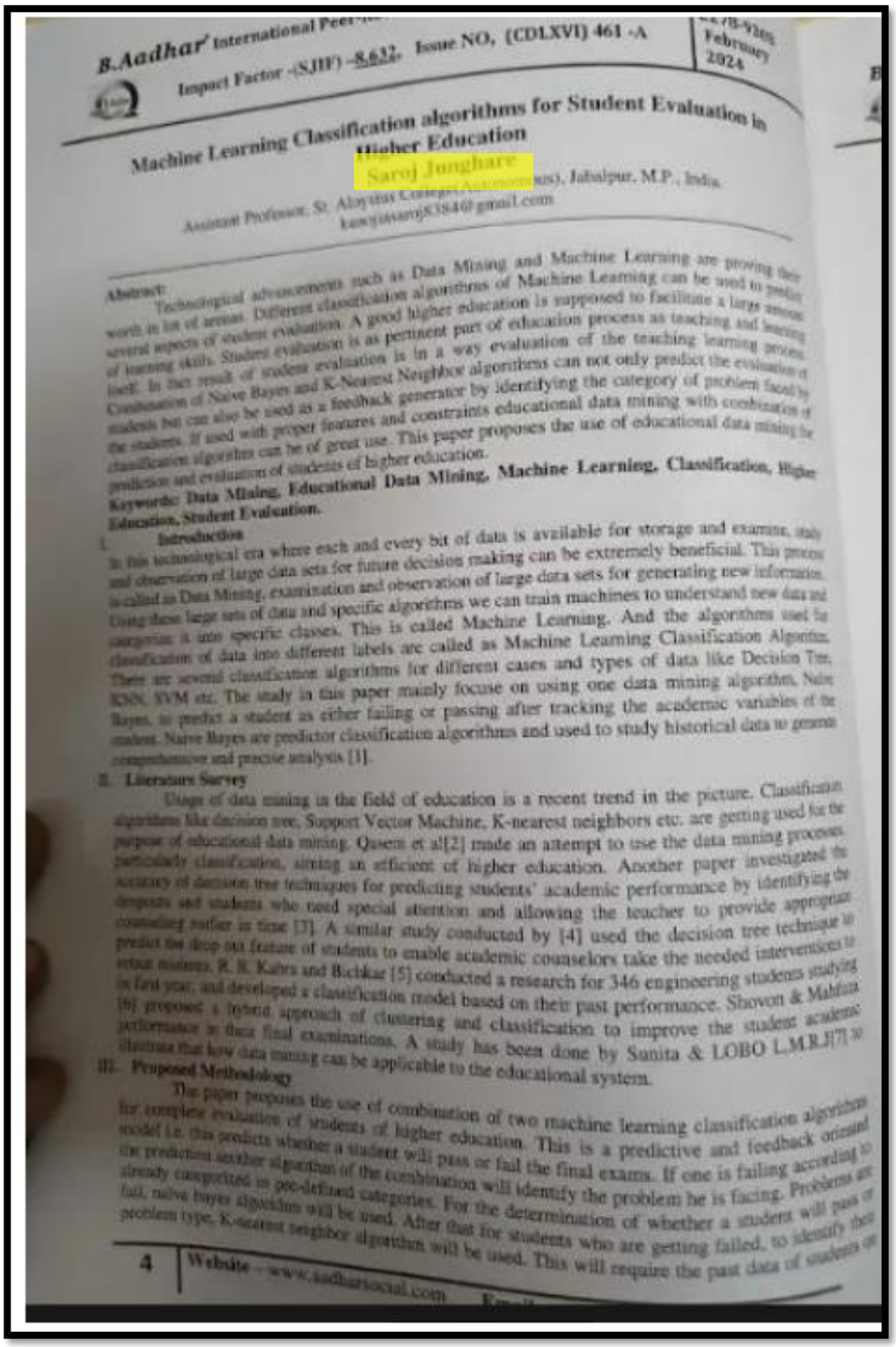
Abstract

With the exposure of social media, online product reviews and ratings have become a powerful source of information that influence or affect buying decisions. Customer reviews are a type of feedback on e-commerce and online shopping sites. In today's world, with the availability of resources like 24x7 internet access, smartphones, and other resources to easily use websites, consumers have continuous and easy access to online product reviews too. There are many platforms like online retailer's websites, E-Commerce websites, brand websites, brand blogs, and third-party reviews, where consumers can take part and join the discussions about their purchases and consumption experiences, and so these product reviews and ratings have become a well-known marketing and sales tool that affect consumer's buying decision. Consumer reviews may affect product sales and help a customer in making effective buying decisions. The study finds the relationship between reviews and ratings and consumers' buying decisions. The objective of the research is to understand the influence of Reviews and Ratings on buying behavior of the consumers and to know the change in product sales after referring to reviews and ratings available online.

Keywords: Reviews and Ratings, Online Shopping Platforms

Introduction

Previously people used to prefer buying products on the basis of the recommendations given by their friends, family, and relatives. But as time changed and as the technology took over, the consumers started considering the reviews available online and started checking them before making any purchases. In earlier times ads were the essential part to impart knowledge about the product. Even though an efficient and good ad increases sales, people still may not believe totally what the ads show because generally, the ads try to overstate the benefits of the product. But, on the other hand, the consumers believe other consumers very easily because they most probably don't lie and at the same time they also notify about the benefits of the product as well as the problems that were faced by them if any. Reviews and ratings play a major role in affecting the purchase decisions of consumers while using online shopping platforms. It should be kept in mind that if all the reviews available online are positive then the consumers might think that they are paid reviews. If it has a combination of negative and positive reviews or at least a few negative reviews then they will find these reviews authentic. People might not want to buy a product that has zero reviews and ratings or very few reviews and ratings. They might think that either the product is new or that it is not bought by many people. Due to this reason itself they might not want to take a chance of buying that product. Reviews and ratings have a great impact on consumers' buying decisions. Requesting the customers to write a review and put their ratings for the product helps in getting a lot of reviews and when it comes to revie and



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Machine Learning Classification algorithms for Student Evaluation in Higher Education

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Abstract:

Technological advancements such as Data Mining and Machine Learning are proving their worth in lot of arenas. Different classification algorithms of Machine Learning can be used to predict several aspects of student evaluation. A good higher education is supposed to facilitate a large amount of learning skills. Student evaluation is as pertinent part of education process as teaching and learning itself. In fact result of student evaluation is in a way evaluation of the teaching learning process. Combination of Naïve Bayes and K-Nearest Neighbor algorithms can not only predict the evaluation of students but can also be used as a feedback generator by identifying the category of problem faced by the students. If used with proper features and constraints educational data mining with combination of classification algorithms can be of great use. This paper proposes the use of educational data mining for prediction and evaluation of students of higher education.

Keywords: Data Mining, Educational Data Mining, Machine Learning, Classification, Higher Education, Student Evaluation.

I. Introduction

In this technological era where each and every bit of data is available for storage and examine, study and observation of large data sets for future decision making can be extremely beneficial. This process is called as Data Mining, examination and observation of large data sets for generating new information. Using these large sets of data and specific algorithms we can train machines to understand new data and categorize it into specific classes. This is called Machine Learning. And the algorithms used for classification of data into different labels are called as Machine Learning Classification Algorithm. There are several classification algorithms for different cases and types of data like Decision Tree, KNN, SVM etc. The study in this paper mainly focuse on using one data mining algorithm, Naïve Bayes, to predict a student as either failing or passing after tracking the academic variables of the student. Naïve Bayes are predictor classification algorithms and used to study historical data to generate comprehensive and precise analysis [1].

II. Literature Survey

Usage of data mining in the field of education is a recent trend in the picture. Classification algorithms like decision tree, Support Vector Machine, K-nearest neighbors etc. are getting used for the purpose of educational data mining. Qasem et al[2] made an attempt to use the data mining processes, particularly classification, aiming an efficient of higher education. Another paper investigated the accuracy of decision tree techniques for predicting students' academic performance by identifying the dropouts and students who need special attention and allowing the teacher to provide appropriate counseling earlier in time [3]. A similar study conducted by [4] used the decision tree technique to predict the drop out feature of students to enable academic counselors take the needed interventions to retain students. R. R. Kabra and Bichkar [5] conducted a research for 346 engineering students studying in first year, and developed a classification model based on their past performance. Shovon & Mahfuza [6] proposed a hybrid approach of clustering and classification to improve the student academic performance in their final examinations. A study has been done by Sunita & LOBO L.M.R.J[7] to illustrate that how data mining can be applicable to the educational system.

III. Proposed Methodology

The paper proposes the use of combination of two machine learning classification algorithms for complete evaluation of students of higher education. This is a predictive and feedback oriented model i.e. this predicts whether a student will pass or fail the final exams. If one is failing according to the predictions another algorithm of the combination will identify the problem he is facing. Problems are already categorized in pre-defined categories. For the determination of whether a student will pass or fail, naïve bayes algorithm will be used. After that for students who are getting failed, to identify their problem type, K-nearest neighbor algorithm will be used. This will require the past data of students on

4 Website – www.aadharsocial.com

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COMPARATIVE STUDY OF XGBOOST AND SVM ALGORITHMS FOR PREDICTION OF HEART DISEASE

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Abstract
Early detection and diagnosis of heart disease are essential for successful disease management and prevention. In this study, we applied Support Vector Machine and Extreme Gradient Boost machine learning techniques to predict the occurrence of heart disease. Our models were trained and tested using a large dataset of patient medical records, which included a variety of health indicators like blood pressure, cholesterol levels, and other risk factors. The results showed that the Support Vector Machine had a 93.51% accuracy rate, whereas the Extreme Gradient Boost had a 90.26% accuracy rate. These findings demonstrate the potential for machine learning algorithms to predict heart disease, allowing for earlier diagnosis and better disease management.
Keywords: Machine learning, Predictive modelling, cardiovascular disease, Support vector machine

1. Introduction

Cardiovascular diseases (CVDs) remain a significant global health concern, causing high mortality and morbidity rates. The World Health Organisation (WHO) estimates that about 17 million deaths worldwide are caused by CVDs each year, or around 31% of all fatalities. About 655,000 persons per year in the United States die from heart disease alone, accounting for one in four fatalities [1]. To address this issue, predictive modeling, specifically leveraging machine learning algorithms, has emerged as a promising approach for preventing and treating CVDs. With the goal of developing a more precise and effective tool for early diagnosis and prevention, this study aims to evaluate the usefulness of machine learning algorithms in predicting the likelihood of heart disease. Previous research has demonstrated the potential of machine learning in predicting cardiovascular diseases. For example, Krittanawong et al. (2018) used machine learning algorithms to forecast cardiovascular risk using electronic health records, demonstrating their superiority over traditional risk prediction models and highlighting the potential of machine learning in improving cardiovascular health outcomes [2].

Logistic regression, random forest, extreme gradient boost, and support vector machine are among the widely used machine learning algorithms for predicting heart disease. These algorithms have shown impressive accuracy rates in previous studies. Jain et al. (2020) compared logistic regression, decision trees, and random forest algorithms and found that random forest achieved an accuracy rate of 89% [3]. Mahmoud et al. (2021) conducted a study comparing logistic regression, k-nearest neighbours, and support vector machines and determined that support vector machines achieved the highest accuracy rate of 91.5% in predicting heart disease [4]. Although these results are positive, further research is required to confirm the effectiveness of machine learning algorithms in predicting cardiac disease. Additionally, it is crucial to identify the factors that influence algorithm performance and consider the potential limitations and ethical implications associated with their use [5][6].

This study aims to contribute to the field of predicting heart disease by using extreme gradient boost and support vector machine algorithms. Based on the features of the patient and information about their medical history, these algorithms will be used to forecast the chance of heart disease. By comparing their performance and identifying the factors affecting accuracy rates, this research aims to enhance our understanding of the effectiveness of machine learning models in predicting heart disease. Furthermore, the study will explore the potential limitations and ethical considerations associated with using these algorithms in this domain.

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PERCEIVED RETURNS OF HIGHER EDUCATION: A CASE STUDY ON SOME COLLEGE STUDENTS OF JABALPUR

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ABSTRACT

The paper reports the perceived returns of higher education for some first-semester college students of Jabalpur, M.P., India. It followed a previous study that was conducted for class XII students of Siliguri, W.B., India. The findings indicate a more or less similar pattern. In addition, the present paper identifies a gap, as was pointed out by Jensen (2010), between the perceived return of education for the students and the actual potential return. The students preferred subjects like management over science subjects at the graduation level with the hope of getting better job opportunities. It has been opined based on conceptual analysis that the contemporary market is heading towards Gig-economy that promotes project-based short-term employment which has the threat of uncertainty and at the same time has the advantage of flexibility. This job-market situation calls for nurturing critical thinking, life-skill development with an emphasis on professional collaboration, the approach of an entrepreneur and life-long learning. It has been suggested that among several options, the active learning strategy and the concept-point-recovery (CPR) approach (Cho, Mcilloch and Levesque-Bristol, 2021), change from a surface-learning approach to a deep-learning approach and vice-versa (Xie, Zhang and King,2022) and maintaining appropriate learning environment may be effective (Ahmed, Taha, Alneel and Gaffar,2018).

KEYWORDS: Perceived Return of Education; Actual Potential Return of Education; Gig-Economy; Critical Thinking; Collaboration; Entrepreneurship; Life-Long Learning; Mentoring

1. INTRODUCTION

While studying the psychological changes of students over time one of the most important aspects is learning. Students learn formally and informally. The theories of learning change or develop depending on new observations or new interpretations. But those do not modify with environmental changes. The environmental changes come as inputs of an operating system for which the learning outcomes may differ if the initial conditions or inputs differ. The inputs include the physiology of the learner, the choice of the individual and the environmental intervention. However, 'choice' is strongly dominated by the information coming from the environment and other parameters like interest, aptitude, and motivation of an individual. Also, the choice is prominent in young adults (like those under study in this paper) compared to children. Economists (e.g. Jensen, 2010) opine that, choices are not always made objectively. Rather, choices are made on perceived returns. According to Jensen (2010), "Economists emphasize the link between market returns to education and investments in schooling. Though many studies estimate these returns with earnings data, it is the perceived returns that affect schooling decisions, and these perceptions may be inaccurate". In the contemporary scenario, the economic situation is uncertain. Accordingly, the expected economic returns for any educational investment are also uncertain. The possibility of deviations of the perceived returns from actual returns becomes high. It becomes imperative to mentor young minds for minimising the gap. The present study proceeds in line with a previous study (Mitra, 2023) where a case study with XII Students in Siliguri (West Bengal) on perceived returns of Higher Education was done.

2. REVIEW:

The study of Mitra (2023) was conducted on 36 (thirty-six) XII students for observing their perceived returns to Higher Education. The perceived returns were job-oriented having awareness of the scarcity of the job market. The students seemed to be under-informed. At least 30% of them were aware of the importance of information. The study could not detect any significant variation between boys and girls relating to the perceived returns. The paper depended on three documents: one by Jensen (2010); another by Montenegro and Patrinos (2014); and the last one by Samreen (2017).

Jensen (2010) reported the survey results for eighth-grade boys in the Dominican Republic. The perceived returns to secondary schools were found to be severely low. In that context, the researcher felt the need for the availability of accurate information on the returns for schooling to the students.

The Policy Research Working Paper 7020 by Montenegro and Patrinos (2014) was on data available for more than sixty years starting from 1950 from 139 global economics. Out of six major findings that were reported one was like this: the returns to schooling were higher for women than men.

The research of Samreen (2017) has been reported in his thesis. The researcher investigated the reasons behind low schooling among the Muslim community of the Aligarh district of Western U.P. It was hypothesized and verified the gap between the perceived returns to schooling and actual returns is one of the major reasons for the low effective enrolment in that area. However, here the perception of the parents or guardians was studied.

From the above research works we get a direction for the present investigation. In this connection, we took the help of three more research reports which helped us to look into the psychological changes of first-semester undergraduate students relating to

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Vanadium complexes: potential candidates for therapeutic applications

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Abstract

Transition metal with variable oxidation states has always been a point of attraction since many decades for scientists with special focus in the field of catalysis, biologically active agents, therapeutic drugs, etc. Among these, vanadium is a metal which is of multi-dimensional potential for industry, pharmaceutics, physiology, etc. Albeit the fact that inorganic vanadium salts like Na_2VO_3 and $VOSO_4$ have shown considerable medical potential, yet their low absorbance, higher toxicity and excretion through feces and urine drifted the attention of scientist to synthesize novel vanadium compounds/organic poly-oxovanadate (POV) having versatile therapeutic potential, better absorbance and specific intra-/intercellular biomolecular interaction with various cell signaling pathways, resulting in better therapeutic activities. In past few decades, this area of research has gained much attention but still need to be done a lot in future. Keeping in mind the therapeutic scope of various vanadium complexes, the present review article is written with the purpose of providing comprehensive overview to those who are interested to dive and explore the possibility for the synthesis of new vanadium complexes as drug with its therapeutic properties. Our study aims at reporting the biphasic behavior of vanadium, a range of vanadium compound with special focus on its anti-diabetic, anti-bacterial, anti-viral, cardiovascular, anticancer, anti-oxidant, alkaline phosphatase (ALP) inhibitor properties and their probable mechanism cited in recent leading literature databases. Analogy of vanadate with phosphate responsible for its interaction with various phosphatase enzymes like ALP, protein tyrosine phosphatase (PTP), etc. in the mechanistic point of view is analyzed. The multi-directional study carried out so far on vanadium complexes and its mechanistic interaction at biomolecular level need to be systematically summarized for further innovation in drug discovery and to make new avenues in the synthetic metallodrug fields to fight against some lethal diseases.

Introduction

Background

Vanadium is ubiquitous metal with its abundance as element in earth crust at 21st position and in sea water at 2nd position after Mo [1]. It is also present in air through different channels in the form of various vanadium oxides.

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Vanadium toxicity depends on its concentration in the organism. It is non-toxic to human body when present in trace amount (0.05 µM) while it is toxic at the concentration of > 10 µM [2, 3]. Vanadium is a metal of special focus in this review with many stable oxidation states, i.e., +2, +3, +4, +5, which make it versatile metal as far as mechanism of action and stability of complexes is concerned [4, 5]. Vanadium can be present in both cationic and anionic forms like orthovanadate $(VO_4)^{3-}$, metavanadate $(VO_3)^-$, vanadyl cation $(VO)^{2+}$, etc (Fig. 1) [4, 5]. Structural analogy of orthovanadate $(VO_4)^{3-}$ with phosphate $(PO_4)^{3-}$ ion [4–6] is a possible cause of interaction with phosphorylation/dephosphorylation route of ATP/ADP in glucose/lipid metabolism [7–11], DNA binding and mutation by possibly replacing the phosphate linkage with orthovanadate in DNA/enzyme regulation [12, 13] and lipid peroxidation [14–20]. Probable mechanism of anticancer action [21–23] of few vanadium complexes has been suggested on the basis of pi–pi intercalation of

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Applications and advancements of polysaccharide-based nanostructures for enhanced drug delivery

Asra Fatimah Kareemi, Sweta Likhitkar
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Highlights

- Interaction of polysaccharides with various drugs.
- PS-based nanogels, nanocapsules, and nanoemulsions for enhanced drug delivery.
- Synthesis routes for innovative nanostructures are reviewed.
- Chemical, bioinspired, and biomimetic modifications of PS and nanostructures.
- Overcoming challenges through synthetic PS.

Abstract

Growing demand for highly effective, site-specific delivery of pharmaceuticals and nutraceuticals using nano-sized carriers has prompted increased scrutiny of carrier biocompatibility and biodegradability. To address these concerns, biodegradable natural polymers have emerged as a transformative domain, offering non-toxic, precisely targetable carriers capable of finely modulating cargo pharmacokinetics while generating innocuous decomposition by-products. This comprehensive review illuminates the emergence of polysaccharide-based nanoparticulate drug delivery systems. These systems establish an interactive interface between drug and targeted organs, guided by strategic modifications to polysaccharide backbones, which facilitate the creation of morphologically, constitutionally, and characteristically vibrant nanostructures through various fabrication routes, underpinning their pivotal role in biomedical applications. Advancements crucial to enhancing polysaccharide-based drug delivery, such as surface modifications and bioinspired modifications for enhanced targeting, and stimuli-responsive release, strategies to overcome biological barriers, enhance tumor penetration, and optimize therapeutic outcomes are highlighted. This review also examines some potent challenges, and the contemporary way out of them, and discusses future perspectives in the field.

Graphical Abstract

Biocatalysis and Agricultural Biotechnology
Volume 53, October 2023, 102857

Analysis of endophytic microbes harboring in medicinal plants of Himalayan region with their medicinal properties

Monika Singh [a d], Ananya Naskar [c], Anisha Rupashree [b], Minakshi Rajput [a], Vipin Kumar Singh [c]

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Highlights

- The biodiversity of Himalayas
- Medicinal plants.
- Endangered medicinally important plants of Himlayan region
- Plant growth promoting microbes.
- Endophytes
- Human health

Abstract

Endophytic microbes coexist inside the plant without causing any negative impact on host. Endophytic microbes including bacteria and fungi represent huge diversity in the plants of Himalayan region with immense economic importance. Since ages, medicinal plants like Ocimum sanctum, Cinnamomum camphora, *Arnebia euchroma*, Taxus wallichiana, Picrorhiza kurroa (Kutki) and *Pinus roxburghii* are used in Ayurveda due to high curative properties. Endophytes present in these plants have been found to be associated with plant growth-promoting activities as well as therapeutic properties such as antimicrobial, anti-fungal, anti-inflammatory, and antiseptic. Some endophytic microbes isolated from plants of Himalayan region are documented to produce different bioactive compounds of therapeutic interest. The species of microbes are; *Tolypocladium niveum*, Cylindrocarpon *lucidum*, Enterobacter cloacae, Alternaria alternata, Pseudomonas, Bacillus sp., *etc.* All have caliber to synthesize various compounds of medicinal interest against various diseases like respiratory, gastrointestinal, and skin diseases as well as repair of oncogenic cells. Therefore, it is of key significance to focus on researches pertaining to enhancement of bioactive potential in view of human health. Through a web search using the keywords "endophytes harboring in medicinal plants of Himalyan region" or "Himalayan region endophytes with their medicinal properties," we have succinctly summarised the various medicinal plants and their endophytes residing the plants of Himalayan region with their medicinal significance in the present review. Here, we have comprehensively discussed the diversity of endophytic microbes including bacteria and fungi present in the plants and their medicinal properties to cure severe human diseases.

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(RESEARCH ARTICLE)

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Screening and molecular identification of l-asparaginase producing bacteria with ansB gene from sewage water

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Abstract

Enzymes are vital biocatalysts facilitating biochemical reactions in organisms, playing pivotal roles in both biological systems and numerous industrial applications. This study focuses on the isolation and screening of asparaginase-producing bacteria from sewage water samples in Bhopal City. A modified M9 media, supplemented with asparagine and phenol red, was used to isolate asparaginase-producing bacteria. Out of the ten samples, seven exhibited asparaginase activity. Two bacterial strains, identified as *Bacillus tropicus* (S-1) and *Priestiaveravalensis* (S-2), were found to harbor the ansB gene. Sequence analysis revealed a 96.52% and 95.09% resemblance to *Bacillus tropicus* MCCC 1A01406 and *Priestiaveravalensis* strain SGD-V-76, respectively. These findings highlight the potential of these bacterial strains in producing L-asparaginase, emphasizing their significance in pharmaceutical applications, particularly in cancer treatment.

Keywords: Anticancer enzymes; L-Asparaginase; Sewage water; Microbial metabolites

1. Introduction

Enzymes act as crucial biocatalysts that enable biochemical reactions within living organisms under the gentle conditions found in cellular settings (Robinson, 2015; Blanco and Blanco, 2017). These catalysts are essential for the various chemical transformations that maintain life, dramatically speeding up metabolic processes by as much as 10 billion times compared to standard chemical reactions (Gurung *et al.*, 2013). Beyond their role in biological systems, enzymes play a vital role in a wide range of industrial applications. They are instrumental in the creation of sweetening agents, the modification of antibiotics, and are used in cleaning products and analytical tools with applications in clinical, forensic, and environmental sectors (Robinson, 2015).

The biotechnology sector prioritizes enzyme production, utilizing traditional and advanced methods like genetic engineering to scale up production of naturally scarce proteins (Headon and Walsh, 1994). Asparaginase is a key enzyme with roles in pharmaceuticals, biosensors, and food industries. It shows promise in cancer treatment by degrading L-asparagine, leading to nutrient deprivation and cancer cell death (Karpel-Massler *et al.*, 2016; Martinez-Outschoorn*et al.*, 2017).

Microorganisms, especially bacteria and fungi, are key enzyme sources due to their rapid large-scale cultivation and the potential for genetic enhancements to boost enzyme yield (Laatsch, 2006; Lebaret*et al.*, 2007). While *Erwinia chrysanthemi* and *E. coli* are known asparaginase producers for commercial use (Alrumman*et al.*, 2019), there's a need

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RESEARCH ARTICLES

Enhancement in production of baicalein through transformation in *Oroxylum indicum* (L.) Vent by *Rhizobium rhizogenes*

Rumana Faraz[1] · Mamta Gokhale[2] · Ragini Gothalwal[3]

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Abstract
Oroxylum indicum (L) Vent (*O. indicum*), a significant endangered medicinal plant, was transformed by the *Rhizobium rhizogenes* (*R. rhizogenes)* mediated transformation method using the bacterial strain MTCC 532. For a successful transformation, factors such as explant selection, Co-cultivation time, temperature for induced root development, transformation technique, and antibiotic concentration were optimized. Various methods were employed for enhancing the rate of transformation. A drastic increase in transformation frequency was observed when $CaCl_2$ was used in concentration of 10 mM and 15 mM along with ultrasonication during Co-cultivation. Total phenolic and flavonoid content was determined in various extracts of *O. indicum* by using Folin–Ciocalteau reagent and Aluminium chloride colorimetric method respectively. Moreover, the antioxidant potential of different extracts of *O. indicum* were assessed with the 2, 2-diphenyl-1-picrylhydrazyl (DPPH) method. Using specific *rolA* primers, molecular analysis was performed, revealing T-DNA integration in the hairy roots and confirming the expression of hairy root inducible genes. Murashige and Skoog (MS) medium with 3% sucrose was shown to have the maximum induction rate of hairy roots after 28 days of Co-cultivation. TLC as well as spectroscopic methods (UV–VIS and FTIR) were performed to compare the specific flavonoid (baicalein) in transformed roots as well as several non-transformed extracts. Comparing hairy roots to non-transformed roots, the total phenolic, flavonoid contents, and antioxidant activities were greater in hairy roots. The findings indicate that *O. indicum* hairy root cultures have a greater capacity for producing beneficial chemicals and researching their biological activities. The transformation of *O. indicum* by *R. rhizogenes* (MTCC 532) has been reported for the first time.

Keywords *Rhizobium rhizogenes* · Hairy roots · *Oroxylum indicum* · Flavonoid · UV–VIS spectroscopy · FTIR

Introduction

Oroxylum indicum (L) Vent of family Bignoniaceae, is a medicinally important plant bearing vital secondary metabolites. It is an endangered medicinal tree species, which possesses several antimicrobial, antiarthritic, antihepatic qualities in its various parts (Laupattarakasem et al. 2003; Begum et al. 2019). Parts of the tree are often used to cure inflammation, dropsy, bronchitis, jaundice, piles, smallpox, leucoderma, scabies, enlarged spleen, helminthiasis, gastropathy, hemorrhoids, cholera and rheumatoid arthritis (Bansal and Gokhale 2012). Root of the tree has long been used in Ayurveda for preparation of *Amartarista, Awalwha, Brahmarasayana, Chyawanaprasha, Dantyadarishta, Dhanawantaraghrita, Mulayadikwath, Narayanataila, Shyonaka patpak*, *Bruhatpanchamulaya dikwath* and *Dashmularisht* (Singh 2015). *O. indicum* is characterized by brown bark and large pinnate leaves. *Oroxylum* is a genus of medium sized, deciduous trees, distributed in India, Sri Lanka, Malaysia, China, Thailand, Philippines and Indonesia. In India, the tree is indigenous to Eastern and Western Ghats and is also found in North-East regions (Ahad et al. 2012). *O. indicum* is commonly known as "Indian Trumpet tree" due to its resemblance to trumpet. The plant is known for its high commercial and

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A COMPARATIVE ANALYSIS OF MACHINE LEARNING ALGORITHMS FOR CRIME DETECTION RESEARCH

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ABSTRACT

Crime is a significant challenge for everyone across the world, even with the advancement of technology which is being utilized to simplify more complex judicial procedures. By removing the relevant data from the vast crime databases, data mining and machine learning algorithms play a crucial role in both forecasting and analyzing crime. Data mining has been used in a variety of ways to analyze and predict crimes. In order to present a fundamental understanding of the intelligent strategies utilized for the prediction and detection of crime, a decade's worth of research work completed between 2014 and 2022 was reviewed. In order to investigate the machine learning approaches utilized and determine their benefits and drawbacks, this review paper presents the research that has already been done in the areas of crime detection and prediction. ACM, IEEE Xplore, Google Scholar, Science Direct, Scopus, Springer, and Web of Science are only a few of the electronic bibliographic databases that were searched. A sample of 72 relevant academic publications was chosen in the search. The most commonly used machine learning methods were recognized, along with their advantages and disadvantages. Finally, the results, limitations, and advised future actions have been presented.

KEYWORDS: machine learning, natural language processing, crime patterns.

INTRODUCTION

In the 21st century, when technology connects the entire world, our society suffers from modern age crime and criminals. In India and abroad criminals commit crimes using hi-tech technologies and make the lives of the citizens restless. Terrorists' attacks, robberies, traffic violations, sex crime, theft, fraud, and cybercrime are some crimes where the law enforcement agencies and intelligence gathering organizations face a big challenge to solve the crime puzzle.

According to law enforcement agencies, a crime is an illegal activity for which an individual gets a punishment . The National Incident-Based Reporting System (NIBRS) categorizes

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COMPREHENSIVE PERFORMANCE EVALUATION OF MACHINE LEARNING ALGORITHMS ACROSS DIVERSE FIELDS

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Abstract:
This research paper presents a comprehensive performance evaluation and comparative analysis of machine learning algorithms using the UCB Heart Disease dataset. The selected algorithms, including decision trees, support vector machines (SVM), random forests, k- nearest neighbors (KNN), and neural networks, were evaluated based on accuracy, precision, recall, and other relevant metrics. The strengths, weaknesses, and limitations of each algorithm were discussed, providing insights into their suitability for different applications. The results revealed that the neural network algorithm exhibited the highest performance, followed by random forests, while decision trees and KNN had a slightly lower performance. The study contributes to the understanding of machine learning algorithms and their performance in the context of heart disease classification. Future research directions are suggested to address the identified gaps and limitations, further enhancing the accuracy and efficiency of machine learning algorithms in healthcare and other domains.
Keywords: Support vector machines, Neural Networks, decision trees, K-nearest Neighbors.

I. Introduction

Machine learning algorithms have garnered significant attention in recent years due to their ability to extract patterns and make predictions from complex data [1][2]. These algorithms find applications in various domains such as finance, healthcare, image recognition, and natural language processing. The performance of machine learning algorithms is crucial for their successful deployment and application in real-world scenarios. Therefore, it is essential to conduct a comprehensive evaluation of different machine learning algorithms to assess their effectiveness, accuracy, and limitations [3]. The field of machine learning encompasses a wide range of algorithms, each with its strengths and weaknesses. Decision trees are interpretable and easy to understand but may suffer from overfitting [4]. Support vector machines (SVM) offer good generalization capabilities but can be computationally expensive [5][6]. Random forests provide robustness against outliers and noise but can be resource-intensive [6]. K- nearest neighbors (KNN) is a simple yet effective algorithm but can be sensitive to the choice of distance metric [7]. Neural networks, specifically deep learning models, have shown remarkable performance in complex tasks but require substantial amounts of training data and computational resources [8]. These are just a few examples of the many machine learning algorithms available, highlighting the need for a comprehensive evaluation.

Prior research studies have compared specific machine learning algorithms or focused on performance metrics in specific domains. According to Smith et al. [7], in their study on sentiment analysis, a comparative analysis of machine learning algorithms revealed that support vector machines achieved the highest accuracy. Additionally, the study found that decision trees exhibited a higher level of interpretability compared to other algorithms. Johnson and Lee [8] evaluated machine learning algorithms for medical diagnosis and observed that neural networks outperformed other algorithms in terms of precision and recall. Zhang and Wang [9] conducted a comparative analysis of image recognition, revealing that convolutional neural networks achieved superior performance compared to other algorithms. While these studies contribute valuable insights, they have limitations in terms of the number of algorithms considered or the diversity of the datasets used [9][10].

This work aims to address the aforementioned limitations by conducting a comprehensive performance evaluation of a wide range of machine learning algorithms on diverse datasets. The main goals of this research encompass the comparison of selected machine learning algorithms across multiple datasets, taking into account performance metrics such as accuracy, precision, recall, and F1 score. Additionally,

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Diaspora of Indian Women Migration to British Colonies in Eighteenth Century: Cultural Assimilation

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Abstract

Migration of workers is a human phenomenon which has historical roots and wider implications. The search for the source of survival. The blissful life, has ever remained the inspiring and the dovetailing force of migrations within countries or of trans-migration. Migrations have economic genesis but resulting socio-political cultural ramification. Indeed, mingling of different cultures has had positive consequences as well as placing strain on the culture and life of the upcoming society affected in either way by migration. Migration is a form of spatial mobility of population between one geographical unit and another involving a permanent change of residence (UN, 1958).

Women were a neglected community in every aspect of the past, in society, politics, religion or History. Women are not given equal importance as compared to men even in the migration process since they are not perceived as equal actors worthy of being accounted for. This paper is an attempt to write on Indian women migrants of the colonial times to various British colonies. Trinidad and Tobago and Ceylon. The system of indentured labour was initially devised to address the labour shortage that resulted from the abolition of slavery. This paper discusses the causes for migration, proportion of women migrants to men, in the British Colonies in Eighteenth Century.

KEYWORDS: Migration, Plantation, Laborers, British Colonies, Women , Indentured, Migrants

Introduction

"Migration is an expression of the human aspiration for dignity, safety and a better future. It is part of the social fabric, part of our very make-up as a human family."

Ban ki –Moon. Former, UN. Secretary General

India as one of the oldest civilizations and land of opportunities has been remained a magnet for visitors, traders, students and warriors from all over the world since very long. Migration is a natural process that often happens depending on the socio-economic, demographic, cultural, political and environmental factors related to the migrant people. Migration is not a mere shift of people from one place of residence to another. It is most fundamental to the understanding of continuously changing space content and space relationships of areas (Gosal, 1961). Migration from India to various parts of the world was very old and in modern times five patterns of Indian emigration were identified such as i) Unskilled labour emigration, ii) Kangani/Maistry or Contract labour emigration, iii) Free or Passage emigration, iv)