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Navigating Generative AI Ownership and Copyright of AI Generated Content – Risks and Challenges for Advertisers

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Abstract

The emergence of artificial intelligence (AI) technology has brought about significant changes in various facets of our existence, altering not only how content is generated but also how it is consumed. AI-generated content, such as music, art, and literature, has become increasingly prevalent, raising a range of legal and ethical challenges regarding copyright ownership, infringement, and ethics. This paper explores the interaction between AI and copyright law, examining the legal implications of AI-generated content and its impact on copyright ownership along with the ethical considerations of using AI to create content, and its implications on the copyright law.

Introduction

Unlike human intelligence, artificial intelligence (AI) is an intelligent agent machine system that senses the environment to successfully achieve its goals. Artificial intelligence describes a machine (computer) that simulates the cognitive and affective functions of the human mind. Systems with AI ability are designed to observe and react to their environment. Generative AI encompasses artificial intelligence systems with the ability to create text, images, or various forms of media through the utilization of generative models. These models acquire an understanding of the underlying patterns and structures within their training data, subsequently producing fresh data that share similar traits and characteristics

Understanding Generative AI in Advertising

Generative AI enables users to create content such as text, images, videos, and code through prompts. It learns from existing online documents and evolves by analysing larger datasets. Using complex algorithms, it predicts outcomes like human creativity and requires significant computing power. Its growth is driven by natural language understanding, leading to applications in writing, research, coding, and design.

Companies are eager to implement generative AI in advertising for its ability to create personalised, engaging content at scale, enhancing customer targeting and improving campaign efficiency. This technology reduces costs and time, allowing marketers to concentrate on strategic initiatives while optimising ad performance in real time. According to Salesforce's State of Marketing

report in May 2024, which surveyed over 4,800 marketers across 29 countries, leading marketers are gaining a competitive edge by leveraging AI. Notably, over half have achieved full personalisation in mobile messaging (57%), email marketing (54%), and social media (52%).

Advantages of Generative AI over Traditional Advertising Methods

Generative AI writes the book on advertisement as speed, effectiveness, and cost-effectiveness are innovatively introduced instead of traditional methods. AI can read and write data in real time for its ability to produce fast insights and optimisation compared with more 'traditional' ad creation that could take weeks or months. It even helps minimize costs by automating the tasking and bringing technologies more advanced to the table of even small- and large-sized businesses. Finally, AI enables content at scale with better targeting accuracy because advanced user data analysis is used. In a nutshell, there is a future of effective advertisement by merely adding AI efficiency with human creativity.

Potential Benefits of Generative AI in Advertising

Generative AI changes everything in terms of how people experience advertisements in the quality of their original content, personalising the experience for the customer, and through data analysis. Such technology will enable brands to do a better job at crafting campaigns that are relevant more efficiently. It also spurs creativity and helps bring relevance to the campaign while creating growth so that relationships may be established with audiences in a closer manner amidst this competitive marketplace.

Copyright of AI generated content

The copyright of AI-generated content is a rapidly evolving and complex topic. Here are some key points from recent literature:

1. **Originality and Ownership**: The legal frameworks, such as the Berne Convention and EU Copyright Law, are being examined to determine how they apply to AI-generated works. The question of whether AI-generated content can be considered original and who owns the copyright is central to this discussion.

2. **Human Involvement**: Cases like Infopaq International A/S v Danske Dagblades Forening and Levola Hengelo BV v Smilde Foods BV highlight the evolving definitions of originality and human involvement in AI creativity.

3. **Global Perspectives**: Different countries are adopting diverse approaches to address the challenges and opportunities of AI-generated works. International collaboration and public awareness are crucial in shaping copyright policies for AI-driven creativity.

4. **Ethical Implications**: The lack of clear legal guidance on the copyright status of AI-generated works creates uncertainty for artists, creators, and businesses. This uncertainty could stifle innovation in the field of AI-generated art.

5. **Economic Implications**: The fair use standard and AI-copyrightability are two key issues that affect the compensation to creators and the eligibility of AI-generated content for copyright protection. Policymakers need to consider these issues carefully to balance the interests of all parties involved.

Objectives of Research

1. To Understand Generative AI and its applications in Advertising
2. To Introspect the generative AI Ownership through Copyrights Act.
3. To examine the legal risks and challenges for advertisers

Literature Review

Kaplan and Haenlein 2019, A system's ability to correctly interpret external data, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation".

Ng and Jordan 2001, Generative AI is primarily based on generative modelling, which has distinctive mathematical differences from dis-criminative modelling.

Sandeep Singh Sengar, Affan Bin Hasan, Sanjay Kumar & Fiona Carroll 2024, Generative AI refers to artificial intelligence systems that have the ability to create new content, such as text, images, or other forms of media, by learning and mimicking the underlying patterns and structures in their training data.

A. Lakshmipriyanka, M. Harihararao, M. Prasanna, Y.Deepika, Artificial Intelligence in marketing is the use of technology, particularly AI, to automate and optimize marketing processes. It

involves the use of algorithms, machine learning, and other technologies to analyze data and make decisions about marketing campaigns**.**

Alexis FierensKaat Scheerlinck, Under EU law, human intervention is a prerequisite for granting copyright protection to works created using generative AI tools. The work must reflect the author's "own intellectual creation" resulting from their free and creative choices

Mansi Shukla, Harshit Mohan, the rise of AI-generated content raises ethical questions about copyright infringement and the use of AI in creative processes. There is a need for new legal frameworks to better accommodate AI-generated content and balance the interests of creators, users, and the public

Research Methodology

The research attempts to study whether AI ownership with reference to the Copyrights Act and compile information collected through various sources ranging from case studies, journals, articles and other published sources relevant to the study. Content analysis is used in this study as an exploratory empirical research method to collect and analyse data.

Introspecting the Generative AI Ownership through Copyrights Act

It was along the lines of the first criteria that the Copyright Review Board of the United States Copyright Office refused to register copyright in the work 'A Recent Entrance to Paradise, in the name of DABUS, an A.I. system developed by Stephen Thaler. The said copyright application was filed in the year 2018 by DABUS as an author claiming that the work was independently created by the AI. The copyright office refused the application on the grounds that "it lacks the human authorship necessary to support a copyright claim."

Relevant Case Laws On AI And Copyright:

While the question of AI-generated works and copyright is relatively new, there are some key cases both Indian and international that provide guidance on the evolving legal landscape. These cases focus on authorship, originality, and the human role in the creation process, all of which are central to determining copyright ownership in AI-generated works.

1. **Feist Publications, Inc. v. Rural Telephone Service Co. (1991, U.S.):**

   In the above-mentioned case we note that the Supreme Court stated that copy right requires minimal degree of creativity and the telephone directory was deemed uncopyrightable due to poor originality.

2. **Naruto v. Slater (2018, U.S.):**

   The U.S. Court of Appeals for the Ninth Circuit rejected the claim, ruling that animals cannot own copyright. This aligns with the traditional requirement of human authorship and is indicative of how courts may treat AI-generated works in the future.

3. **Thaler Application (2022, U.K.):**

   While in this, the case primarily focused on patents rather than copyright, the UK Intellectual Property Office and courts denied the application on the grounds that the inventor must be a human.

4. **Eastern Book Company v. D.B. Modak (2008, India):**

   The case involved a dispute over the copyrightability of judicial decisions published in a law reporter. The court held that copyright requires a degree of creativity, ruling that merely selecting and arranging pre-existing materials, such as legal judgments, did not meet the originality requirement.

Development in India

On the first criteria, Indian courts remain silent on the legal position with respect to the ownership of AI generated content and this complex legal issue is yet to be tested in courts. However, there is one instance that caught major attention and gave a ray of hope to the those who wish to be AI registrants. Ankit Sahani, who owned Raghav, an AI based Painting App, filed two copyrights application for the AI generated artwork, Suryast. The first copyright application for registration was filed in the name of Raghav, which was outrightly rejected by the copyright registry. The other application for registration was filed in the name of Mr. Sahani, with Raghav as the co-author. While the second Suryast application was registered, the Copyright Office, subsequently, raised objections and sought to cancel the registration. Since the work is part of a parallel proceeding in the United States, the objections raised by the Copyright Office as well as the reply to the objections remains confidential. It is likely that such objections were raised owing to Indian copyright law only identifying human beings as being capable of being authors of works.

Legal Risks and Challenges for Advertisers

Here are some key points:

1. **Financial Risk**: Advertisers face financial risks due to the high costs associated with digital advertising campaigns, especially in competitive markets. The return on investment (ROI) can be uncertain, and there is always the risk of overspending without achieving desired results.

2. **Time Risk**: The rapidly changing nature of digital platforms means that advertising strategies can quickly become outdated. Advertisers need to constantly monitor and adapt to new trends and technologies to stay relevant.

3. **Psychological Risk**: Advertisers must navigate the psychological aspects of consumer behavior, such as trust and skepticism. Misleading or intrusive ads can damage a brand's reputation and lead to consumer backlash.

4. **Ad-Blocking Software**: The rise of ad-blocking software poses a significant challenge for advertisers, as it prevents ads from reaching a portion of their target audience.

5. **Regulatory and Ethical Concerns**: Advertisers must comply with various regulations and ethical standards, which can vary by region and platform. Non-compliance can result in legal issues and damage to the brand's image.

6. **Ad Fatigue**: Consumers can become desensitized to advertisements, leading to reduced effectiveness over time. Advertisers need to find creative ways to engage their audience without causing fatigue.

7. **Platform Dependency**: Relying heavily on specific platforms (e.g., social media) can be risky if those platforms change their algorithms or policies, which can impact the visibility and effectiveness of ads.

Granting authorship right to an AI in an AI-generated work is not as straight forward as it seems, and it might have largescale implication. For instance, if AI is granted authorship rights in an AI-generated work and there is copyright infringement of such work or such work infringes on the already existing copyrighted work, in such a scenario, neither the AI can enforce its copyrighted work

against potential infringement nor can the AI be sued for potentially infringing an already existing copyrighted work. This is because AI is neither a juristic nor a natural person and cannot be sued. Hence, before the issue to affording authorship right to AI is addressed, the legislation must decide on the legal status of AI.

Moreover, under Indian law, in the case of original literary, dramatic, musical, and artistic works the 60-year protection period is counted from the year following the death of the author. If the AI is granted authorship over such work, the whole rationale behind the time period of protection under the copyright law loses its applicability since AI has a perpetual existence.

Findings

1. There is no legal personality given to AI.
2. Distinctions on the Owner of the work and Author of the work is not made.
3. Current AI technology is not completely autonomous.

Suggestions

1. Duties, rights in concern to AI and its ownership need to be defined.
2. In case of human involvement and AI then proper defining of the owner and author is necessary.
3. Defining autonomy is necessary in case of AI.

Conclusions

Hence, the grant of copyright registration in the name of an AI doesn't seem a practical and plausible step so far. A solid and comprehensive reform needs to be made in copyright law before AI can be granted copyright ownership. Such amendments in the copyright law must cover all the aspects leaving no loophole and as such appreciating the spirit of copyright law in general.

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A Study on Consumer Awareness towards Zomato Food Delivery Services in Kovilpatti Taluk

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Abstract

This research explores consumer awareness and preferences towards Zomato food delivery services in Kovilpatti Taluk. The study investigates the key factors influencing users' decisions to order food online, including app usability, trust in delivery service, pricing, food quality, and overall satisfaction. A structured survey was conducted with 425 respondents, and the data was analyzed using statistical tools such as percentage analysis, mean, and standard deviation. The findings reveal that convenience, timely delivery, and variety of cuisines are primary drivers, while issues such as delivery delays, pricing transparency, and inconsistent food quality remain challenges. The study offers insights into consumer behavior and suggests improvements to enhance user experience and trust in Zomato services.

Keywords: *Zomato, Food Delivery, Consumer Awareness, App Usability, Customer Satisfaction*

Introduction

Online food delivery platforms have transformed how consumers access meals, with Zomato emerging as a leading app in India. With the convenience of browsing menus, tracking deliveries, and availing discounts, consumers increasingly rely on food delivery apps. In Kovilpatti Taluk, where digital adoption is steadily rising, the use of Zomato has grown among younger and working populations. However, concerns such as inaccurate order delivery, fluctuating food quality, high delivery charges, and customer service gaps still affect user trust. Additionally, consumer preferences differ based on digital literacy, lifestyle, and affordability. This study aims to understand consumer awareness, satisfaction, and challenges faced by Zomato users in Kovilpatti Taluk, thereby providing insights for service improvement and market expansion.

Objectives

- To assess the demographic profile of Zomato users in Kovilpatti Taluk.
- To analyze consumer awareness regarding the Zomato food delivery platform.
- To identify key factors affecting user satisfaction and trust.
- To evaluate common challenges faced during the use of Zomato services.

Study Area Profile

Kovilpatti Taluk in Thoothukudi District is witnessing an increase in mobile app usage due to affordable smartphones and improved internet connectivity. With a growing population of students, employees, and urban households, food delivery apps like Zomato have gained popularity. Consumers prefer Zomato for its variety, fast delivery, and promotional offers. However, the region still faces challenges such as poor customer support, limited restaurant tie-ups in rural areas, inconsistent pricing, and concerns about food hygiene. As Zomato continues to expand its presence, understanding consumer expectations and barriers can help the platform customize services for this semi-urban and rural population.

Research Methodology

Source of Data

Primary data was collected using structured questionnaires from 425 respondents. Secondary data was obtained from industry articles, government records, and research papers on food delivery trends.

Data Collection

Data was gathered through both online and offline surveys to include users with varying degrees of digital exposure.

Sample Size

425 respondents participated in the study.

Sampling Technique

Random sampling was adopted to ensure representation across different age groups, occupations, and localities.

Statistical Tools

Percentage analysis, mean, and standard deviation were used to interpret the results and measure consumer awareness levels and preferences.

Demographic Profile of Respondents

Demographic Factors	Category	Frequency	Percentage
Age	Below 25	120	28.2%
	26–35	140	32.9%

Demographic Factors	Category	Frequency	Percentage
	36–45	80	18.8%
	46–55	50	11.8%
	Above 55	35	8.2%
	Total	425	100%
Gender	Male	220	51.8%
	Female	205	48.2%
	Total	425	100%
Marital Status	Single	190	44.7%
	Married	235	55.3%
	Total	425	100%
Living Area	Urban	250	58.8%
	Rural	175	41.2%
	Total	425	100%
Family Income	Below ₹20,000	80	18.8%
	₹20,001–₹40,000	160	37.6%
	₹40,001–₹60,000	120	28.2%
	Above ₹60,000	65	15.3%
	Total	425	100%

Consumer Awareness and Satisfaction with Zomato

Factors Influencing Zomato Usage	Mean	S. D
Ease of using the Zomato app	4.6	0.5
Trust in online food transactions	4.1	0.7
Variety of restaurants and cuisines	4.5	0.6
Discounts and offers	4.3	0.5
Timeliness of food delivery	4.0	0.8
Food quality and packaging	3.9	0.7
Customer service responsiveness	3.7	0.6
Awareness of hygiene and food safety	4.1	0.7
Impact of ratings and reviews	4.4	0.5
Overall satisfaction with Zomato	4.2	0.6

Interpretation

The analysis reveals that the **ease of using the Zomato app (Mean = 4.6)** and the **variety of restaurants and cuisines (Mean = 4.5)** are the most influential factors driving Zomato usage, highlighting user preference for a simple interface and diverse food choices. **Ratings and reviews (Mean = 4.4)** and **discounts and offers (Mean = 4.3)** also play a significant role, suggesting users rely on peer feedback and cost-saving incentives. While **overall satisfaction (Mean = 4.2)** and **trust in online transactions (Mean = 4.1)** are relatively high, factors like **timeliness of delivery (Mean = 4.0)**, **food quality and packaging (Mean = 3.9)**, and **customer service responsiveness (Mean = 3.7)** received slightly lower scores, indicating areas where users see room for improvement. The low standard deviations across most factors show a strong consensus in user experiences.

Likert Scale Assessment of Consumer Preferences

Shopping Preferences	SA (5)	A (4)	N (3)	D (2)	SD (1)	Mean	S. D
Zomato is more convenient than dining out	210	130	50	20	15	4.2	0.6
I trust food safety and hygiene measures by Zomato	180	140	60	25	20	4.0	0.7
Zomato reviews influence my food choices	200	140	50	20	15	4.2	0.6
I prefer Cash-on-Delivery for Zomato orders	150	120	90	40	25	3.7	0.8
I find using Zomato mobile app very easy and convenient	220	130	50	15	10	4.3	0.5

Interpretation

The data indicates that users generally perceive Zomato as **more convenient than dining out (Mean = 4.2)** and find the **mobile app easy and convenient to use (Mean = 4.3)**, both with low standard deviations, reflecting strong and consistent agreement. **Zomato reviews also significantly influence food choices (Mean = 4.2)**, showing the importance of peer feedback in decision-making. While users **trust Zomato's food safety and hygiene measures (Mean = 4.0)**, this aspect shows slightly more variation in responses. Preference for **Cash-on-Delivery (Mean = 3.7)** is comparatively lower and more varied (S.D. = 0.8), suggesting a shift toward digital payments or mixed preferences in payment methods.

Conclusion

This study concludes that awareness and usage of Zomato in Kovilpatti Taluk are rising steadily. Consumers are drawn to the platform for its app usability, restaurant variety, and discounts.

However, challenges such as trust in delivery safety, inconsistent food quality, and customer support delays persist. Addressing these concerns with better communication, transparent hygiene practices, responsive customer service, and localized offers can significantly enhance user experience. By adapting to the preferences and concerns of semi-urban consumers, Zomato can strengthen its market presence in tier-2 and tier-3 towns like Kovilpatti.

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A Study on Passenger Awareness towards Omni Bus Services in Thoothukudi District

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Abstract

This research investigates passenger awareness, preferences, and satisfaction levels regarding omni bus services in Thoothukudi District. As road transportation remains the backbone of intercity travel, private omni bus services offer an alternative to public transport by providing flexible timings, comfort, and faster transit. The study aims to analyze the extent of passenger usage, awareness of safety and amenities, ticket pricing, and overall satisfaction with these services. A survey was conducted among 230 respondents using structured questionnaires, and the data were analyzed using percentage analysis, mean, and standard deviation. The findings suggest that while passengers appreciate the convenience and punctuality of omni buses, issues such as high fare rates, lack of proper seating arrangements, and safety concerns during night travel persist. The study offers recommendations for improving passenger experience, pricing transparency, and regulatory compliance.

Keywords: *Omni Bus, Passenger Awareness, Road Transport, Bus Services, Travel Preferences*

Introduction

India's growing need for intercity travel, driven by urbanization and economic growth, has significantly increased the reliance on road transportation. Among the various modes of road transport, *omni bus services*—privately operated intercity buses-have gained immense popularity due to their convenience, flexible schedules, improved on-board amenities, and widespread online booking platforms. In regions like Thoothukudi District, where railway and government bus coverage may not fully cater to all passenger demands, Omni buses fill the mobility gap by offering a comfortable and relatively faster travel option.

However, with the rising demand for these services, questions related to service quality, passenger safety-especially during night travel-pricing transparency, and overall passenger satisfaction have become critical. An understanding of passenger awareness and expectations is essential to improve service delivery and ensure customer loyalty. This study seeks to explore how

passengers perceive and experience Omni bus services in Thoothukudi District, focusing on the key factors that influence their preferences and satisfaction.

Objectives of the Study

1. **To assess the level of awareness** among passengers about omni bus services in Thoothukudi District.
2. **To examine travel preferences** including reasons for choosing Omni buses over other modes.
3. **To evaluate satisfaction levels** with various service dimensions such as comfort, convenience, safety, and affordability.
4. **To identify factors** that significantly influence customer satisfaction using factor analysis.

Study Area Profile: Thoothukudi District

Thoothukudi (also known as Tuticorin) is a coastal district in the southeastern part of Tamil Nadu, India. It plays a pivotal role in Tamil Nadu's industrial, maritime, and transportation sectors. The district comprises urban centers like Thoothukudi city and Tiruchendur, semi-urban areas like Kayalpattinam and Srivaikuntam, and several rural villages.

- **Population**: Approx. 17.5 lakhs (as per latest census)
- **Urbanization**: Over 50% of the population resides in urban or semi-urban areas.
- **Key economic activities**: Port operations, shipping, fisheries, salt production, agriculture, and textile trade.
- **Transport Infrastructure**: National highways, a domestic airport, railways, and both government and private road transport services connect the region with major cities like Madurai, Tirunelveli, and Chennai.

Omni buses are crucial in this region due to limited public transport services during peak travel times and to destinations not well-connected by rail.

Research Methodology

Source of Data

Primary data was collected through structured questionnaires from 230 respondents in Thoothukudi District. Secondary data was sourced from transport department reports, bus operator websites, travel apps, and research publications.

Data Collection

Both online and face-to-face surveys were conducted. The questionnaire included queries related to frequency of travel, awareness of amenities, safety, pricing, and booking convenience.

Sample Size

A total of 230 respondents, including students, working professionals, and daily travelers, were surveyed across the district.

Sampling Technique

Stratified random sampling was used to include people from urban, semi-urban, and rural regions of Thoothukudi.

Statistical Tools

Percentage analysis, mean, and standard deviation were employed to interpret the data and identify passenger patterns.

Demographic Profile of the Respondents

A total of **230 respondents** were surveyed. The demographic details are summarized in the table below:

Demographic Factor	Category	No. of Respondents	Percentage (%)
Gender	Male	135	58.7%
	Female	95	41.3%
	Total	230	100%
Age Group	Below 20	25	10.9%
	21–30	95	41.3%
	31–40	60	26.1%
	41–50	30	13.0%
	Above 50	20	8.7%
	Total	230	100%

Demographic Factor	Category	No. of Respondents	Percentage (%)
Occupation	Students	80	34.8%
	Working Professionals	95	41.3%
	Business People	25	10.9%
	Others	30	13.0%
	Total	230	100%
Residence Area	Urban	100	43.5%
	Semi-Urban	80	34.8%
	Rural	50	21.7%
	Total	230	100%
Frequency of Travel	Once a week	50	21.7%
	Once a month	80	34.8%
	Occasionally	100	43.5%
	Total	230	100%
Booking Method Used	Online	150	65.2%
	Ticket Counters/Agents	80	34.8%
	Total	230	100%

Factor Analysis

Factor analysis is a statistical technique used to identify underlying relationships among a large set of variables by grouping them into smaller, meaningful factors. In this study, factor analysis was applied to determine the key dimensions influencing passenger satisfaction with omni bus services in Thoothukudi District. By analyzing interrelated variables such as convenience, safety, pricing, and service quality, the method helps simplify and interpret complex data to highlight the core aspects that impact passenger perceptions.

KMO and Bartlett's Test

Test	Value
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.783
Bartlett’s Test of Sphericity (Approx. Chi-Square)	465.229
df	45
Sig.	0.000

Interpretation

The KMO value of 0.783 indicates that the sample is adequate for factor analysis. The significance value ($p < 0.05$) from Bartlett's test confirms that there are patterned relationships among the variables, validating the use of factor analysis.

Rotated Component Matrix

Variables	Factor 1 (Convenience & Comfort)	Factor 2 (Safety & Pricing)
Availability of convenient timings	**0.802**	
Comfort and cleanliness in buses	**0.767**	
Online booking and tracking facilities	**0.732**	
Behavior of staff and drivers	**0.714**	
Punctuality and reliability	**0.698**	
Overall satisfaction with omni bus services	**0.676**	
Safety during night travel		**0.753**
Emergency response and safety features		**0.727**
Fare affordability		**0.703**
Clean rest stops and washroom facilities		**0.689**

Interpretation

Factor 1 includes items related to comfort, convenience, staff behaviour, and punctuality—highlighting "Convenience & Comfort" as a major driver of satisfaction.

Factor 2 includes items like night safety, affordability, and emergency services, forming a "Safety & Pricing" dimension.

Conclusion

The study concludes that Omni bus services in Thoothukudi District are widely preferred for their convenience, punctuality, and ease of online booking, especially among students and working professionals. However, key concerns such as high fares, inadequate seating comfort, and safety issues during night travel continue to affect overall passenger satisfaction. Factor analysis revealed two core dimensions—Convenience & Comfort and Safety & Pricing—that influence passenger perceptions. Addressing these areas through better fare regulation, improved safety features, and enhanced service quality can significantly elevate the travel experience and encourage broader usage of Omni bus services in the region.

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A Study of "Rise of AI in Digital Marketing"

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Abstract

In recent years, Artificial Intelligence (AI) has completely transformed the world of digital marketing. It's brought about a whole new era of innovation and efficiency. This abstract will dive into the many ways AI has impacted digital marketing strategies, highlighting its game-changing rise and what it means for businesses. AI has given marketers access to an incredible amount of data, allowing them to make smarter decisions using advanced analytics and machine learning algorithms. By digging deep into consumer behavior, preferences, and trends, AI helps create highly targeted and personalized marketing campaigns that really engage customers and drive-up conversion rates. AI-powered platforms take care of all the repetitive tasks like ad placement, audience segmentation, and campaign optimization. This automation not only saves time and resources, but it also lets marketers focus on the big picture and drive real results. So, in a nutshell, AI has completely revolutionized the world of digital marketing. It's given marketers a wealth of opportunities to understand their customers better, create amazing content, and streamline their campaigns. But it's not without its challenges. As AI continues to advance, it's important for marketers to stay on top of the game and navigate the ethical considerations that come with it.

Introduction

Artificial intelligence (AI) is rapidly transforming the way businesses operate across various industries. One such industry is digital marketing, where AI is being utilized to streamline processes, analyze data, and optimize campaigns. Artificial Intelligence (AI) and digital marketing have a close relationship. AI is allowing marketers to make better decisions and provide a more personalized experience to consumers. In this post, we will discuss the various ways in which AI is being used in digital marketing and its impact on the industry.

AI is democratizing sophisticated marketing techniques. The rise of generative AI is further blurring the lines between human and machine, enabling the creation of personalized content at scale, from ad copy and social media posts to even video and audio content. Crucially, **AI is not just about automation; it's about augmentation.** It empowers marketers to focus on strategic thinking, creative innovation, and building meaningful customer relationships, while AI handles the data-intensive and repetitive tasks. As AI continues to evolve, its impact on digital marketing will only deepen, driving a future where personalized, data-driven, and seamless customer experiences are the norm.

Role of AI in "Rise of Digital Marketing "

Personalizing customer experiences.

- Automating marketing tasks.
- Analyzing data for insights.
- Enhancing customer service.
- Predicting market trends.
- Optimizing content and ads.
- Preventing fraud.

Challenges and Ethical Considerations in Adopting AI for Marketing

In recent years, according to respondents, marketers have wondered how marketing can deliver value without being too intrusive (externally) and how marketing can reshape and empower people within companies (internally) to work in this logic. A successful AI strategy can only be effective when there is strong technical (technology, data, processes) and organizational (people, capacity, culture) technical capability.

Adopting AI for marketing can bring significant benefits, but there are also several challenges businesses may face:

- **Data Quality:**

  AI requires large amounts of high-quality data to function effectively. Many businesses struggle to collect and maintain this data, which can hinder their ability to implement AI solutions.

- **Integration:**

  AI often requires integration with existing systems, such as customer relationship management (CRM) or marketing automation software. This can be a complex and time-consuming process, especially for businesses with legacy systems.

- **Cost:**

  Implementing AI for marketing can be expensive, especially for smaller businesses. This includes the cost of acquiring and maintaining the necessary hardware and software, as well as the cost of training employees to use AI tools effectively.

- **Privacy Concerns:**

  AI requires access to customer data, which can raise privacy concerns. Businesses must take steps to ensure that customer data is protected and used in accordance with relevant regulations and industry best practices.

- **Expertise:**

  Implementing AI for marketing requires specialized skills and expertise. Many businesses may not have the necessary talent in-house, which can make it difficult to implement AI solutions effectively.

- **Ethical Considerations:**

  AI can raise ethical considerations, such as bias in algorithms and the potential impact on employment. Businesses must consider these issues when implementing AI solutions to ensure that they align with their values and do not harm their stakeholders.

Benefits of AI in "Rise of Digital Marketing "

In today's dynamic digital landscape, the integration of artificial intelligence (AI) has emerged as a cornerstone for businesses seeking to enhance their marketing strategies and gain a competitive edge. AI empowers marketers to craft hyper-personalized customer experiences, fostering stronger connections and driving increased engagement through tailored content and interactions. Simultaneously, AI streamlines operational efficiency by automating repetitive tasks, freeing up valuable time for strategic endeavors and creative innovation. The ability of AI to analyze vast datasets and extract actionable insights enables data-driven decision-making, leading to optimized campaigns and a deeper understanding of customer behavior. Moreover, AI-powered customer support enhances satisfaction and loyalty by providing instant, personalized assistance. Ultimately, the adoption of AI provides a significant competitive advantage, allowing businesses to anticipate market trends, adapt swiftly, and remain at the forefront of digital marketing innovation.

Impacts of AI in "Rise of Digital Marketing "

Shift towards Hyper-Personalization:

- AI enables marketers to move beyond basic segmentation to deliver truly personalized experiences, leading to increased customer engagement and loyalty.
- This impacts how content is created, how offers are delivered, and how customer journeys are designed.

Automation of Marketing Tasks:

- AI automates repetitive tasks like ad optimization, email marketing, and social media management, freeing up marketers to focus on strategic initiatives.
- This impacts marketing efficiency, allowing for faster campaign execution and greater resource allocation to creative and strategic work.

Data-Driven Decision Making:

- AI provides marketers with access to real-time insights and predictive analytics, enabling data-driven decision-making.
- This impacts marketing strategy, campaign optimization, and resource allocation.

Enhanced Customer Experience:

- AI-powered chatbots and virtual assistants provide instant customer support, improving customer satisfaction and loyalty.
- This impacts customer service strategies, and customer relationship managment.

Evolution of Content Creation:

- Generative AI tools are changing how content is created, enabling personalized content at scale.
- This impacts content creation workflows, and the amount of personalized content produced.

Transformation of Advertising:

- AI-powered programmatic advertising allows for more precise targeting and optimization, leading to higher ROI.
- This impacts ad spending, ad placement, and audience targeting.

Increased Efficiency and ROI:

- By automating tasks and optimizing campaigns, AI helps marketers achieve higher ROI and improve marketing efficiency.
- This impacts budget allocation, and marketing performance metrics.

Changes in Marketing Roles:

- The rise of AI is changing the skills required for marketing roles, with a growing demand for data scientists and AI specialists.
- This impacts the job market for marketers, and the required skillsets.

Ethical Considerations:

- The use of AI in marketing raises ethical concerns related to data privacy, bias, and transparency.
- This impacts the development of ethical guidelines and regulations for AI in marketing

Conclusion

Artificial Intelligence has transformed the way we approach digital marketing. By leveraging AI tools such as chat bots, personalized recommendations, and predictive analytics, businesses can optimize their marketing strategies and improve customer experiences. While AI can automate many tasks, it is essential to remember that human touch and creativity are still critical components of effective digital marketing. AI can enhance and augment our efforts, but it cannot replace the human touch that is necessary for building relationships and creating meaningful connections with customers. Ultimately, the successful integration of AI into digital marketing requires a balance between technology and human expertise.

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AI's Position: in Academia

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Abstract

This study discusses the clear need for information exchange and policy development about "artificial intelligence," a quickly evolving class of fundamental capabilities that are becoming more widely available and integrated into all educational technology systems. Both (a) technologies created particularly for educational purposes and (b) general technologies that are frequently utilized in educational contexts will be included in our definition of "educational technology" (edtech). This report's recommendations aim to involve educators, educational leaders, lawmakers, academics, and providers and inventors of educational technology in addressing urgent policy concerns that emerge from artificial intelligence (AI) in the classroom. The range of tasks pattern recognition and decision automation. Creating an AI system may end up in unfair automated decision-making and bias in pattern recognition This report describes opportunities for using AI to improve education, recognizes challenges that will arise, and develops recommendations to guide further policy development.

Keywords: *Artificial Intelligence, Educational technology, Education, Academic*

Introduction

"Automation based on associations" is one definition of artificial intelligence. Two fundamental shifts in calculating outside traditional edtech occur when computers automate reasoning based on associations in data (or associations assumed from expert knowledge): (1) from collecting data to detecting patterns in data, and (2) from providing access to instructional resources to automating decisions about instruction and other educational processes. Artificial intelligence (AI), like many technologies that have revolutionized the world, took years to develop before it became ubiquitous. AI is ubiquitous today and has transformative educational potential. AI helps teachers personalize lessons to meet the needs of each unique student, increasing the effectiveness and appeal of learning. In addition, AI-enabled technology helps with administrative duties, streamlines processes, and allows teachers to focus on instruction. Learn more about the current use of AI-enabled technologies by educators and school administrators and the potential applications of AI in education in the future. With AI, we can easily get answers in the language we know.

AI has the potential to revolutionize the way we learn and teach, making it more personalized, engaging, and efficient (Alneyadi, Wardat, Alshannag, & AbuAl-Aish, 2023). In this review article, we will explore the role of AI in education and how it is changing the face of learning (T. Vinoth Kumar et al., 2022) (Samad, Hamza, Muazzam, Ahmad, et al., 2022). AI in education refers to the use of artificial intelligence technologies, such as machine learning and natural language processing, to enhance the learning experience (Alneyadi et al., 2023). It involves the use of algorithms that analyze data, identify patterns, and make predictions, enabling educators to personalize learning for each student (Khan et al., 2022). The potential benefits of using AI in education are significant. Personalized learning, one of the most significant advantages of AI in education, can lead to better student outcomes, as students can learn at their own pace and in a way that suits their learning style (Shrivastava et al., 2023). Intelligent tutoring systems, chatbots, and automated grading and assessment can increase efficiency, save teachers' time, and provide more accurate and consistent feedback. However, there are also challenges associated with using AI in education. Privacy and security concerns, lack of trust, cost, and potential bias are some of the challenges that need to be addressed (Jarrah, Wardat, & Gningue, 2022). Ethical considerations such as ensuring accessibility, transparency, and fairness in AI-based education systems also need to be taken into account (AlArabi, Tairab, Wardat, Belbase, & Alabidi, 2022) (Tariq et al., 2022). Despite these challenges, the potential of AI in education is immense (M. Al-Bahrani, Gombos, & Cree, 2018). With the help of AI, education can be made more accessible and inclusive, enabling learners of all backgrounds to access high-quality education. In the following sections of this review article, we will delve deeper into the applications of AI in education, including personalized learning, intelligent tutoring systems, chatbots, and grading and assessment (Madasamy, Raja, AL-Bonsrulah, & Al-Bahrani, 2022). We will also discuss the benefits and challenges of using AI in education and the ethical considerations that need to be taken into account. Finally, we will explore the future of AI in education and the opportunities it presents for innovation and growth.

Development of AI systems

In 1956, the word "artificial intelligence" was first used. The term "artificial intelligence" was first used in that year at a crucial workshop led by John McCarthy, a professor at Dartmouth College, to build machines that could reason and speak like humans.

Research interest in artificial intelligence (AI) waned for a few decades after a rapid start, but improvements in machine learning and neural networks in the 1990s sparked a comeback. An

important turning point was reached in 2022 with the public launch of ChatGPT, which demonstrated previously unheard-of powers in natural language creation and comprehension and fueled additional AI developments. AI now has a big impact on a lot of industries, including manufacturing, transportation, healthcare, and finance. Many believe it has the potential to transform education as well.

Open the door for educational AI tools

The term "artificial intelligence" was initially used in 1956. To create machines that could think and speak like people, John McCarthy, a professor at Dartmouth College, organized a pivotal workshop that year where the term "artificial intelligence" was first used.

After a fast start, research interest in artificial intelligence (AI) declined for a few decades until the 1990s, when advancements in machine learning and neural networks spurred a resurgence. In 2022, ChatGPT was made publicly available, marking a significant turning point that sparked further advancements in AI while showcasing hitherto unseen capabilities in natural language generation and understanding. Many industries, including manufacturing, transportation, healthcare, and finance, are now significantly impacted by AI. Many believe it has the potential to transform education as well.

AI's Advantages for Education

Customized Instruction:

AI can help tailor each student's educational experience to meet their individual requirements and skills while enabling them to learn at their own pace. This may result in more powerful learning outcomes and higher levels of overall student engagement.

Increased Efficiency:

By employing AI to automate monotonous tasks like data analysis, grading, and managerial labor, students and educators can concentrate on the more important tasks.

Enhanced Student Participation:

By creating dynamic and captivating learning environments, artificial intelligence (AI) can raise student involvement. Chatbots and virtual assistants, for instance, can make learning more enjoyable and participatory, while adaptive learning technology can keep students' attention by providing material at their comprehension level.

Improved Data Analysis:

Teachers can better understand their pupils and adjust their classes by using AI's ability to analyze vast volumes of data and provide insights into student performance. Student performance and learning outcomes may increase as a result.

Current applications of AI in education:

Artificial intelligence is transforming K–12 education by offering state-of-the-art solutions in the disciplines of intelligent teaching systems, adaptive learning platforms, automated grading and feedback, personalized learning, and administrative tasks.

Adaptive learning:

AI-powered systems evaluate students' proficiency levels instantly and modify course materials to suit each learner's requirements. These systems offer tailored pathways to assist students in mastering subjects at their own pace by dynamically modifying lectures in response to student reactions.

Assistive technological advances:

By translating spoken words into text and vice versa, systems like voice recognition software enable students with disabilities like dyslexia or hearing impairments to engage more deeply in the classroom.

Data and Learning Analytics:

AI facilitates the analysis of data from grades, attendance records, and online learning portals. This information gives teachers a better knowledge of student performance, allowing them to spot patterns and adjust their lessons to close performance and comprehension gaps.

Classroom Management:

Platforms use AI to make classroom management more enjoyable. AI tracks student participation and behaviour, providing administrators with knowledge on classroom dynamics to assist them in guiding and motivating their students. Certificates and points are also issued for good behaviour.

Intelligent Tutoring Systems:

To help students grasp difficult ideas and raise their grades, Oxford Learning and other AI-powered tutoring services provide tailored assistance and feedback depending on each student's particular learning preferences and requirements.

Automated Grading and Assessing Technologies:

By leveraging AI to evaluate assignments and offer in-depth comments, these technologies expedite the grading process, ensure consistency, and save teachers' time. AI may also score more general examinations, like essays, by assessing the content for relevance and consistency.

Artificial assistants and chatbots:

Mainstay, in addition to AI-powered chatbots, provides students with 24/7 support and assistance outside of the classroom. These chatbots enhance student engagement and encourage self-directed learning by replying to questions, reminding students of schedules, and helping them with administrative tasks.

Planning for Education:

AI helps professors create groups through examining educational data and recognizing gaps and patterns. By suggesting changes based on the latest standards and requirements, this ensures that the curriculum remains thorough, up to date, and consistent with its educational goals.

Interactive and Learning Games:

Artificial intelligence enhances educational games by creating engaging and adaptable learning environments. These games use artificial intelligence (AI) to generate challenges and tasks that vary according to students' responses, which promotes active participation and understanding of challenging subjects.

Personalized Teaching:

AI learning platforms help students learn in a variety of ways by adapting to their unique learning styles. This ensures that training is tailored to each student's academic preferences and speed, reducing the cognitive load.

Robotics:

AI makes repetitive tasks like evaluating assignments, grading tests, and generating reports more efficient. Teachers can now focus on more important learning activities and pupils benefit as a result.

Intelligent Information Creation:

Eduaide and Magic School AI are two examples of how AI helps instructors in producing online courses and study materials. By simplifying lesson preparation, developing assessments, drafting individualized education plans (IEPs), and much more, artificial intelligence (AI) improves learning and expedites instruction.

The evaluation:

AI-powered assessment systems monitor exams to prevent cheating and uphold academic integrity. These systems look at how students engage throughout courses to guarantee a secure testing environment and offer real-time alerts for suspicious activities.

Language Teaching:

Artificial Intelligence programs like Duolingo use adaptive methods to customize educational experiences. By adjusting the exercises' level of difficulty based on the user's success, the AI ensures the optimal learning curve and enhances language acquisition.

Closing the Ability Gap:

AI examines student performance data to identify pupil skill gaps and offer resources customized to address them. This prepares students for more challenging education and helps them become adept in an assortment of sectors.

Reading Finding:

Artificial intelligence (AI) systems that include Dysolve can detect reading and other learning difficulties at an early age by looking at spelling mistakes and patterns. Such materials, which include particular reading activities and programs, provide tailored interventions and support to assist the affected students in achieving.

Education and Games include:

By merging game elements into educational material, AI makes learning interesting and enjoyable. Organizations are using AI to generate fun games and tests that encourage increased awareness and memory of the course material.

The administrative Support:

AI assists with administrative tasks such as scheduling, budgeting, and resource allocation. Tools like Fetchy optimize educational operations by providing data-driven insights and recommendations, boosting productivity, and reducing the workload for teachers.

Digital three-dimensional Classrooms:

The metaverse enables flexible online learning environments where students can interact with peers and teachers. Platforms like Engage VR offer virtual worlds that go beyond traditional methods of instruction, providing opportunities for interactive and experiential learning.

Digital Educational:

AI increases online learning settings by providing engaging video content and interactive simulations. Programs like Nearpod leverage AI to deliver dynamic courses and real-time student feedback, improving learning experiences efficiently and interestingly.

Activities on the Digital Campus:

Students can participate in clubs and activities virtually from anywhere in the world thanks to artificial intelligence. Platforms like Remo are using AI to develop social networks for work and networking, boosting student engagement beyond the classroom.

Collaborative learning:

AI promotes multidisciplinary study by removing subject-specific obstacles. Programs including Wolfram Alpha use AI to show how various theories are applied in practical settings, helping students understand the connections between various academic fields.

Replicating Real-Life Scenarios:

By imitating real-life scenarios in virtual environments, artificial intelligence (AI) allows students to conduct experiments and gain knowledge through hands-on training. Websites like Labster offer virtual labs where students can safely research and test scientific theories.

Increasing Awareness:

Among other social difficulties, AI can teach learners about unemployment and climate change. In addition to providing theoretical knowledge, AI-powered innovations like Earth Speakr provide a profound understanding of emotions, increasing engagement and action on worldwide issues.

Digital Experiences:

Thanks to AI-powered virtual tours, students can investigate the world from the comfort of their classrooms. Platforms include Google Expeditions uses AI to create entertaining virtual field trips that broaden students' horizons and enhance their cultural awareness. In addition, these can help perspectives and improve their cultural awareness. These can also help enable online college visits.

Conferences and Special Speakers:

AI permits virtual meetings and lectures by guests, allowing students a chance to hear from prominent figures and experts in their respective fields. Programs like BigMarker employ AI to plan and carry out online discussions, enhancing the process of learning with professional knowledge.

The use of predictive analytics:

Algorithms using AI in learning analytics help teachers identify trends and predict student performance, enabling early intervention for children who may prove troublesome.

Communication among Parents and Teachers:

AI-powered resources that include Remind enhance dialogue between parents and educators. By delivering parents real-time updates on their children's development and classroom activities, this improves the role of parents in the educational process.

Testing Strategies:

AI platforms such as Magoosh offer tailored test preparation through assessing student performance and modifying instructional materials and practice questions so they concentrate on areas where students need the greatest improvement. This improves students' chances of being successful.

Learning management systems (LMS):

AI improves LMS platforms by bringing data-driven insights into student performance and engagement, automating administrative duties, and creating individualized learning routes.

Professional Growth:

AI systems give teachers personalized opportunities for professional development by suggesting courses and resources based on their learning needs and career goals.

Transportation:

AI-powered solutions are employed to optimize school bus routes, decreasing travel time and improving safety. Programs like SafeStop, which use real-time data to track bus positions and provide parents with specific arrival times, increase the overall effectiveness of school transportation.

Funding:

Artificial intelligence (AI) helps educational organizations with handling their finances by analyzing expenditure patterns, projecting future expenses, and identifying areas for cost reduction. Allovue is one of the tools that schools can utilize to improve their resource allocation and budget planning.

Privacy and security:

AI strengthens the security of educational institutions by quickly recognizing and responding to cyber threats. Programs like Darkness use machine learning approaches to identify anomalous network behaviour, prevent data breaches, and protect sensitive student information.

Safety and Protection:

Camera systems enabled by artificial intelligence (AI) scan school property for possible hazards to safety. Tools like Avigilon, which use artificial intelligence (AI) to analyze footage and alert security personnel of suspicious activities, enhance the general safety and security of the school environment.

Plagiarism Recognition:

AI systems check student contributions for potential plagiarism by comparing them to a sizable database of academic information to guarantee academic integrity and uniqueness in student work.

Better Online Discussion Boards:

Artificial intelligence enhances online discussion boards by regulating substances, promoting dialogue, and providing personalized feedback. Programs like Packback use AI to encourage

involvement in online discussion boards and critical thinking, creating a more dynamic and interesting learning environment.

Scholarly Research:

AI aids academic research by examining vast volumes of data, detecting patterns, and producing insights. With the help of tools like IBM Watson Discovery, which provide them access to strong analytics capabilities, researchers can uncover new information and expedite the study process.

Connecting Universities:

AI delivers a practical and interconnected learning environment by integrating many campus systems. Tools like Cisco Digital Network Architecture (DNA) use artificial intelligence (AI) to manage and improve campus infrastructure, boosting connectivity and the whole campus experience.

AI's Difficulties in Education

Security and Privacy Issues

Large volumes of student personal data may be collected and analyzed, which could be dangerous if it ends up in the wrong hands. Institutions need to make sure that the right steps are being taken to safeguard student privacy and stop data breaches.

Not Sufficient Trust

Students may be reluctant to accept grades or feedback generated by an AI system when they favor human input and evaluation. It's critical to establish trust with students and make sure they feel comfortable using technology.

Costs

AI system setup and maintenance can be expensive, which is an issue for educational institutions that are already struggling commercially. Educational institutions need to carefully consider both the advantages and drawbacks of implementing AI technologies in the studio.

Possibility Criticism

Because AI systems can be educated on incorrect information, they are vulnerable to bias. This might exacerbate already-existing disparities and lead to certain kids being treated unfairly.

Authorities must ensure that their artificial intelligence (AI) platforms are impartial and do not reinforce current disparities.

Moral Considerations to Make

AI-based educational systems must be developed with accessibility in mind to ensure that all scholars, including those with impairments, can access and use the technology.

Transparency

AI systems must be upfront and honest about how they reach their decisions. This can help build trust with children while additionally being sure they understand the technology.

Equity

Fair AI-based educational systems must guarantee that every student receives the same treatment and is not subjected to discrimination on the basis of gender, color, or other characteristics.

The future of AI in Education:

There are many chances for innovation and expansion in the field of AI in education. AI has the power to transform education by improving efficiency, effectiveness, and personalization. More advanced artificial intelligence that can understand and react to human emotions, offer more insightful feedback, and even design unique lesson plans for every student is anticipated in the future.

Conclusion

Even though using AI in education has lots of benefits, some issues and problems must be resolved. In addition to making sure they are taking appropriate steps to safeguard students' privacy and avoid bias; educational institutions must carefully weigh the advantages and disadvantages of integrating AI systems in the classroom. We can give every student a more individualized, effective, and efficient learning experience by striking a balance between the advantages and difficulties of AI in education.

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A Study on "Artificial intelligence in Cybersecurity"

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Abstract

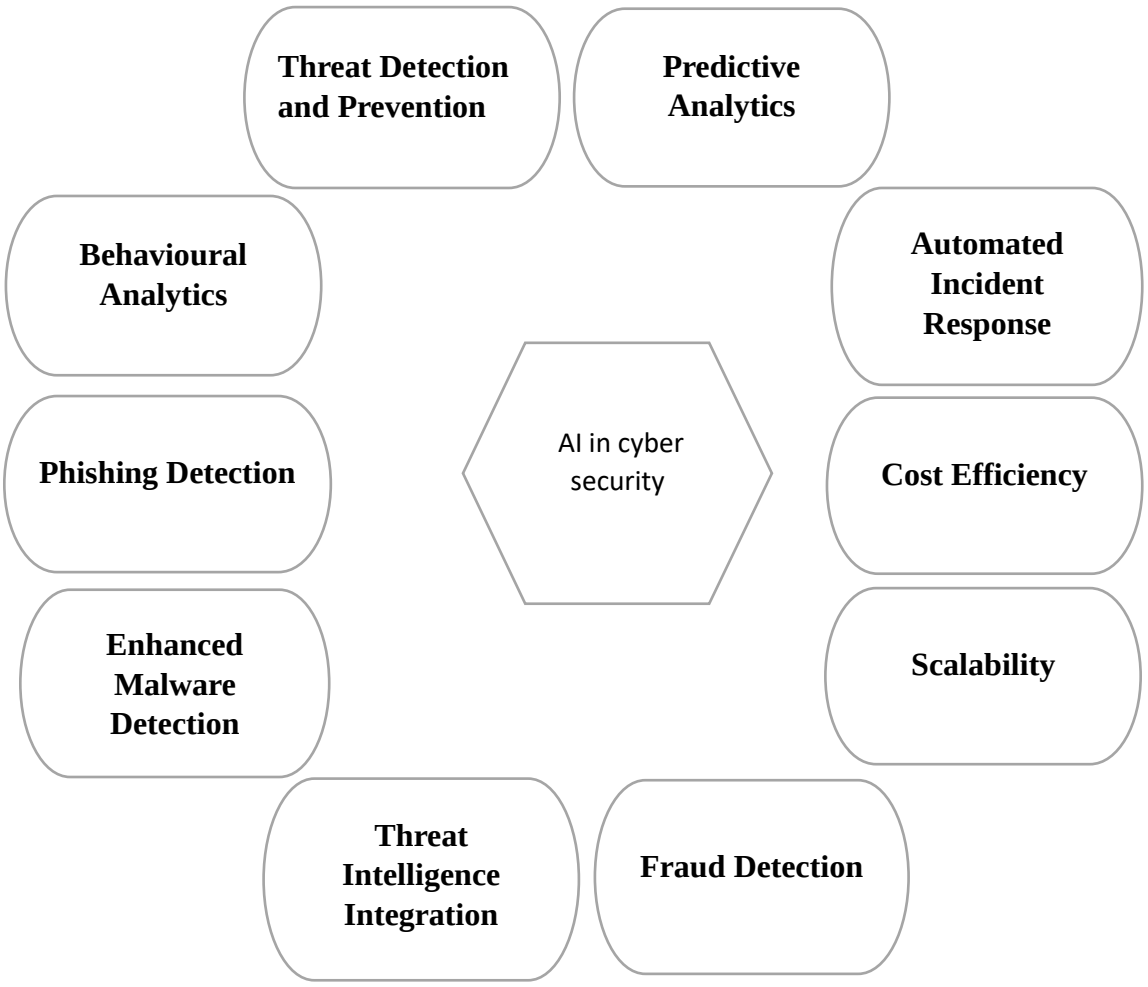
AI is changing the way cybersecurity works by improving how cyber threats are detected, prevented and responded to. With the help of machine learning, anomaly detection, and behavioural analysis, AI equips systems to counter risks quicker and more efficiently than standard practices. Moreover, it has helped in automating a lot of processes such as incident response, phishing scams, malware analysis, and fraud detection, significantly reducing the load on human security personnel. AI's capabilities do not stop there, as it is able to anticipate new threats and enhance user authentication while increasing the level of security in the cloud and IoT. At the same time, obstacles like adversarial AI, privacy issues, and heuristic bias in AI remain as major challenges. Regardless of these problems, AI is set to be the go-to countermeasure for tackling cybercrime in the future, ensuring that cybersecurity systems are more self-sufficient and proactive. The present paper aims at exploring the application of artificial intelligence in cybersecurity.

Introduction

AI is a new technology that has the potential to provide solutions for challenging issues in cybersecurity. This paper examines their uses in this important area of study. We seek to analyse cutting-edge developments in these areas divided into four primary subfields: phishing, social engineering, ransomware, and malware attempts. In every subfield, there is a detailed examination of the AI techniques and methodologies used to respond against these sophisticated threats. Cybersecurity is a critical concern for organizations and governments worldwide, as cyberattacks grow in sophistication and scale.

Traditional rule-based systems and signature-based detection methods are no longer sufficient to combat modern threats like zero-day exploits, advanced persistent threats (APTs), and ransomware. AI, with its ability to process vast amounts of data, identify patterns, and adapt to new threats, offers a powerful solution. This paper takes a comparatively descriptive position on the opportunities, challenges, and future directions of the AI solutions in cybersecurity by employing descriptive analysis and intensive discussions.

Roles of AI in Cybersecurity



Intelligent techniques to facilitate security measures

1.Artificial Intelligence (AI) and Machine Learning (ML)

- Threat Detection and Response
- Behavioural Analytics
- Automated Response

2.Deep Learning

- Advanced Malware Detection
- Phishing Detection

3.Natural Language Processing (NLP)

- Automated Threat Intelligence Gathering
- Social Engineering Detection

4.Big Data Analytics

- Real-time Threat Monitoring
- Predictive Analysis

5.Blockchain for Security

- Decentralized Security
- Cryptographic Protection

6.Autonomous Systems

- Self-Healing Networks
- Incident Response Automation

7.Security Automation and Orchestration (SOAR)

- Incident Handling
- Integration Across Security Tools

8.AI-based Identity and Access Management (IAM)

- Biometrics and Behavioural Biometrics
- Adaptive Authentication

9. Anomaly Detection and Predictive Modelling

- Unsupervised Learning
- Predictive Threat Modelling

10. Cyber Threat Hunting

- Proactive Threat Hunting
- Automated Investigation

11. Red and Blue Teaming Using AI

- Red Team (Offensive)
- Blue Team (Defensive)

12. AI-enhanced Endpoint Detection and Response (EDR)

- Endpoint Protection

13.Threat Intelligence Sharing

- Automated Information Sharing

14. Zero Trust Architecture (ZTA)

- AI-driven Access Control

Tools used for AI in cybersecurity

CrowdStrike is a cybersecurity company specializing in endpoint protection, threat intelligence, and cyberattack response.

Darktrace is an AI-powered cybersecurity company that uses machine learning to detect and respond to cyber threats in real-time.

Vectra AI is a cybersecurity company that leverages artificial intelligence to detect, prioritize, and respond to cyber threats across cloud, network, and endpoint environments.

Snort AI is an advanced network intrusion detection system that uses machine learning to enhance threat detection and response capabilities.

Cisco Secure X is a cloud-native security platform that integrates Cisco's security products to provide unified visibility, automation, and enhanced threat response across environments.

Total AV is an antivirus software that provides comprehensive protection against malware, viruses, and online threats for PCs, Macs, and mobile devices.

Cylance PROTECT is an AI-driven endpoint security solution that uses machine learning to prevent malware and cyber threats in real-time.

Cloudflare is a global network service that provides website security, content delivery, and DDoS protection to enhance performance and safeguard online assets.

IBM QRadar is a security information and event management (SIEM) platform that helps organizations detect, prioritize, and respond to security threats in real-time.

SentinelOne is an endpoint security platform that uses AI and machine learning to autonomously detect, prevent, and respond to cyber threats.

Challenges of using AI in cybersecurity

1. **Data Privacy**: AI systems require vast amounts of data to function effectively, which raises concerns about data privacy and compliance with regulations like GDPR.
2. **False Positives/Negatives**: AI models can sometimes generate inaccurate results, either by flagging legitimate activities as threats (false positives) or missing actual threats (false negatives).
3. **Adversarial Attacks**: Cybercriminals can exploit vulnerabilities in AI systems through adversarial attacks, manipulating AI models to bypass security measures.

4. **Bias in Algorithms**: AI systems can inherit biases from training data, potentially leading to unfair or ineffective security measures.
5. **Resource Intensive**: AI-driven security solutions require significant computational power and resources, which can be costly for organizations to implement and maintain.
6. **Complexity of Integration**: Integrating AI into existing cybersecurity infrastructures can be complex, requiring specialized expertise and time-consuming adaptation.
7. **Lack of Trust**: There is still scepticism around relying solely on AI for security, as human oversight is often deemed necessary to ensure effectiveness and avoid catastrophic errors.

AI's Future Prospects in Cybersecurity

As technology develops and cyber threats get more complex, artificial intelligence (AI) in cybersecurity is expected to undergo substantial change in the next years. Artificial Intelligence (AI) will be essential in creating novel solutions to improve security protocols, optimize workflows, and safeguard confidential information as enterprises confront an expanding range of cyber threats. The potential future paths of artificial intelligence (AI) in cybersecurity are examined in this section. These include the development of AI technologies, the integration of AI with newly developing technologies, a greater emphasis on automation, and the significance of ongoing learning and adaptation.

Technological Developments in Artificial Intelligence:

Artificial intelligence (AI) technologies will find more sophisticated uses in cybersecurity as they develop. Improving machine learning algorithms is one interesting field of research. These algorithms' next revisions will probably concentrate on enhancing their real-time detection and reaction to sophisticated cyber threats. This might entail creating more reliable unsupervised learning methods that can recognize unfamiliar dangers without requiring sizable labelled datasets. Additionally, cybersecurity will depend heavily on developments in explainable AI (XAI). The term "explainable AI" describes models that are able to give concise, intelligible justifications for their choices.

Combining Traditional and New Technologies:

More integration of AI with cutting-edge technologies like block chain, quantum computing, and the Internet of Things (IoT) will also be a feature of cybersecurity in the future. The threat surface increases with the number of connected devices, making advanced AI solutions necessary to

efficiently manage and safeguard these environments. For example, by tracking device behavior, identifying anomalies, and automating reactions to possible attacks, AI can be used to improve security in IoT networks.

Artificial Intelligence (AI) in cybersecurity has a bright future ahead of it thanks to technological developments, trend integration, automation, and an emphasis on ongoing learning and adaptability. Leveraging AI will be crucial for establishing proactive and resilient security measures as firms deal with a changing threat landscape. Embracing these future approaches will help firms improve their capacity to safeguard confidential information, handle crises with efficiency, and eventually create a safer digital ecosystem. AI's position in cybersecurity will grow more and more important as its capabilities spread, protecting enterprises from an ever-expanding range of cyber threats

Conclusion

Multiple AI approaches can be used on cybersecurity quickly, and urgent cybersecurity challenges need smarter solutions than they are actually applied. So far, these current immediate apps have been discussed is currently Artificial Intelligence, but many other developments enable the development of intelligent intelligence, provided they meet a threshold degree of complexity. AI is revolutionizing cybersecurity by providing advanced tools for threat detection, incident response, and predictive analytics. However, its implementation is not without challenges, including adversarial attacks, data privacy concerns, and ethical dilemmas. It's crucial to recognize that there are difficulties with implementing AI in cybersecurity. Implementation may be complicated by problems with data privacy, ethical considerations, and the possibility of false positives. Companies need to carefully consider how to handle these issues in order to strike a balance between utilizing AI's potential and respecting moral principles and individual privacy rights.With potential for more developments in automation, predictive analytics, and integration with cutting-edge technologies like quantum computing, block chain, and the Internet of Things (IoT), the future of AI in cybersecurity is bright.

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Customer Awareness and Adoption of Green Banking Practices

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Abstract

Green banking refers to environmentally responsible banking practices that aim to reduce the carbon footprint from banking activities. This includes promoting energy-efficient technologies, and encouraging customers to adopt environmentally friendly habits (Gupta & Aggarwal, 2020). The concept of green banking not only supports environmental protection, but also brings mutual benefits to banks, industries and the economy as a whole (Singh, 2019). Green banking integrates social and environmental considerations into its operations and decision-making processes. It represents a conscious effort on the part of financial institutions to align their activities with the Sustainable Development Goals, contributing to a greener and more responsible financial system (Rao & Kumar, 2021). Even though the term 'Green banking' has coined in the year 2009, it gained its importance in the recent years. This study explores the awareness and adoption of green banking among consumers in Kottayam, Kerala, and its influence on their financial choices. In order to support sustainability practices like green banking, its awareness among customers is vital. The present study aims to whether customers are aware about the green banking practices. It includes the usage of ATMs, Net/Mobile banking, UPI Payments, Green cards etc. The study identifies the products and service usage in terms of customer convenience pattern. The scope of the study is confined to the people of Kottayam district, Kerala. A collaborative approach involving banks and customers will be helpful for bringing more sustainability-oriented practices and thus building responsible financial behaviour by the society in general.

Keywords: *Green Banking, Consumer Awareness, Kottayam, Kerala, Sustainable Finance*

Introduction

The beginning of 21st century brought tremendous changes in banking activities. Due to this change, banks had shifted towards the adoption of innovative banking products. The growing popularity of services such as ATMs, online banking, online money transfers, debit cards and credit cards has changed the way in which customers interact with banks. These innovative banking channels rely primarily on internet-based technologies, which not only reduce operational costs for banks but also save time and help reduce environmental pollution (Kumar and Sharma, 2020). Environmental sustainability in the banking sector involves making strategic decisions that reduce the negative environmental impact of business activities. However, it goes beyond just harm reduction – it emphasizes creating long-term, environmentally friendly systems that support sustainable growth in the future (Reedy and Thomas, 2021).

Green banking promotes the responsible use of the bank's resources with the aim of reducing waste and prioritizing environmentally sustainable options. Green banking integrates environmental and social considerations into its operations. According to the Indian Banks' Association (IBA), green banking functions like any other bank but includes a special focus on protecting the environment and conserving natural resources through its activities and policies (IBA, 2013).For those in the banking sector, this concept involves incorporating sustainability principles into areas such as lending practices, resource use and energy efficiency. Green banking services and products includes mobile and online banking, remote deposits, paperless statements, green savings and checking accounts, green credit cards, energy-efficient home loans, and dedicated "green channel" meters that simplify environmentally conscious banking (Patel & Joshi, 2019).

Today every business organization and corporation is adopting "go green" concept because of the increasing friendly attitude of the society towards the environment. Banks play a critical role in the economic development of the nations by providing various socio-economic activities like job creation, wealth generation, Poverty eradication, entrepreneurial activity etc. Besides these activities, banks are introducing the practices of green banking in order to protect the environment and to reduce carbon emissions.

Green banking comprises of two key dimensions. Firstly, it involves the responsible and efficient use of resources and energy, with a strong emphasis on minimising carbon emissions. Secondly, it focuses on supporting and financing projects that are environmentally sustainable. Thus, green banking is not just about using resources wisely but also about ensuring that credit is extended to ventures that align with environmental sustainability goals. A critical component of this approach is the thorough environmental assessment of all projects before granting financial support (Sharma & Verma, 2020).

The concept of green banking began to gain attention in 2009, following the establishment of the first Green Bank in Mt. Dora, Florida, USA (Green Bank Alliance, 2011). In India, the Institute for Development and Research in Banking Technology (IDRBT), a body set up by the Reserve Bank of India (RBI) focuses on banking and financial technology identified the importance of holistic IT practices. IDRBT considers green banking as an essential aspect of sustainable development. It acknowledges that the enterprises with environmentally products will have a distinctive advantage over other concerns.

Literature Review

Green banking has emerged as a key area of interest for researchers and practitioners due to the adoption of eco-friendly technologies and the growing emphasis on social responsibility by banks. Various studies have attempted to understand consumer awareness, institutional efforts and policy frameworks related to sustainable banking practices.

Jha and Bhome (2013) explored the general awareness of green banking in India, emphasizing the need to educate consumers on its broader goals.

Sharma (2014) identified that even in metropolitan cities like Mumbai, a significant portion of consumers using digital banking services were unaware of the term "green banking," often associating it only with online transactions. Meanwhile, banks like SBI and ICICI have launched initiatives such as green channel counters, digital finance products, and investments in renewable energy to reduce environmental impact (Jaggi, 2014). Institutional contributions by the Reserve Bank of India and World Bank, have encouraged banks to adopt eco-conscious practices with tools like the Green Coin Rating system evaluating banks on carbon footprint and recycling efforts (Nath 2014).

Region-specific studies, such as those by Sudhalakshmi and Chinnadurai (2014), showed that awareness levels in Tier-2 cities remained low despite the importance of sustainability for emerging economies. Ragupathi and Sujatha (2015) noted the gradual shift in banks' role—from passive participants to active supporters of environmental sustainability. Complementary findings by Nagu (2012) and Mishra et al. (2013) reinforced the significance of digital innovation and service quality in strengthening green banking implementation. However, the overall literature indicates a strong concentration of research in major urban centres and lacks deeper investigation into customer awareness, perception, and adoption in smaller cities.

This study addresses that gap by focusing on the awareness and adoption of green banking practices among consumers in Kottayam, Kerala—a Tier-2 city that remains underrepresented in existing literature. While green banking is being integrated into urban banking structures, little is known about how consumers in semi-urban or rural areas perceive these initiatives and whether such awareness influences their financial choices. By exploring this less-studied demographic, with high

literacy rates the study contributes to a more inclusive understanding of green banking's reach and effectiveness across diverse regions of India.

Statement of the Problem

In today's environmentally conscious society, all types of business firms are adopting innovative strategies to become more sustainable. These efforts range from enhancing energy efficiency and purchasing eco-friendly products to composting waste and reducing electricity usage after hours. The idea of "going green" can vary widely depending on the type of organisation. In the context of the financial sector, green banking refers to conducting banking operations in ways that minimise both internal carbon footprints and external carbon emissions. One of the key ways banks can contribute to reducing external emissions is by financing environmentally friendly technologies and projects aimed at pollution control. However, the successful implementation of green banking relies heavily on active customer participation and awareness. Organisations that can offer solutions addressing environmental concerns are likely to gain a competitive advantage. In India, the concept of green banking is gradually gaining momentum, with many banks exploring initiatives to position themselves as environmentally responsible institutions. In this context it is important to conduct a study on customer perceptions, awareness levels, and patterns of usage related to green banking initiatives.

Scope of the Study

The present study is limited to Kottayam district in Kerala. Kottayam is considered to be the most literate district in Kerala as per with a literacy rate of 97.2% according to the Census of India (Census of India, 2011). This high literacy rate makes Kottayam an ideal location for studying awareness and adoption of green banking practices among consumers.

Objectives of the Study

- To study the awareness level of green banking practises among the respondents in the study area.
- To analyse the adoption of green banking practises by customers.
- To analyse the factors that affecting the use of green banking initiatives by the respondents.
- To identify the most preferred green banking services by the respondents.

Research Methodology

The present study used the convenient sampling method. Primary data was collected through a well-structured questionnaire from 60 respondents in Kottayam. Secondary data was collected from the official websites of various banks, as well as journals and books related to banking. The statistical tools used for data analysis include percentage analysis, Henry Garrett ranking method and weighted average analysis. Tables have been used to present the results in a clear and easily understandable manner.

Data Analysis and Interpretation

Table 1. Demographic Profile

Demographic Profile	Variables	Frequency	Percentage
Gender	Male	35	58.3
	Female	23	38.4
	Others	2	3.3
Age	21-40	46	76.7
	41-50	10	16.6
	50 above	4	6.7
Educational Qualification	10^{th} or below	5	8.3
	12^{th}	3	5.0
	Graduation	32	53.3
	Post-graduation	20	33.4
Occupation	Student	12	20
	Govt. employee	28	46.7
	Private employee	8	13.3
	Business/Profession	12	20
Income	Below 10,000	16	26.7
	10,001 to 25,000	27	45.0
	25,001 to 50,000	10	16.7
	50001 and above	7	11.6
Area of residence	Semi -urban	27	45.0
	Rural	22	36.7
	Urban	11	18.3

Source: Primary data

Table 1 presents the demographic profile of the respondents in the study area. The majority of respondents are male (58.3%), and most of them (76.7%) fall in the age group of 21 to 40 years. Over 86% of the respondents are graduates, and a large portion are employed in the public sector. The average monthly income of the respondents is above ₹25,000. Additionally, a significant number of participants (81%) reside in rural or semi-urban areas.

Table2: Bank related data

Profile	Variables	Frequency	Percentage
Bank account	SBI	39	65
	Canara Bank	3	5
	Union bank of India	4	6.7
	HDFC	2	3.3
	Federal bank	11	18.3
	Others	1	1.7
Type of account	Savings account	50	83.3
	Current account	10	16.7
Period of relationship	Less than 1 year	9	15.0
	1-5 years	32	53.3
	5-10 year and above	19	31.7

Source: Primary data

The data shows that the majority of respondents (65%) hold their bank accounts with State Bank of India (SBI), followed by Federal Bank (18.3%). Other banks like Union Bank of India (6.7%), Canara Bank (5%), HDFC Bank (3.3%), and others (1.7%) have a smaller share among the respondents.

When it comes to the type of account, a large majority (83.3%) have savings accounts, while only 16.7% maintain current accounts, indicating that most respondents use banking services primarily for personal savings and transactions.

Regarding the period of relationship with the bank, over half of the respondents (53.3%) have been associated with their bank for 1 to 5 years, suggesting a relatively stable customer base. Additionally, 31.7% have maintained their accounts for 5 years or more, while 15% are new customers with less than 1 year of relationship, showing a mix of both new and long-term customers in the sample.

Table 3 Awareness level of green banking initiatives

Products	Highly aware		aware		Somew aware		Not Aware	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Net banking	20	33.3	34	56.6	4	6.6	2	3.3
Debit/ Credit Card	26	43.4	30	50	4	6.6	2	3.3
Mobile banking	25	41.6	27	54	6	10	2	3.3
Solar ATMs	6	10	16	26.6	21	35	17	28.3
UPI	27	45	24	40	5	8.3	4	6.6
Green cards	7	11.6	14	23.3	21	35	18	30
Green car loans	6	10	8	13.3	25	42	21	35

Source: Primary data

From Table 3, it is identified that, most of the respondents are aware about net banking, debit/credit cards, mobile banking and UPI. But almost 30% of the respondents are unaware about the green cards and green loan. Only 10% respondents are aware about the use of Solar powered ATMs.

Table 4 Usage of Green Banking Services

Profile	Variable	Frequency	Percentage
Usage of green Banking services	Always	42	70
	Rarely	9	15
	Never	9	15
	Total	60	100

Source: Primary data

From the table 4, among 60 respondents, 70% of them always use green banking services, 15% rarely use and remaining 15% never use green banking services.

Table 5 Composite indices of mostly used Green Banking Services

Particulars	**Weighted scores***					**Total Score**	**Mean Score**	**Level of Rank**
	Rank 1	**Rank 2**	**Rank 3**	**Rank 4**	**Rank 5**			
Online bill payment	145	44	30	18	1	238	3.96	Rank 1
Online Savings Account	60	52	42	28	7	189	3.15	Rank 5

Net banking	85	52	51	16	5	209	3.48	Rank 3
Electronic Fund Transfer	55	80	36	20	7	198	3.3	Rank 4
Mobile banking	120	64	27	12	5	228	3.8	Rank 2

Source: Data compiled by the researcher.

Analysis of Composite indices of most used green banking services are shown in this table. It is identified that, majority of the respondents are giving first preference for online bill payment with mean score of 3.96, (3.8) with mobile banking. (3.48) score for internet banking services provided by banks and respondents least prefer holding online savings account with mean score 3.1

Table 6 Factors influencing adoption of green banking services

Particulars	Weighted scores*					Total Score	Mean Score	Level of Rank
	Rank1	Rank2	Rank3	Rank4	Rank5			
Convenience	165	60	21	4	3	253	4.2	Rank 1
Ease of use	150	80	15	6	2	253	4.2	Rank 1
Environment concern	125	52	21	24	3	225	3.75	Rank 4
Time and Cost saving	135	44	33	14	4	230	3.8	Rank 3

Source: Data compiled by the researcher.

Analysis of Composite indices of factors influencing green banking services reveals that, majority of the respondents are giving first preference for both convenience and ease of use with mean score of 4.2, (3.8) time and cost saving. Mean score of (3.75) for environment concern which is least preferred by respondents among all other factors.

Table 7 Best way of implementing Green Banking

Particulars	Weighted scores*				Total Score	Mean Score	Rank Level
	Rank 1	Rank 2	Rank 3	Rank 4			
Adopting paperless banking methods	164	27	14	3	208	3.5	Rank 1

Use of energy consumption method	52	87	24	6	169	2.8	Rank 3
Introducing green financial products	72	63	34	4	173	2.9	Rank 2
Green building	68	45	22	17	152	2.5	Rank 4

Source: Data compiled by the researcher.

Analysis of Composite indices of best ways of implementing Green Banking; are shown in table 7. It is identified that, majority of the respondents are giving first preference for adopting paperless banking methods such as net banking, mobile banking etc. with mean score of 3.5, second preference to introducing green banking products with mean score of (2.9). Mean score of (2.8) for the usage of energy consumption and green building with a mean score of 2.5, is least preferred by respondents among all other factors.

Conclusion

The findings offer a comprehensive insight into the demographic profile of respondents. Majority of the respondents were male (58.3%). The age distribution highlights significance presence in the 20 to 40 years range (76.7%), while academic qualifications show a majority with graduation (53.3%). income wise, a notable portion falls with in the 10001 to 25,000 range (45%). Most of the respondents from rural area (45%). Most of the respondents are customers of public sector banks with a majority of 65% from SBI. No of years of relationship with bank indicates the majority are using the same bank over the years. Majority of the customers are aware about all green banking initiatives, but solar powered ATMs, green car loans etc need more attention. Based on Henry garret ranking method and Weighted average analysis, the result indicates that almost 70% of customers always uses green banking products. Out of these products, online bill payments (Rank 1) and mobile banking (Rank 2) are the widely used services. Most of the respondents uses green products as it is convenient and very easy to use (Rank 1). The findings of best ways of implementing green banking are adopting paperless banking methods (Rank 1) and introducing green financial products (Rank 2). In order to ensure proper adoption of all green banking products, all banks should provide customer education on these products. If it's successful, it will not only benefit to the people, banks and industries but also to the economy.

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Artificial Intelligence Marketing's Effect on Online Sales

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Abstract

E-commerce is undergoing a revolution thanks to artificial intelligence (AI), which is changing marketing tactics and increasing sales. Chat bots, tailored suggestions, and predictive analytics are a few examples of AI-powered marketing technologies that are improving consumer experiences and boosting sales. This study investigates the effects of AI marketing on e-commerce sales, looking at important topics such consumer behavior analysis, conversion rates, and customer engagement. This includes improving several facets of the e-commerce experience through the application of computer vision, natural language processing, and machine learning techniques. AI in e-commerce seeks to enhance supply chain optimization, fraud detection, recommendation systems, customer interaction, and inventory management.

Keywords: *Artificial Intelligence, E-Commerce, Predictive Analytics, Consumer Behavior, Digital Advertising.*

Introduction

AI-driven marketing strategies are being used by e-commerce companies more and more to maintain their competitiveness in the online market. Businesses may customize their marketing campaigns for improved customer targeting and engagement thanks to AI's capacity to evaluate enormous volumes of consumer data and produce useful insights. The function of AI in e-commerce marketing and its impact on sales performance are examined in this journal article. By investigating the effects of AI-driven marketing tactics on e-commerce sales data and the moral ramifications of AI use in marketing, this review seeks to close these gaps. There is still a lot of room for innovation as the integration of multiple data sources for price prediction is still not commonly used. Artificial Intelligence (AI) has completely changed the marketing scene by changing how companies engage with their clientele and increase online sales. AI marketing uses data analytics, natural language processing, and machine learning algorithms to produce multichannel, customized experiences that engage and convert consumers. Online sales are significantly impacted by AI marketing, which raises revenue growth, conversion rates, and consumer engagement. The impact of AI technology on internet sales will only increase as it develops further. Companies that use AI marketing will be better able to increase sales, enhance customer happiness, and maintain an advantage over rivals.

Objectives

1) To research how AI is used in e-commerce marketing.
2) To research using AI to improve the customer experience.

3) To research AI-Powered Marketing Techniques to Increase Sales.
4) To research the difficulties and moral issues.
5) To identify the issue and its resolution.

Methodology

Research Design

Using a mixed-method approach, this study combines qualitative and quantitative research techniques. The association between e-commerce sales and AI marketing strategies is examined using a descriptive research approach.

Data Collection Methods

a) Primary Data:

Survey: E-commerce companies who use AI-driven marketing tools (such as recommendation engines, chat bots, and tailored advertising) will receive structured questionnaires.

Interviews: conducting in-depth interviews with managers of e-commerce and specialists in digital marketing to obtain qualitative information on the effects of AI.

b) Secondary Data:

Published case studies, business reports, and journal papers about artificial intelligence in marketing. Sales statistics from e-commerce before and after AI was used.

Sample Selection

a) Target Population: E-commerce businesses in a variety of industries (fashion, electronics, etc.) are utilizing AI marketing techniques.

b) Sampling Technique: E-commerce companies that have incorporated AI technologies will be chosen through the use of a purposive sample technique. Ten to fifteen experts will be interviewed, and a sample size of 100 to 200 respondents will be surveyed.

Data Analysis Techniques

a) Quantitative Analysis: nil

b) Descriptive Statistics: Mean, median, standard deviation.

c) Regression Analysis: To measure the correlation between AI-driven marketing and e-commerce sales performance.

d) T-tests/ANOVA: To compare different AI tools' effectiveness.

Thematic Analysis: Coding and categorizing interview responses to identify recurring themes and insights.

Ethical Considerations

Every participant will be asked for their informed consent. Anonymity and data confidentiality will be preserved. The study will adhere to the ethical standards for business and technology research.

Limitations of the Study

Possible bias in survey and interview self-reported data. It is challenging to separate the influence of AI from other marketing considerations. Restricted to companies that have previously embraced AI, thus leaving out smaller companies. Some findings become obsolete soon due to the rapid evolution of AI marketing tools and algorithms. Because AI models are always evolving, it is challenging to quantify long-term effects. It's possible that some e-commerce companies lack the resources necessary to successfully use AI-driven marketing. Businesses may have variable outcomes as a result of varying degrees of AI deployment.

Statement of the Problem

The environment of e-commerce has changed dramatically as a result of the quick development of artificial intelligence (AI) in marketing. Customer experiences and engagement have been improved by AI-driven marketing techniques like chat bots, predictive analytics, tailored suggestions, and automated advertising. Notwithstanding these advantages, it is still necessary to determine the exact effect of AI marketing on e-commerce sales.

Effectiveness and ROI – Businesses find it difficult to gauge the true return on investment (ROI) of AI marketing technologies, despite their claims to increase sales.

Customer Trust and Data Privacy – Concerns about data protection and trust may make consumers reluctant to interact with AI-driven marketing.

Adoption Barriers for Small Businesses – Due to financial constraints and a lack of technical know-how, many smaller e-commerce companies struggle to adopt AI-driven marketing techniques.

Consumer Behavior and Personalization – Targeted marketing and AI-driven recommendations can increase sales, but if personalization is viewed as obtrusive, too much automation could drive away customers. Investigate the effects of AI marketing on e-commerce sales, evaluate its efficacy, and investigate the opportunities and obstacles that firms face when implementing AI-powered marketing tactics. Businesses can improve their AI marketing efforts and increase sales by being aware of these elements.

Importance of AI Marketing on E-Commerce Sales

AI-Driven Personalization in E-Commerce: A key element of contemporary e-commerce marketing techniques is personalization. Recommendation engines driven by AI examine user preferences, browsing patterns, and purchase history to provide incredibly relevant product recommendations. This focused strategy improves conversion rates, raises consumer satisfaction, and improves the purchasing experience.

Chat bots and Customer Engagement: Chat bots powered by AI offer real-time customer service, increasing user engagement and retention. Chat bots improve client happiness and raise the possibility of recurring business by providing prompt answers to questions, helping with purchases, and effectively handling complaints.

Predictive Analytics and Consumer Insights: Using historical data and artificial intelligence, predictive analytics makes predictions about future customer behavior. This technology is used by e-commerce companies to create successful marketing campaigns, optimize inventory management, and predict market trends. Businesses can increase their competitive edge and improve sales forecasting by anticipating client wants.

AI-Powered Advertising and Campaign Optimization: Through real-time data analysis and campaign adjustments for optimal impact, AI-driven marketing technologies aid in the optimization of digital advertising. Through the identification of high-potential clients and the delivery of tailored ads, AI improves email campaigns, social media marketing, and programmatic advertising. Increased sales conversions and a better return on investment (ROI) result from this.

Challenges and Limitations of AI in E-Commerce Marketing: Notwithstanding its benefits, AI marketing has drawbacks, including possible biases in AI algorithms, expensive implementation costs, and data privacy issues. To maintain customer trust and guarantee ethical AI processes, businesses need to handle these issues.

Review of Literature

(Zhang et al., 2021) AI-powered chat bots improve customer service by providing instant responses and guiding users through the purchasing process. Studies indicate that chat bots increase user engagement and drive higher sales conversions by reducing cart abandonment rates

(Elmaghraby & Keskinocak 2020) AI facilitates real-time price optimization based on market trends, competitor pricing, and customer behavior. Research shows that businesses employing AI-driven dynamic pricing strategies experience higher profitability and improved competitive advantage).

(Gupta & Dhillon, 2022) Advancements in AI have enabled image and voice search functionalities, allowing consumers to find products more efficiently. Studies suggest that incorporating AI-driven search features enhances user experience and contributes to higher sales conversions.

(Binns, 2018) Despite the benefits, AI in e-commerce marketing presents challenges such as data privacy concerns, algorithmic biases, and the need for continuous model improvements. Ethical considerations surrounding AI transparency and consumer trust remain critical areas of discussion.

(Chen et al., 2020) AI-powered recommendation engines, such as those used by Amazon and Netflix, leverage machine learning algorithms to analyze user behavior and suggest products tailored to individual preferences (Smith & Linden, 2017). Research suggests that AI-driven recommendations enhance customer satisfaction and increase sales conversion rates.

Limitation of the Study

Data Constraints

Limited access to real-time or high-quality data on marketing initiatives powered by AI. The dataset may contain biases because some e-commerce companies might not completely reveal their use of AI or sales results.

Generalizability Issues

The results might not apply to every e-commerce industry (luxury vs. fast-moving consumer items, for example). Differences in the use of AI between various business sizes and geographical areas (small vs. large organizations).

Consumer Behavior Complexity

Consumer decisions are influenced by AI marketing, but there are other elements at play as well, such as seasonal trends, brand loyalty, and economic situations. Consumer trust in AI-driven marketing may be impacted by privacy and ethical concerns.

Measurement Challenges

It might be challenging to distinguish the benefits of AI marketing from those of other digital marketing techniques (such as SEO, influencer marketing, and traditional advertisements). Key performance indicators (KPIs) vary from company to company, making comparisons challenging.

Conclusion

By increasing personalization, boosting customer interaction, and streamlining marketing efforts, AI marketing is revolutionizing e-commerce sales. Future studies should concentrate on addressing AI-related issues and investigating cutting-edge AI uses in e-commerce. E-commerce sales are significantly impacted by AI marketing since it promotes creativity, efficiency, and customisation. Businesses who strategically use AI's capabilities will have an advantage in the ever-changing digital marketplace as it develops further. Future studies should examine new developments in AI, moral issues, and their long-term effects on customer behavior and the viability of businesses.

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A Study on the Impact of Influencer Marketing on Consumer Purchasing Decisions

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Abstract

Influencer marketing has emerged as a dominant force in the digital marketing landscape, significantly shaping consumer purchasing behavior across various industries. This study explores the impact of influencer endorsements on consumers' buying intentions, with a focus on social media platforms such as Instagram, YouTube, and TikTok. Influencers now serve as powerful intermediaries between brands and consumers, capable of delivering persuasive brand messages to highly engaged audiences. The research examines key factors that influence the effectiveness of influencer marketing, including trustworthiness, authenticity, and perceived expertise. Using a mixed-methods approach—combining surveys and interviews—the study evaluates how consumers perceive influencer promotions and whether these perceptions translate into actual purchasing behavior. It also considers demographic variables such as age and social media usage patterns to identify differences in response across consumer segments. Findings reveal that consumers are more inclined to purchase products recommended by influencers they trust, particularly when the influencer's content aligns with their personal values and interests. However, the study also highlights a growing skepticism toward overly commercialized content, which can undermine the credibility and effectiveness of influencer marketing. This research offers valuable insights for brands seeking to leverage influencer partnerships. By understanding the nuances of consumer-influencer dynamics, businesses can refine their marketing strategies to foster trust, boost engagement, and ultimately drive sales.

Keywords: *Influencer marketing, consumer behavior, brand endorsement, digital marketing, consumer engagement*

Introduction

With the rapid expansion of social media platforms, influencer marketing has become one of the most influential tools in modern marketing. Influencers function as opinion leaders, shaping consumer attitudes and behaviors through their endorsements of products and services. Particularly among younger generations, consumers often perceive influencers as more relatable and trustworthy than traditional advertising channels, leading to a growing reliance on influencer recommendations during the purchasing process. Despite the widespread adoption of influencer marketing, its actual effectiveness in driving consumer purchasing decisions remains underexplored. This study aims to address this gap by examining how key factors—such as perceived trustworthiness, authenticity, and the type of influencer—impact consumer behavior. By analyzing these variables, the research seeks to better understand how influencer marketing strategies translate into real-world consumer actions.

Review of Literature

Influencer marketing has rapidly evolved with the rise of social media, positioning influencers as powerful intermediaries in shaping consumer purchasing behavior. According to Freberg et al. (2011), influencers are often perceived as authentic and trustworthy figures, making them more effective than traditional celebrities in shaping public opinion. Lou and Yuan (2019) further emphasized that the credibility of influencers significantly affects consumer trust and their intention to purchase endorsed products.

Trustworthiness and perceived expertise are two critical factors in the influencer-consumer relationship. Djafarova and Rushworth (2017) found that young consumers are more likely to be influenced by online celebrities they find relatable and credible, particularly on platforms like Instagram. This aligns with Erdogan's (1999) earlier findings on the importance of endorser credibility and the fit between the influencer and the brand being promoted.

The type of influencer also plays a pivotal role. While macro-influencers may reach broader audiences, micro-influencers often foster deeper engagement and trust due to their closer connection with followers (De Veirman et al., 2017). Schouten et al. (2020) supported this by highlighting the role of product-endorser fit in enhancing advertising effectiveness, noting that consumers are more responsive when there is alignment between the influencer's persona and the product.

Demographics and usage behavior also mediate the impact of influencer marketing. Casaló et al. (2018) noted that younger generations, especially Gen Z and Millennials, are more inclined to follow influencers and base their purchasing decisions on their endorsements. However, Evans et al. (2017) pointed out an increasing demand for transparency, as overly promotional or undisclosed advertisements may lead to skepticism and reduced consumer trust.

Collectively, these studies illustrate that while influencer marketing is highly effective under the right conditions, its success largely depends on the influencer's authenticity, credibility, and the nature of their relationship with their followers.

Statement of the Problem

While influencer marketing has seen rapid growth in recent years, there's still a lot of uncertainty around how much it actually influences what people buy. Many businesses struggle to figure out whether working with influencers really boosts sales or how to accurately measure the success of these campaigns. This study looks into how influencer marketing shapes consumer buying

decisions by focusing on key factors like how trustworthy and authentic influencers seem, as well as the impact of different types of influencers—such as celebrities, macro-influencers, and micro-influencers. It also considers how personal characteristics like age, gender, and social media habits play a role in shaping these effects.

Methodology

A mixed-method approach was adopted, with a combination of qualitative (interviews) and quantitative (surveys) data collection methods. The study focuses on the statistical analysis of survey data using Chi-Square Test and ANOVA to test the research hypotheses.

Data Collection:

Survey Method: A structured questionnaire was developed to collect data from consumers regarding their attitudes toward influencers and their purchasing behavior. The questionnaire consisted of both closed and open-ended questions.

Sample Size:

A sample of 300 consumers aged 18-45 was selected randomly from social media users who follow at least one influencer. The respondents were divided into different groups based on their demographics and the types of influencers they follow.

Data Analysis

Statistical Analysis:

Chi-Square Test:

The Chi-Square Test was used to analyze the relationship between the type of influencer (macro, micro, nano) and consumer purchasing decisions. This test examines if there is a significant association between categorical variables (e.g., influencer type and purchase intent).

Hypotheses for Chi-Square Test:

Null Hypothesis (H_0): There is no significant relationship between influencer type and consumer purchasing decisions.

Alternative Hypothesis (H_1): There is a significant relationship between influencer type and consumer purchasing decisions.

Purchase Decision	Influenced by Influencer	Not Influenced by Influencer	Total
Purchased	80	70	150
Not Purchased	90	60	150
Total	170	130	300

Source: Primary Data

The data shows that consumers influenced by influencers are slightly more likely to make a purchase compared to those who are not, though the difference is not substantial. Out of those influenced, 47% made a purchase, while 54% of those not influenced also purchased. This suggests that while influencer marketing may have some effect on consumer behavior, it is not the only factor driving purchase decisions. Other influences such as personal preference, brand familiarity, and product value likely also play important roles.

Chi-Square Test Results:

Variable	Chi-Square value	Degree of freedom (df)	p-value
Purchase Behavior	15.24	4	0.004

Interpretation of Chi-Square Test:

The Chi-Square Test results indicate a significant relationship between the type of influencer and consumer purchasing decisions (p-value = 0.004 < 0.05). This suggests that the type of influencer (macro, micro, or nano) does affect the likelihood of a consumer making a purchase. The significant relationship found through the Chi-Square Test suggests that consumer purchasing decisions are influenced by the type of influencer they follow. Specifically, consumers who follow nano influencers are more likely to purchase products compared to those who follow macro influencers.

ANOVA (Analysis of Variance):

ANOVA was used to determine whether there were significant differences in consumer purchasing intent across different influencer types (macro, micro, nano). This test compares the means of multiple groups to assess whether they are different from each other.

Hypotheses for ANOVA:

Null Hypothesis (H_0): There is no significant difference in purchasing intent across different influencer types.

Alternative Hypothesis (H_1): There is a significant difference in purchasing intent across different influencer types.

Influencer Type	Mean	Standard Deviation	p-value
Macro Influencer	3.75	0.85	0.021
Micro Influencer	4.25	0.78	
Nano Influencer	4.60	0.70	

The ANOVA results indicate that consumer purchasing intent varies significantly based on the type of influencer, with a p-value of 0.021 (less than 0.05), confirming the presence of notable differences. Nano influencers showed the highest purchasing intent, followed by micro influencers, while macro influencers had the lowest. This suggests that influencers with smaller, more engaged audiences are more successful at influencing purchases, likely due to their higher perceived authenticity and trustworthiness among consumers.

Conclusion

The study confirms that influencer marketing has a significant impact on consumer purchasing decisions, with the type of influencer (macro, micro, nano) playing a crucial role. Despite having fewer followers, nano influencers often have a stronger effect on consumer behavior due to higher trust and engagement levels.

Data from 300 respondents, analyzed using chi-square tests and ANOVA, revealed the following key findings:

- **Significant Association**: The chi-square test demonstrated a significant link between influencer marketing and consumer purchasing decisions, highlighting the role of influencer recommendations in shaping purchasing choices.
- **Influence Levels**: ANOVA analysis showed that the degree of influence—whether high, medium, or low—directly impacted the amount consumers spent. Respondents who were more influenced by an influencer tended to make higher-value purchases.

- **Trust and Credibility**: The study found that the trustworthiness and credibility of influencers are critical factors in shaping purchasing behavior. Consumers who saw influencers as trustworthy were more likely to follow their recommendations and make purchases.
- **Content Preferences**: Different types of content, such as reviews, tutorials, and unboxings, had varying effects on consumer decisions. Among these, reviews and tutorials were particularly effective in driving purchases.

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Empowering Education: The Transformative Role of AI

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Abstract

*The basic goal of AI is to imitate human intellect and execute complex human tasks more efficiently and quickly. In the educational sector, AI can quickly accelerate the entire teaching-learning process. One of the roles of AI in the education sector is to support customize learning. Traditional classrooms are normally one-size-fits-all types. However, this approach disregards the fact that each kid is unique, with distinct learning styles, skills, and shortcomings. The benefits of AI in the education sector are making teaching-learning methods effective, aiding in better teacher-student communication, offering real-time feedback, establishing a flexible learning environment, creating inclusive teaching-learning content for students with special needs, time-saving, generating adaptive learning materials, 24*7 assistance via chatbots, addressing skill gaps effectively and facilitating remote learning. Hence this study attempts to analyse the transformative role of AI in empowering education. The main objectives of this study are to know about the AI applications in education, to exhibit the usage of AI-powered tools in education, to assess the opinion of respondents about the benefits of using AI in education, to analyse the challenges faced by the respondents while adopting AI tools in education and to offer suggestions on the basis of findings of the study.*

Keywords: *Artificial Intelligence, Learning process, Transformation, AI powered tools, Education.*

Introduction

AI refers to all applications that do complicated tasks that demanded human creativity and involvement. There are abundant examples of Artificial Intelligence present in our everyday lives, such as Google Maps, ride-hailing applications, face detection software, text editors or autocorrect, search recommendations, chatbots, digital assistants, e-payments, and Natural Language Processing (NLP) tools, etc. The purpose of these technologies is to facilitate computers to perform logical tasks. These include roles like decision-making, problem-solving, perception, and understanding human communication. The basic goal of AI is to imitate human intellect and execute complex human tasks more efficiently and quickly. In the educational sector, AI can quickly accelerate the entire teaching-learning process. One of the roles of AI in the education sector is to support customize learning. Traditional classrooms are normally one-size-fits-all types. However, this approach disregards the fact that each kid is unique, with distinct learning styles, skills, and shortcomings. The involvement of AI in the education sector is tailoring learning materials. The adaptive learning method is one of the greatest ways AI can help personalized learning.

Statement of the Problem

AI has the potential to make the full teaching process simpler and more efficient. AI technology might help teachers to teach more effectively by creating smart content, producing adaptive content, providing feedback based on the needs of the students in real-time, facilitating tasks such as assessing, grading, responding to student inquiries and improving interactions with students with special needs through the use of adaptive technologies. Students suffering from disabilities can find novel ways of interacting with the help of AI. One of the main benefits of AI in education for students with special needs is that it may support in the creation of lesson plans tailored to their individual needs. For instance, students with speech or communication impairments can use AI-driven speech recognition and text-to-speech technologies to connect with teachers and fellow students. AR and VR technologies used with AI, have the potential to create immersive and interactive learning experiences that appeal to a wide range of learning styles and abilities. The benefits of AI in the education sector are making teaching-learning methods effective, aiding in better teacher-student communication, offering real-time feedback, establishing a flexible learning environment, creating inclusive teaching-learning content for students with special needs, time-saving, generating adaptive learning materials, 24*7 assistance via chatbots, addressing skill gaps effectively and facilitating remote learning. Hence this study attempts to analyse the transformative role of AI in empowering education.

Scope of the Study

The scope of the present study is confined to know about the AI applications in education, to exhibit the usage of AI-powered tools in education, to assess the opinion of respondents about the benefits of using AI in education, to analyse the challenges faced by the respondents while adopting AI tools in education and to offer suggestions on the basis of findings of the study.

Objectives

The main objectives of this study are

- To present the socio economic profile of the sample respondents in the study area.
- To know about the AI applications in education.
- To exhibit the usage of AI-powered tools in education.
- To assess the opinion of respondents about the benefits of using AI in education.
- To analyse the challenges faced by the respondents in the adoption of AI in education.
- To offer suggestions for the effective use of AI in education.

Review of Literature

Below an attempt is made to review the available literature related to the topic of this research.

Muhammad Tahir et al (2024), Conducted research on “Role of artificial intelligence in education: A conceptual review”. The study provides a comprehensive conceptual review of how Artificial Intelligence (AI) is transforming the education sector. It explores AI applications, benefits, challenges, and future opportunities, emphasizing both global initiatives (such as UNESCO's AI integration efforts) and technological advancements in education. It also discusses AI applications in content creation, delivery, assessment, and feedback, offering a structured approach to understanding AI in education.

Gunasekaran et al., (2024) performed a study on “Digital Transformation of Classroom; Impact of AI and Iot in The Educational Sector”. The objective of the study is to study the challenges that AI and IoT create for the educational sector, particularly in the usage of classroom technology. The results highlighted in this study indicated that educators should consider setting the appropriate aims, providing the continuous help necessary to fulfil them and address the following issues as the main policy implications: Ethical approaches to the use of AI and IoT in learning environments.

Alexandra Harry(2023) undertaken the study entitled on “Role of AI in Education”. The study provides a comprehensive overview of how artificial intelligence is reshaping the educational landscape. It explores AI's potential to personalize learning, enhance efficiency, and automate various educational processes. It also study role of AI in management, promotion of education which describe the effect of AI in education sector.

Kandula Neha (2021) underwent a study on “Role of Artificial Intelligence in Education”. The objective of the study is to present the applications of AI and its future work force. It reveals that shows that AI is that the backbone of all the information science enabled intelligent tutor systems. These systems helps in developing qualities like self-reflection, responsive deep queries, partitioning conflict statements, generating artistic queries, and choice-making skills.

Methodology

The present study is based on both primary and secondary data. Primary data have been collected from 240 educators in Virudhunagar who were selected by convenience sampling method.

The collected data were edited, tabulated and analysed for the purpose of presentation. Percentage analysis, Likert's three point scaling technique and simple ranking technique have been applied to analyse the data. Secondary data have been collected from various journals, books and websites.

Socio Economic Profile of the Respondents

The opinion of educators about the usage of AI may be influenced by socio economic variables such as age, gender, marital status, educational qualification and academic discipline. Hence, these variables of the respondents were collected and tabulated in Table 1.

Table 1

Socio Economic Profile of the Respondents

Socio Economic Variables		Number of Respondents	Percentage to Total
Age (in years)	Below 30	20	8
	30 – 40	70	29
	41 - 50	84	35
	Above 50	66	28
	Total	**240**	**100**
Gender	Male	112	47
	Female	128	53
	Total	**240**	**100**
Marital status	Married	190	79
	Unmarried	50	21
	Total	**240**	**100**
Educational Qualification	M. Phil	92	38
	NET/SET	108	45
	P. hD	40	17
	Total	**240**	**100**
Academic Discipline	Science	40	17
	Arts	108	45
	Commerce	92	38
	Total	**240**	**100**

Source: Primary data

Out of 240 respondents surveyed, 84 (35 %) are in the age group of 40-50 years; 128 (53%) are male respondents; 190 (79%) are married; 108 (74.29%) are qualified with NET / SET and 108(45%) belongs to arts discipline.

AI Applications in Education

Artificial Intelligence (AI) has emerged as a transformative force in the field of education, revolutionizing traditional learning methodologies and enhancing teaching practices. With advancements in machine learning, natural language processing, and data analytics, AI is reshaping the educational landscape by enabling content design, delivery of content, automated assessments and feedback and support. These applications were given to the respondents and they were asked to rank them. Simple ranking technique has been used and the results were presented in Table2.

Table 2

AI Applications in Education

Applications	Ranks				Total	Rank
	I	II	III	IV		
Content Design	33	62	**97**	48	240	III
Automated Assessment	**126**	57	35	22	**240**	I
Delivery of Content	31	**106**	103	0	**240**	II
Feed Back & Support	50	15	5	**170**	**240**	IV
Total	**240**	**240**	**240**	**240**		

Source: Primary data

From the table 2 it was inferred that the application ‘Automated Assessment’ gets the first rank and the application ‘Delivery of Content’ secures the second rank, the application ‘Content Design’ gets the third rank and the application ‘Feed Back & Support’ gets the fourth rank.

Usage of AI Tools in Education

There are seven AI-powered tools that will help the educators with personalized learning that enables them to become more efficient and save time that can then be spent with students. They are AudioPen, Canva Magic Write, Curipod, Eduaide.Ai, OpenAI, Quizizz and Slidesgo. These tools

were given to the respondents and they were asked to state their usage about these tools and presented in table 3.

Table 3

Usage of AI Tools in Education

AI Tools	Opinion of the Respondents		Percentage to Total
	Used	Not Used	
AudioPen	112(46.67)	128(53.33)	240(100)
Canva Magic Write	188(78.33)	52(21.67)	240(100)
Curipod	83(34.58)	157(65.42)	240(100)
Eduaide.Ai	72(30)	168(70)	240(100)
OpenAI	215(89.58)	25(10.42)	240(100)
Quizizz	178(74.17)	62(25.83)	240(100)
Slidesgo	195(81.25)	45(18.75)	240(100)

Source: Primary data

Figures in Parenthesis denote percentage to horizontal total

Out of 240 respondents, 215(89.58%) use the “Open AI” tool for their teaching and 157(65.42%) did not use “Curipod” tool for their teaching purpose.

Benefits of Using AI in Education

Artificial intelligence is transforming various sectors and education is no exception. The integration of AI in education has fetched about significant changes that enhance learning experiences, streamline administrative tasks and support both students and educators in various ways. They are Personalised learning, increased efficiency, improved student engagement, accessibility and inclusivity, time and resource efficiency and continuous professional development. Likert’s three point scaling technique has been used to quantify the opinion of the respondents about the benefits of using AI in education and presented in table4.

Table 4

Benefits of using AI in Education

Benefits	Opinion			Percentage to Horizontal total
	Agree	Disagree	Neutral	
Personalised learning	146 (60.83)	9 (3.75)	85 (35.42)	240 (100)

Increased efficiency	21 (8.75)	63 (26.25)	156 (65)	240 (100)
Improved student engagement	123 (51.25)	15 (6.25)	102 (42.5)	240 (100)
Accessibility and inclusivity	82 (34.17)	112 (46.67)	46 (19.71)	240 (100)
Time and resource efficiency	133 (55.42)	52 (21.67)	55 (22.91)	240 (100)
Continuous professional development	162 (67.5)	21 (8.75)	57 (23.75)	240 (100)

Source: Primary data

Figures in Parenthesis denote percentage to horizontal total

Table 4 showed that out of 240 respondents, 146(60.83%) strongly agree that 'personalised learning' is the benefit of using AI tool in teaching; 112 (46.67%) disagree that 'Accessibility and inclusivity' is the benefit of using AI tool in teaching and 102(42.5%) respondents opined that the benefit 'Improved student engagement' is neutral.

Challenges Faced by Educators while adopting AI Tools in Education

With the incredible advantages of AI in education also bring various challenges and ethical considerations. In traditional education, student privacy and security were never a cause for concern or discussion. But with the increasing use of digital learning platforms, data privacy and ethical use of artificial intelligence is the need of the hour. The challenges faced includes privacy and security concern, lack of trust, cost of AI tools and applications, need for technical expertise and resistance to change. These challenges were given to the respondents and they were asked to rank the challenges faced by them while adopting AI tools in education. Weighted ranking technique has been applied. On the basis of the mean score ranks have been found out. The results have been tabulated in Table 5.

Table 5

Challenges Faced by Educators while adopting AI Tools in Education

Challenges	Ranks					Total Score	Mean Score	Rank
	I	II	III	IV	V			
Lack of trust	32 (160)	64 (256)	40 (120)	44 (88)	60 (60)	684	2.85	IV

Resistance to change	88 (440)	44 (176)	60 (180)	28 (56)	20 (20)	872	3.63	I
Cost of AI tools and applications	52 (260)	60 (240)	72 (216)	20 (40)	36 (36)	792	3.30	III
Need for technical expertise	68 (340)	48 (192)	36 (108)	56 (132)	32 (32)	804	3.35	II
Privacy and security concern	20 (100)	48 (192)	72 (216)	16 (32)	84 (84)	624	2.60	V

Source: Primary data

Figures in Parenthesis denote points

It is inferred from Table 5 that the main challenge faced by the respondents are 'Resistance to change'. This challenge secures the first rank with the mean score of 3.63points. The challenge 'Need for technical expertise' gets the second rank with the mean score of 3.35 points. The challenge 'Cost of AI tools and applications' gets the third rank with the mean score of 3.30points. 'Lack of trust' and 'Privacy and security concern' secures fourth and fifth rank respectively.

Suggestions

In order to overcome the challenges faced by the respondents, in the light of inferences of the study, the following suggestions are to be made for the effective use of AI in education.

- Both students and teachers should be educated on their data privacy rights and the best security practices. This helps them to make informed decisions while using any AI-powered education platform and avoid falling victim to potential hazards.
- Awareness programmes should be conducted to educate students and teachers on the benefits of AI in education as well as dispel misconceptions about the usage of AI.
- Institutions should implement frameworks and guidelines to ensure transparency in the development and deployment of AI to address ethical concerns.
- Teachers should play the role of motivators and mentors to the students as AI-powered education systems may assist in assessment, real-time feedback, and tutoring.

Conclusion

As AI automates routine processes, teachers can focus on creating an engaging and supportive atmosphere for students. This way, AI in education will continue to improve, not

substitute, human elements. While AI becomes more skilful at automating administrative duties and performing data analysis, teachers can select direct student interactions and attend to their individual needs. In the land of education, AI will play a vital role in humanizing the learning experience. Educators must be prepared for human-centric AI education. AI in education is not intended to replace teachers. Consider it a trusted sidekick that can assist learners achieve their full potential.

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Future of Modern Banking- Shaped by Artificial Intelligence

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Introduction

Banking Sector is one of the robust pillar of any economy. The growth of economy mainly depends upon banks and other financial institution. Even though the banking industry has a lengthy history, it is increasingly embracing new technology and is one of the main adopters of contemporary scientific methods and instruments. The banking industry is now more customer-focused and technologically relevant thanks to the introduction of AI in banking apps and services. By boosting productivity and making decisions based on information that is incomprehensible to a human, AI-based systems are now assisting banks in cutting expenses. In just a few seconds, intelligent algorithms can identify false information. The potential advantages of AI in banking are recognised by about 80% of banks. Artificial intelligence is quickly gaining traction in the banking and financial industry, opening the door to increased production, lower costs, and better efficiency.

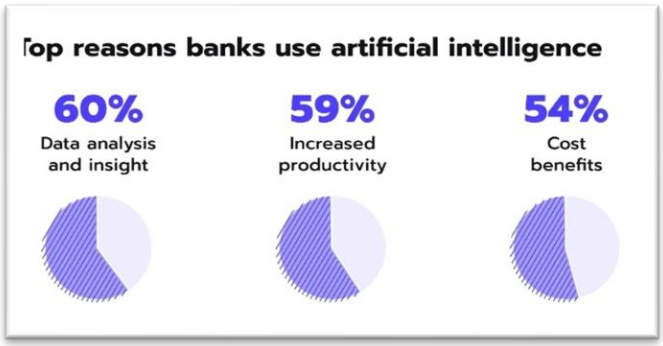
Reasons for adoption of Artificial Intelligence in Banking Sector

Artificial intelligence in the banking industry: This section primarily focusses on the effects of AI applications in the banking industry. The application of artificial intelligence in the banking industry has both benefits and drawbacks. One of the most robust economic cornerstones is the banking industry. It is regarded as essential to economic growth. The banking industry has a long history of lending money and taking deposits, but in the present day, customers have higher expectations of banks. Traditional banks are always up against tech-savvy competitors and are embracing cutting-edge technologies like artificial intelligence.

The banking industry's intense competitiveness is one of the factors driving the adoption of AI in this area.

1. Immense competition in banking sector
2. To increase the effectiveness of operations.
3. To reduce the fraud risk.
4. To use software robotics to supplement human labour.

5. To handle large volume of data in very small space.
6. To visualize extension of human function with the use of robotics tools.
7. To increase operational efficiency



Technologies Driving Banking Automation

- **Robotic Process Automation (RPA)**

Without requiring human involvement, RPA enables banks to automate tasks like data entry, transaction processing, and report preparation. Significant cost savings, fewer mistakes, and improved operational efficiency result from this. RPA is used by banks to automate back-office tasks like customer onboarding, compliance checks, and reconciliation.

- **Machine Learning (ML)**

Large datasets are analysed by ML models to find trends, forecast consumer behaviour, and spot dangers like fraudulent transactions. ML helps banks make better decisions more quickly and correctly in areas like fraud detection, credit scoring, and predictive analytics.

- **Artificial Intelligence (AI)**

Chatbots and virtual assistants, two AI-powered solutions, may respond to customer care enquiries 24/7, offering prompt assistance and tailored answers. AI is capable of reliably identifying possible fraud or compliance issues in risk management by analysing large volumes of transaction data.

AI is Reshaping Workflows in Banking

By automating crucial tasks in the front, middle, and back offices, artificial intelligence (AI) is transforming the banking industry. AI gives banks the means to improve the total customer experience in a time of rising competition, complicated regulatory requirements, and elevated

customer expectations. With this tiered approach, AI is guaranteed to have an impact on all facets of banking, promoting accuracy, efficiency, and innovation in all areas.

Tier 1: Front Office (Customer Facing Services)

Enhancing Customer Service with AI

By automating repetitive tasks, chatbots and virtual assistants driven by AI are transforming customer service. These AI systems are capable of a wide range of functions, including processing basic transactions, responding to often requested questions, and even offering tailored financial advice. McKinsey claims that automation can save bank operating expenses by as much as 30%, especially in areas like compliance, customer experience, and transaction processing.

Personalized Banking Experiences

Banks that take a customer-centric strategy use technology and data to provide individualised services based on the preferences of each individual consumer. Banks may provide tailored product suggestions, pertinent financial advice, and targeted offers by using AI and data analytics to examine consumer behaviour, spending trends, and financial objectives.

Tier 2: Middle Office Operations (Risk and Compliance Management)

Improving Risk Management and Fraud Detection

Large datasets may be analysed by machine learning algorithms, which can then spot suspect transaction patterns and warn them right away. ML has helped banks like Citibank reduce phishing attacks by 70%. AI enables banks to react quickly and minimise possible losses by identifying abnormalities in transaction histories or flagging odd spending habits.

Regulatory Compliance

By automating intricate procedures, increasing accuracy, and making sure banks follow the constantly changing regulatory environment, artificial intelligence (AI) is revolutionising banking regulatory compliance.

1. **Anti-Money Laundering (AML) and Fraud Detection**: AI improves fraud detection and lowers false positives by using machine learning to identify questionable transactions in real time.

2. **Know Your Customer (KYC) Compliance**: AI streamlines KYC procedures and guarantees continuous monitoring by automating risk assessment, document extraction, and customer identity verification.

3. Data Privacy and Protection: By automating data classification, encryption, and access monitoring, artificial intelligence (AI) assists banks in adhering to data privacy laws (such as the CCPA and GDPR).

4. Regulatory Reporting and Audit Trails: AI reduces errors and delays by automating regulatory reporting and guaranteeing adherence to documentation requirements.

5. Monitoring Regulatory Changes: AI regularly follows changes in financial rules, alerting banks to new needs and enabling them to stay compliant

Tier 3: Back Office Operations

Automating Back-office Operations and Decision Making

AI is simplifying back-office processes and increasing efficiency in loan underwriting, credit scoring, and compliance monitoring in addition to customer-facing tasks. Artificial intelligence (AI) systems can automatically check transactions for regulatory compliance, highlighting any problems that require attention.

AI in Transaction Reconciliation

By rapidly comparing financial information from several systems, detecting inconsistencies, and resolving them with little assistance from humans, artificial intelligence (AI) automates transaction reconciliation. Algorithms for machine learning examine transaction data, identify trends, and highlight irregularities.

Loan Processing

The technology has shortened the time needed to accept or reject loans, expedited document verification, and accelerated decision-making. Using AI-powered algorithms, several banks have reported cutting loan processing times to as little as 30 to 60 seconds.

Artificial Intelligence used by Indian Banking

The whole banking industry in the twenty-first century was impacted by artificial intelligence, which caused a significant digital disruption. It can assist financial institutions in innovating and making better-informed decisions to address issues. While some of India's leading banks have implemented artificial intelligence, City Union Bank introduced the first financial robot, called "Laxmi."

SBI – The SBI intelligent assistant and smart chat assistant can process 1000 enquiries per second in order to provide efficient services.

HDFC – HDFC Bank employs a chatbot named "Eva" that can resolve millions of customer issues and provide customers with improved service.

ICICI – ICICI Bank, has implemented robotics and software in 200 business processes across a wide range of firm functions. Every day, around 2 million transactions are handled by robotics.

Bank of Baroda – Digital labs and AI robots are used by Bank of Baroda, a prominent public sector bank. Additionally, it features a chatbot, and as of 2018, it has an analytics centre of excellence.

Andhra Bank – The bank operates a large number of satellite offices across the nation. It has an AI assistant to efficiently and promptly respond to consumer enquiries. Core financial servers were also linked with this AI.

Kotak Mahindra Bank – The bank will supplement the conventional interactive voice response with its smart AI chatbot, billing voice bot, and banking helpline.

Future of Banking: Shaped by AI

The future of banking, assisted by AI, promises a landscape in which technology breakthroughs coexist alongside customer-centered methods. As AI advances, we may expect to see even more inventive applications that improve the efficiency, security and personalization of banking services. AI can improve proactive banking while properly controlling risks. Consider new account applications, where AI can help clients gather information, automate chores, and streamline procedures. Numerous banks are using AI's many facets to provide highly customised experiences that anticipate and responsibly address client requirements.

The goal of banking and financial institutions is to expedite the loan underwriting process and more accurately assess a credit applicant's capacity and willingness to repay. AI has the potential to responsibly increase loan availability by assisting lenders in better understanding applicants, especially those with little or no credit history or credit ratings. There must be better ways to make more thorough or educated credit decisions using a lot more processing power.

AI may be able to identify warning signs of fraud, particularly in the context of payments. "In the payments industry, fraud is a major issue. Where may artificial intelligence assist in reducing fraudulent transactions and behaviour? From the front end to the back end, there are numerous chances. Many individuals anticipate that AI will significantly advance this.AI manages time

consuming, repetitive and routine tasks. This is also a cost saving step in a business's transition in scaling up operations and streamlining human resource deployment.

Conclusion

AI is a revolutionary force that is reshaping the banking industry's future, not just a tool for increasing productivity. AI-driven automation gives banks the information and agility they need to stay ahead of the competition as they deal with tightening regulations, changing client expectations, and growing competition. However, careful implementation is necessary for successful AI integration, addressing issues including bias, data quality, and regulatory compliance. Banks need to concentrate on creating strong AI frameworks that put security, equity, and transparency first while encouraging a culture of ongoing innovation. Leveraging AI's ability to streamline procedures, provide individualised experiences, and maintain competitiveness in a constantly shifting financial environment is key to the future of banking. Banks that adopt this change now will be more capable of taking the lead in the future.

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A study on Influence of Parasocial Interaction and Emotional Motivation in Gen Alpha's Impulse Buying Behavior on Live - Streaming Interactive Shopping Platforms

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Abstract

This study explores the influence of parasocial interaction and emotional motivation on impulse buying behavior among Generation Alpha (Gen Alpha) within the context of live-streaming interactive shopping platforms. As digital natives, Gen Alpha engages with live-streaming platforms, where influencers foster one-sided relationships, and real-time emotional stimuli drive impulsive purchasing decisions. The research aims to examine the extent to which PSI, fueled by perceived personal connection with influencers, influences Gen Alpha's susceptibility to impulse buying. Additionally, it investigates the role of emotional motivation such as excitement, urgency, and fear of missing out in enhancing impulse purchases during live-streamed shopping events. By employing a combination of surveys, behavioral data analysis, and qualitative interviews, the study identifies key psychological factors that impact purchasing decisions. Preliminary findings suggest that both parasocial relationships and emotional triggers significantly contribute to Gen Alpha's impulsive buying behavior, with a synergistic effect observed when both elements are present. The study provides valuable insights for marketers and platform developers aiming to engage Gen Alpha through tailored emotional and social engagement strategies in live-stream shopping environments.

Keywords: *Psychological factors, Purchasing decisions, Impulse Buying Behavior, Interactive Shopping Platforms*

Introduction

In recent years, the integration of live-streaming, social media, and e-commerce has fundamentally altered the manner in which consumers interact with brands and conduct their purchases. A key demographic propelling this change is Generation Alpha (Gen Alpha), consisting of individuals born from 2010 onwards. As true digital natives, Gen Alpha has been surrounded by technology since birth, experiencing continuous engagement with interactive content and fluid digital environments. The shopping behaviours of this generation are shaped by a blend of cutting-edge technology, social media dynamics, and the influence of online personalities, rendering them particularly receptive to innovative, interactive, and real-time shopping experiences.

Live-streaming interactive shopping platforms have transformed the landscape of online retail. Services such as Instagram Live and YouTube Live integrate live video presentations with instant product showcases and direct consumer engagement. In contrast to traditional online shopping, where customers typically browse and make purchases without interaction, live-streaming shopping platforms create a vibrant and interactive atmosphere. This enables viewers to engage with hosts, influencers, and brands in real time. The immediacy of these interactions, along with tailored engagement, has led to an increase in impulsive purchasing, particularly among younger demographics such as Generation Alpha.

This research aims to investigate how parasocial interactions and emotional motivations influence the impulse buying behaviors of Generation Alpha on live-streaming interactive shopping platforms. By analyzing these psychological factors, the study intends to enhance the understanding of the elements that affect purchasing choices within this highly engaged and technologically adept demographic. The results will provide critical insights for marketers, brands, and content creators striving to refine their strategies for effectively reaching and engaging Gen Alpha consumers in the realm of live-streaming shopping.

Review of Literature

Horton, D., & Wohl, R. R. (1956). *"Mass Communication and Para-Social Interaction: Observations on Intimacy at a Distance. "*This foundational work introduced the concept of parasocial interaction (PSI), describing how viewers form one-sided emotional relationships with media figures. While the study primarily focused on television, its insights have been expanded to include influencers and streamers in the context of modern digital platforms like live-streaming shopping.

Dholakia, U. M. (2000). *"Temptation and Resistance: An Integrated Model of Impulse Buying Behavior. "*This paper examined the psychological and situational factors contributing to impulse buying. He suggested that impulse buying is often driven by emotional arousal, situational factors like time pressure, and consumer mood. Although this study is not specifically about live-streaming, it provides key insights into the emotional drivers that contribute to impulse buying, which can be applied to understanding consumer behavior in live-streaming shopping environments.

Takala, T., Hietanen, J., & Mikkola, A. (2020). *"Influencer Marketing and Parasocial Interactions: How Influencers Affect Consumer Purchase Behavior."* This study explored how parasocial interactions with influencers influence consumer behavior, particularly in the realm of impulse buying and they highlighted that viewers' emotional connections with influencers significantly enhance their likelihood of making spontaneous purchases during live-streamed events, offering relevant insights into how influencers can drive buying behavior on interactive shopping platforms.

Li, H., Daugherty, T., & Biocca, F. (2020). *"Impact of Virtual Experience on Consumer's Impulse Buying Behavior: A Study on Live Streaming E-Commerce."* This study examined the role of immersive virtual experiences in influencing impulse buying behavior, specifically focusing on live-streaming platforms like TikTok and Instagram. The authors concluded that live-streaming, with its real-time interactivity and emotional engagement, creates a strong impulse buying effect, particularly for younger consumers like Gen Z and Gen Alpha, who are drawn to these platforms' combination of entertainment and shopping.

Casaló, L. V., Flavián, C., & Guinalíu, M. (2020). *"The Role of Perceived Influencer Trustworthiness in Building Customer Loyalty: An Investigation of Parasocial Relationships on Social Media."* This paper explored the role of trust in building parasocial relationships and its impact on consumer behavior. The authors found that consumers' trust in influencers, as a result of parasocial interactions, enhances their likelihood to follow purchasing recommendations, which is particularly relevant in live-streaming shopping contexts where viewers may act impulsively based on emotional motivations and the perceived authenticity of influencers.

Objectives of the Study

1. To evaluate the demographic and psychographic factors influencing impulse buying among Gen Alpha.
2. To identify the key features of live-streaming platforms that enhances impulse buying behavior in Gen Alpha.
3. To investigate Gen Alpha's trust in live-stream influencers as a factor in purchasing decisions.

Research Methodology

This study adopts a quantitative research approach to analyze the influence of parasocial interaction and emotional motivation on Gen alpha's impulse buying behavior on live-streaming interactive shopping platforms. A simple random technique was used collected the data with 100 sample respondents for the study, a descriptive research design was used to understand patterns, correlations, and consumer behavior trends within the target demographic.

Analysis and Interpretation

Table 1: Gender of Respondents

S. No	Gender	No. of. Respondents	Percentage
1	Male	45	45%
2	Female	55	55%
Total		100	100

The above table represents that, maximum of 55% of respondents are female and 45% of respondents are male, indicating that relatively balanced representation of Gen alpha consumers.

Table 2: Age of Respondents

S. No	Age	No. of. Respondents	Percentage
1	18-22 years	60	60 %
2	23-27 years	40	40%
Total		100	100

The above table represents, maximum of 60% of the respondents are aged 18–22 years**,** 40% of the respondents are aged from 23–27 years**,** showing that younger Gen alpha consumers are more actively engaged in live-stream shopping than those aged 23–27 years.

Table 3: Frequency of Online Shopping

S. No	Particulars	No. of. Respondents	Percentage
1	Daily	20	20%
2	Weekly	40	40%
3	Monthly	30	30%
4	Rarely	10	10%
Total		100	100

The above shows that, Most of the respondents shop weekly (40%), 30% of the respondents shopping monthly, 20% of the respondents shopping daily, and 10% of the respondents shopping rarely through online.

Table 4: Frequency of Watching Live-Stream Events

S. No	Particulars	No. of. Respondents	Percentage
1	Daily	15	15%
2	Weekly	50	50%
3	Monthly	25	25%
4	Never	10	10%
Total		100	100

The above table shows that, maximum of 50% of the respondents are watching live stream events through online.

Table 5: Connection to influencers

S. No	Particulars	No. of. Respondents	Percentage
1	Very strongly	10	10%
2	Somewhat strongly	30	30%
3	Neutral	40	40%
4	Not very strongly	15	15%
5	Not at all	5	5%
Total		100	100

The results indicate that a significant portion of respondents feels somewhat or neutral about their connection with influencers (40%). This shows that, while parasocial interaction is present, it may not be very strong for everyone.

Table 6: Trust in product recommendations

S. No	Particulars	No. of. Respondents	Percentage
1	Strongly agree	15	15%
2	Agree	40	40%
3	Neutral	30	30%
4	Disagree	10	10%
5	Strongly disagree	5	5%
Total		100	100

The above results that, Trust in influencer product recommendations was moderate, with 55% agreeing to some extent, showing the importance of influencers in driving purchasing decisions but not as an absolute factor.

Table 7: Excitement Encouraging purchases

S. No	Particulars	No. of. Respondents	Percentage
1	Always	10	10%
2	Sometimes	50	50%
3	Rarely	30	30%
4	Never	10	10%
Total		100	100

The above table shows that, half of the respondents (50%) felt some excitement when influencers interact with them, suggesting that emotional engagement during live-streaming events has an impact.

Table 8: Influence of Social aspect

S. No	Particulars	No. of. Respondents	Percentage
1	Very influenced	15	15%
2	Somewhat influenced	40	40%
3	Not very influenced	30	30%
4	Not at all influenced	15	15%
Total		100	100

From the above table 60% of respondents stated that excitement and social factors (such as seeing others buy) play a crucial role in making a purchase, showing that live-stream shopping creates a highly emotionally engaging experience.

Table 9: Emotional connection to product

S. No	Particulars	No. of. Respondents	Percentage
1	Very important	30	30%
2	Somewhat important	40	40%
3	Neutral	20	20%
4	Not very important	5	5%
5	Not important at all	5	5%
Total		100	100

From the above table, Emotional connection to the product (30% deeming it very important) is moderately important, reinforcing that the emotional aspects of live-stream shopping drive purchasing decisions.

Table 10: Impulse purchases made

S. No	Particulars	No. of. Respondents	Percentage
1	Yes, multiple times	25	25%
2	Yes, once	30	30%
3	No	45	45%
Total		100	100

From the above table, 55% of respondents reported making an impulse purchase after a live-stream event, confirming that live-stream platforms significantly influence spontaneous buying.

Table 11: Factors contributing to impulse purchase

S. No	Particulars	No. of. Respondents	Percentage
1	Excitement of the event	60	60%
2	Influence of the host	45	45%
3	Limited-time offer/discount	70	70%
4	Social proof	50	50%
5	Product demonstration/review	40	40%
Total		100	100

Factors like excitement (60%) and discounts (70%) were the most common motivators for impulse purchases. Social proof (seeing others buy) also contributed significantly (50%).

Table 12: Spontaneity of impulse purchases

S. No	Particulars	No. of. Respondents	Percentage
1	Completely spontaneous	50	50%
2	Somewhat spontaneous	40	40%
3	Planned	5	5%
4	Not sure	5	5%
Total		100	100

The above table shows that, 50% of respondents felt their impulse purchases were spontaneous, further supporting the idea of live-stream shopping events triggering spur-of-the-moment buying behavior.

Table 13: Most frequently used platform

S. No	Particulars	No. of. Respondents	Percentage
1	Instagram Live	25	25%
2	Facebook Live	20	20%
3	YouTube Live	35	35%
4	Other	5	5%
Total		100	100

The above table shows that, YouTube Live (35%) was the most commonly used platform, with Instagram Live also being popular (25%)

Table14: Features influencing purchase

S. No	Particulars	No. of. Respondents	Percentage
1	Real-time interaction with host	65	65%
2	Real-time product demonstrations	70	70%
3	Product discounts and promotions	80	80%
4	Ability to ask questions to host	50	50%
5	Other shoppers' comments	40	40%
Total		100	100

The above table represents that, Key features driving purchases include real-time product demonstrations (70%), discounts (80%), and interaction with hosts (65%). These features highlight the interactive nature of live-stream shopping.

Table 15: Sufficient product information

S. No	Particulars	No. of. Respondents	Percentage
1	Yes, definitely	50	50%
2	Yes, somewhat	40	40%
3	No, not really	5	5%
4	No, not at all	5	5%
Total		100	100

The above table represents that, 90% of respondents felt live-stream shopping platforms generally provide enough product information, which supports the importance of information availability in driving confidence for impulse buying.

Conclusion

This study examined the influence of parasocial interaction and emotional motivation on Gen Alpha's impulse buying behavior in the context of live-streaming interactive shopping platforms. The findings suggest that the sense of connection with influencers or hosts (parasocial interaction) significantly drives spontaneous purchase decisions, reinforcing the persuasive power of social commerce. Additionally, emotional motivation, particularly excitement, trust, and the fear of missing out, plays a crucial role in impulsive buying tendencies among Gen Alpha's consumers. The study highlights the growing impact of interactive digital environments on purchasing behaviors, emphasizing the need for brands to leverage authentic influencer engagement and emotionally driven marketing strategies. Future research could explore the long-term effects of parasocial relationships on consumer loyalty and the ethical concerns surrounding impulse-driven shopping behavior in digital spaces.

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Impact of AI on Higher Education

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Abstract

Artificial Intelligence (AI) is transforming higher education by enhancing learning experiences, improving administrative processes, and reshaping student engagement. This paper explores the various ways AI is being integrated into universities and colleges, its benefits, challenges, and future implications. The study examines AI-driven personalized learning, automated grading, virtual assistants, and predictive analytics, along with ethical concerns such as data privacy and bias. Findings suggest that while AI offers significant advancements, it also presents challenges that require careful consideration.

Keywords: *Artificial Intelligence, Higher Education, Personalized Learning, Student Engagement, Educational Technology*

Introduction

Artificial Intelligence (AI) has developed into a crucial strength in transforming different industries, and higher education is no exception. As institutions strive to adapt to the rapidly evolving digital landscape, AI presents new opportunities for enhancing educational experiences, improving operational efficiency, and supporting innovation in teaching and learning. At its core, AI involves the development of algorithms and systems capable of performing tasks that typically require human intelligence, such as problem-solving, decision-making, and language processing.

In the context of higher education, AI has the potential to revolutionize several aspects of academia, from personalized learning and smart assessment tools to administrative automation and virtual assistants. For students, AI-driven systems can tailor educational content to individual needs, providing adaptive learning pathways that cater to diverse learning styles and paces. For educators, AI can assist in grading, feedback, and classroom management, allowing more time for meaningful interaction with students.

Moreover, AI can support administrative tasks such as student admissions, scheduling, and resource allocation, streamlining operations within universities and colleges. With the power to analyze vast amounts of data, AI can also provide valuable insights into student performance, retention rates, and institutional effectiveness, enabling data-driven decision-making for educational institutions.

However, the integration of AI in higher education also raises important ethical considerations, such as issues of privacy, bias, and the potential for exacerbating inequalities in access to advanced technologies. As AI continues to evolve, it is essential for universities and policymakers to ensure that its adoption aligns with ethical standards, promoting fairness, transparency, and inclusivity.

This introduction outlines the growing influence of AI in higher education and highlights the opportunities and challenges that accompany its implementation. As the technology progresses, AI's role in shaping the future of education is poised to grow, offering the potential for more effective and inclusive educational experiences globally.

The integration of Artificial Intelligence (AI) into higher education is reshaping how institutions, educators, and students approach learning and teaching. AI technologies, such as machine learning, natural language processing, and predictive analytics, are being increasingly applied to personalize learning experiences, streamline administrative tasks, and enhance student engagement.

Purpose of the Study

The purpose of the study **"Impact of AI in Higher Education"** is to explore how artificial intelligence (AI) is transforming teaching, learning, and administration in universities and colleges. The study may focus on:

1. **Enhancing Learning & Teaching** – Examining how AI-powered tools (e.g., chatbots, adaptive learning platforms) improve student engagement, personalize learning, and assist educators.
2. **Administrative Efficiency** – Evaluating AI's role in automating tasks like admissions, grading, and student support services.
3. **Student Performance & Engagement** – Analyzing how AI helps in tracking progress, providing feedback, and improving academic outcomes.
4. **Ethical & Privacy Concerns** – Investigating challenges related to data privacy, bias, and fairness in AI-driven education.
5. **Future Implications** – Predicting how AI will shape the future of higher education, including new teaching models and the role of educators.

Impact of AI in Higher Education

The impact of Artificial Intelligence (AI) in higher education is multifaceted, offering both opportunities and challenges. Below are the primary areas where AI is making a significant impact:

Personalized Learning

AI allows for the customization of learning experiences, providing students with tailored content based on their strengths, weaknesses, and learning preferences. Through adaptive learning systems, AI can adjust the pace and complexity of lessons, allowing for a more individualized educational experience. This personalization helps improve learning outcomes and supports students who may need additional help or accelerated pathways.

Enhanced Teaching and Learning

AI-powered tools can assist educators by automating routine tasks such as grading assignments, giving feedback, and creating learning materials. These tools provide instructors with more time to focus on interactive and engaging teaching. Additionally, AI can recommend teaching strategies, learning resources, and even identify gaps in students' knowledge, enabling more effective lesson plans.

Smart Assessment Tools

AI can improve assessment practices by automating the grading of assignments, quizzes, and exams, offering faster and more objective evaluations. It can also support formative assessments that track student progress in real time, helping instructors make adjustments to instruction. AI-based systems can also use data analytics to predict student performance, providing early warnings about potential academic struggles.

Student Support and Engagement

AI-driven virtual assistants and chatbots are becoming popular tools for providing students with round-the-clock support, answering questions, and guiding them through academic processes such as course registration or research assistance. These AI systems help reduce the administrative burden on faculty and staff, enabling more efficient communication and student engagement.

Administrative Efficiency

AI can streamline various administrative processes, such as admissions, scheduling, and resource allocation. By automating repetitive tasks, AI allows universities to operate more efficiently and focus their resources on strategic initiatives. AI can also be used for predictive analytics, helping institutions anticipate trends and make data-driven decisions regarding student enrollment, faculty requirements, and infrastructure needs.

Improved Research Capabilities

AI tools are revolutionizing research by enhancing data analysis, literature reviews, and simulations. Machine learning algorithms can analyze large datasets, uncover patterns, and generate insights faster than traditional methods. This allows researchers to focus on more complex aspects of their work, fostering innovation and accelerating academic discovery.

Ethical and Bias Concerns

While AI has the potential to improve education, it also introduces ethical challenges. One of the primary concerns is the risk of algorithmic bias, where AI systems may inadvertently reinforce existing stereotypes or inequalities. For instance, an AI algorithm used in admissions or grading might perpetuate biases based on gender, race, or socioeconomic status. Addressing these issues requires careful design, transparency, and monitoring of AI systems to ensure fairness and inclusivity.

Job Displacement and Changing Roles

The integration of AI may change the roles of educators and administrative staff. While some tasks can be automated, it's essential to recognize that AI cannot fully replace human teachers, who offer emotional intelligence, mentorship, and complex problem-solving. However, there may be concerns about job displacement in certain areas, especially in administrative functions. Universities must balance automation with human interaction to ensure that AI complements rather than replaces the role of educators and staff.

Access and Equity

AI has the potential to increase access to education, especially in remote or underserved areas. With AI-driven online learning platforms and personalized learning tools, students can gain access to high-quality educational resources from anywhere in the world. However, there is a risk of exacerbating the digital divide, as access to AI-powered technologies may be limited by socioeconomic factors, creating disparities in educational opportunities.

Future Workforce Development

AI's impact on higher education also extends to preparing students for the workforce. As AI continues to evolve, universities will need to incorporate more AI-related courses and training programs to equip students with the skills necessary for jobs in emerging fields. This includes teaching students how to work alongside AI systems and developing critical thinking, problem-solving, and creativity—skills that AI cannot easily replicate.

Benefits of AI in Higher Education

- **Improved Learning Experience:** AI enhances student engagement through adaptive learning technologies.
- **Operational Efficiency:** Automating administrative tasks allows faculty to focus more on teaching and research.
- **Enhanced Accessibility:** AI tools support students with disabilities by offering speech-to-text, text-to-speech, and translation services.
- **Data-Driven Decision Making:** Institutions can use AI-generated insights to optimize curriculum design and student support.

Challenges and Ethical Considerations

Data Privacy and Security

AI systems collect vast amounts of student data, raising concerns about privacy, data breaches, and unauthorized access.

Algorithmic Bias and Fairness

Bias in AI algorithms can lead to unfair grading, discrimination, or unequal access to educational resources. Transparency and fairness in AI models are crucial for ethical AI deployment.

Dependence on Technology

Over-reliance on AI may reduce critical thinking and problem-solving skills among students. The role of educators remains essential to balance AI with human interaction.

Cost and Implementation Challenges

Deploying AI infrastructure requires significant investment, and not all institutions have the resources to integrate AI effectively.

Negative Implications

Ethical Concerns and Bias:

AI systems are susceptible to biases present in training data, which can lead to unfair assessments and discriminatory outcomes. Bias in algorithms may affect admissions processes, grading, and recommendations, disadvantaging certain student groups.

Data Privacy and Security:

The collection and analysis of vast amounts of student data raise concerns about privacy and security. Without robust data protection measures, sensitive information may be misused or accessed by unauthorized entities.

Dependence on Technology:

Over-reliance on AI-driven solutions may reduce critical thinking and problem-solving skills among students. Additionally, the potential loss of human interaction in learning environments could impact the development of soft skills and collaborative abilities.

Future Implications of AI in Higher Education

As AI continues to evolve, future developments may include:

- **AI-driven adaptive curricula** that evolve based on student performance.
- **Augmented reality (AR) and virtual reality (VR)** integrated with AI for immersive learning experiences.
- **Enhanced AI ethics regulations** ensuring responsible AI usage in education.

Conclusion

AI's impact on higher education is profound and transformative. It has the potential to enhance learning, streamline administrative tasks, and foster innovation in research. However, its integration must be approached with caution, ensuring that ethical issues such as fairness, accessibility, and job displacement are carefully considered. As AI continues to develop, it is essential for institutions to navigate its implementation responsibly, ensuring that its benefits are maximized while its challenges are addressed.

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Transforming Education with Artificial Intelligence in Smart Classrooms

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Abstract

Technological innovations play a crucial role in enhancing and transforming educational methodologies. The National Education Policy (NEP) 2020 underscores the immense potential of artificial intelligence (AI) in redefining workplace structures and increasing the necessity for professionals who are adept in mathematics, computer science, data science, and possess multidisciplinary expertise. Integrating AI into the education sector has the capacity to revolutionize instructional strategies by cultivating a digitally advanced environment that encourages engagement, adaptability, and tailored learning experiences. AI-based tools are essential in meeting the diverse educational needs of learners, enabling educators to design personalized and inclusive learning pathways that enhance academic outcomes. This research paper investigates how artificial intelligence is influencing education through the development and adoption of smart classrooms.

Keywords: *Artificial Intelligence, Education, Smart Classrooms*

Introduction

Artificial intelligence (AI) in the field of education involves the use of computer technologies that can perform functions traditionally associated with human intelligence. These applications enhance the learning experience, simplify administrative duties, and offer support to educators. Technologies such as machine learning, natural language processing, and robotics allow for personalized learning by adapting educational content and pace to suit each student's individual needs. This customization ensures that diverse learning preferences and speeds are accommodated, providing every student with the appropriate support and resources to succeed.

In addition to personalizing learning, AI helps streamline administrative tasks for teachers. By automating routine and repetitive responsibilities, educators are able to invest more time in direct teaching and student interaction. AI tools also generate detailed insights into student performance, helping identify those who require additional support as well as those who excel. This data-driven approach enhances decision-making and ensures targeted interventions and recognition where appropriate.

Furthermore, AI fosters the use of innovative teaching approaches and promotes the development of dynamic, interactive classroom environments. With ongoing advancements in AI technology, its role in making education more adaptable, effective, and student-centered is becoming increasingly significant.

AI in Education

India has been working to encourage AI in education for several years. The "AI for All" strategy was launched in 2018, focusing on education, smart cities, smart infrastructure, and agriculture (NITI Aayog, 2018). The following year, the Central Board of Secondary Education (CBSE) presented the AI Integration for School Curriculum to create interactive, individualised learning experiences through smart classrooms and digital content. Although India has taken various stages in recent years to integrate AI in school education, with both private and public institutions increasingly adopting AI technologies, government school educators often have limited access to these advancements due to lack of training, resource constraints, time-bound curriculum, and lack of professional development opportunities.

To address these challenges, clause 4.24 of NEP 2020 recommends that curriculum should include subjects such as AI at relevant stages in education. It also recommends various steps for continuous professional development of teachers.

Objectives of the Study

This study aims to:

- Evaluate the role of artificial intelligence in transforming the education
- Analyze the future of AI on education
- Identify the advantages of implementing AI in education

Research Methodology

- **Research Design** - The research design serves as a comprehensive framework for conducting the study. A fundamental research design has been employed in this investigation.
- **Data and Data Sources** - This study relies on secondary data gathered from online journals and various websites.

Benefits of AI in Education

A primary advantage of incorporating AI in the classroom is its ability to customize lessons for individual students. Traditional teaching methods often leave some learners feeling overlooked or disengaged. Here's where AI shines, offering a novel and innovative approach! So, what does AI technology mean for education, and how do institutions benefit from it? At its core, AI technologies are designed to meet the unique needs of each student. They consider factors such as interests, learning pace, and strengths, delivering a personalized experience. These platforms dynamically adjust difficulty, pace, and content to align perfectly with each student's requirements, keeping them engaged and aiding information retention. Below, we outline some of the most significant benefits AI brings to the education sector.

Personalized Learning

AI elevates personalization in education by offering tailored tutoring and learning platforms that analyze each student's individual learning needs and pace. This allows for customized educational content, activities, and exercises that cater specifically to them. For instance, a student struggling with math concepts can receive additional practice problems in those areas, while another who grasps them quickly can advance to more challenging topics.

Enhanced Accessibility and Inclusivity

AI-powered technologies eliminate distance and physical barriers in education. Through virtual tutors, interactive course materials, and language translation tools, students in remote areas or those with physical limitations gain access to quality educational resources. This collective effort fosters a classroom environment where every student can thrive.

Adaptive Assessment and Feedback

Generative AI enhances the assessment of each student's progress through tests, tasks, and even analyzing facial expressions or posture. This facilitates immediate feedback, identifying areas where students need additional support and equipping them with tools to improve their understanding. This comprehensive approach not only boosts academic performance but also nurtures students' overall well-being and confidence in their educational journey.

Automated Administrative Tasks

In addition to providing hyper-personalized and engaging lessons, AI streamlines various administrative tasks. It can efficiently manage student data, schedule classes, and grade multiple-choice exams. As a result, teachers can focus more on what truly matters—creating engaging lessons, fostering meaningful relationships with their students, and providing valuable feedback.

Improved Student Engagement

When students struggle to process information, AI offers fresh study methods, such as gamification, interactive simulations, and custom learning plans aimed at higher education. Utilizing tools like interactive classrooms and hyper-realistic platforms, students can engage with each other in enjoyable ways, making learning more enjoyable and encouraging exploration of new concepts.

Data-Driven Decision Making

Finally, AI excels at analyzing vast amounts of student exam scores, learning trends, and potential curriculum adjustments. This capability equips school leaders and educators with the insights necessary to make data-driven decisions that enhance the effectiveness of education.

AI - Transforming the Education Sector

As previously mentioned, traditional classrooms are rapidly becoming a thing of the past! A new era characterized by customized instruction, intelligent supplemental tools, and easily accessible materials is emerging in the education landscape, thanks to the swift advancements in artificial intelligence (AI). With its capability to personalize information and provide round-the-clock learning support, AI is reshaping how we educate and train students. Here are 10 ways AI is revolutionizing the education sector:

Virtual Teachers and Tutors

AI-powered virtual educators and tutors analyze student performance data and learning styles to determine their needs and preferred learning methods. Similar to human teachers, they explain concepts, address questions, provide feedback, and guide students through educational materials. The availability of virtual educators around the clock allows students to learn at their own pace and on their own schedule. Additionally, they help bridge pedagogical gaps in certain subjects or regions, ensuring quality education is accessible globally.

Intelligent Content Creation and Delivery

AI sifts through vast amounts of educational material to deliver exactly what each student requires. This includes adaptive quizzes and interactive multimedia resources. The technology keeps learners engaged by adjusting difficulty levels based on their performance, acting like a personalized learning coach that recommends activities and resources tailored to individual learning styles and past performance.

Customized Learning Paths

Education is undergoing a personalized transformation! Adaptive learning platforms utilize AI to assess student data in real time, adjusting content, difficulty, and pacing as needed. This tailored approach provides each student with a unique learning experience that aligns with their preferences and needs. Mastery-based learning complements this by allowing students to progress at their own pace, ensuring they fully grasp each concept before advancing, resulting in a deeper understanding and a lasting love for learning.

Smart Classroom Management

The integration of smart boards, attendance tracking systems, and classroom management software simplifies administrative tasks, enhances communication, and optimizes classroom organization. Communication platforms and learning management systems promote smooth interactions among students, educators, and parents, facilitating quick feedback and collaborative efforts. Additionally, Internet-of-Things (IoT) devices like smart boards and environmental sensors contribute to greater classroom efficiency and heightened student engagement.

Predictive Analytics for Student Success

One of the most valuable aspects of teaching is the ability to anticipate student behavior and identify factors that lead to their success. AI helps pinpoint at-risk students through early warning systems, enabling educators to take proactive measures and provide targeted support. Continuous data analysis yields insights into elements that influence student outcomes, guiding institutional policies and resource allocation.

Automated Grading and Feedback

Automated grading and feedback systems solve the issue of time-consuming assessment tasks. AI-powered grading offers quick feedback to educators, allowing them to spend more time on

personalized interactions with students. Additionally, automated feedback highlights strengths and areas for improvement, promoting student growth and comprehension.

AI-Powered Language Learning

Personalized language learning becomes dynamic and immersive through Natural Language Processing (NLP). By analyzing language patterns and individual learning goals, NLP creates tailored learning paths that adjust to students' proficiency levels, offering an effective approach to language acquisition. Interactive exercises adapted to individual needs foster deeper understanding and fluency in the target language.

Virtual Reality (VR) and Augmented Reality (AR) Learning Experiences

Simulation-based learning and interactive virtual environments enable students to engage in stimulating educational experiences that enhance comprehension. VR and AR technologies allow for dynamic exploration of abstract concepts, facilitating remote collaboration and providing real-world opportunities to deepen understanding across various subjects.

Personalized Student Support Systems

Virtual assistants and AI-powered chatbots ensure that students can seek help anytime, whether for emotional or academic concerns. Tailored counseling interventions are based on student data, fostering a supportive environment that promotes well-being and academic success. This comprehensive support helps students navigate challenges and thrive emotionally and academically.

AI-Enabled Research and Collaboration

AI-driven research discovery tools and collaborative workspaces accelerate the research process, allowing access to relevant materials and seamless interaction across disciplines. Predictive analytics can help researchers foresee the potential impact of their work, aiding in resource allocation and enhancing innovation. This holistic approach boosts research productivity while encouraging creativity and the dissemination of knowledge.

Delivering on AI in Education

As we build on the lessons learned, it’s clear that new developments in AI may provide much-needed innovation in education. To make sure that new technologies fulfil their potential to enhance Education 4.0 and lifelong learning, we need to deploy them strategically and safely, taking into account the following factors:

Design for equity

Recognizing AI's potential to exacerbate current education gaps, AI-enabled educational innovations must prioritize equity in their design. That means addressing disparities between genders, public and private schools, as well as catering to children with diverse abilities and learning styles, while removing language and access barriers.

Enhance human-led pedagogy

AI will never replace high-quality, human-led pedagogy. To that end, most examples focus on enhancing human-led teaching by providing the right AI tools that automate clerical tasks and alleviate teachers' time to focus on their craft or by providing relevant training about AI skills that help them better deliver lessons on AI.

Co-design and implement with supporting stakeholders

AI-enabled innovations in education should acknowledge the critical roles played by teachers, parents and educational institutions in adopting this emerging technology. Successful instances of AI integration in education underscore the importance of collaboratively designed educational solutions with input from students, teachers and experts.

This collaborative, multi-stakeholder approach ensures that solutions meet the practical demands of the classroom, align with national curricula, remain abreast of industry trends and implement safeguards to protect student data.

Teaching about AI is equally crucial to teaching with AI

AI tools e.g. those that provide data analytics and gamified learning – have long been part of the educational landscape. While developments in generative AI offer new opportunities to leverage AI tools, it becomes increasingly evident that teaching about AI in schools is vital.

This education should prioritize imparting skills related to AI development and understanding its potential risks. These skills are critical for shaping future talent capable of ethically designing and developing AI tools that benefit economies and societies.

Economic viability and access

Ensuring economic viability and access to AI-learning opportunities for all learners, is essential to prevent deepening the existing digital divide and avoid creating new disparities in

education. The realization of AI promise in education requires substantial investment, not only in the products themselves but also in supporting infrastructure, training and data protection.

Future of AI in Education

The future of artificial intelligence in education looks bright, driven by technological advancements and an improved understanding of how AI can enhance the learning experience. One of the most significant areas is personalized learning, where adaptive and intelligent tutoring systems offer tailored educational experiences. These systems respond to the individual strengths and weaknesses of each student, leading to more effective learning outcomes.

AI is also poised to transform administrative functions in educational settings. Automated grading systems can save educators considerable time, particularly in subjects such as math and coding. Furthermore, AI can optimize processes like enrollment, scheduling, and record management, enabling teachers to concentrate more on instruction. Additionally, AI can increase student engagement through interactive content and gamified learning applications, making education more enjoyable.

AI can assist teachers and promote inclusivity and accessibility. AI-driven professional development tools can provide personalized recommendations for resources and training, supporting ongoing teacher growth. Classroom management solutions can help educators track student engagement, offering valuable feedback. Assistive technologies, such as speech-to-text applications for students with hearing impairments, text-to-speech for those with visual impairments, and real-time translation services, can enhance accessibility for diverse student populations.

Despite the substantial advantages of AI in education, it is essential to tackle ethical concerns and challenges. Ensuring that AI systems are unbiased and offer equitable opportunities for all students is imperative.

Conclusion

Artificial intelligence (AI) is rapidly emerging as a testament to human ingenuity and our relentless quest to create sentient beings. This endeavour marks a scientific renaissance, transforming the development of AI into not only an academic pursuit but also a moral imperative. It is our duty to steer this evolution with caution, ensuring that the benefits of AI are harnessed for the betterment of society.

The field has progressed relentlessly, driven by both formidable challenges and ground breaking discoveries throughout the ages. AI opens the door to a promising future, acting as a catalyst for global prosperity and serving as a guiding light for enlightenment. Our role is to fully harness the extraordinary capabilities of AI.

AI is poised to revolutionize education within the smart classroom environment. Its potential to personalize learning, automate tasks, and provide data-driven insights is significant. However, successful implementation requires addressing the challenges, ethical considerations, and ensuring adequate teacher training and support. By embracing AI responsibly and focusing on student-cantered learning, educators can harness its transformative power to create a more engaging, effective, and equitable learning environment for all students. The future of education is inextricably linked to the intelligent application of AI. Further research is crucial to explore and refine the responsible and effective integration of AI in smart classrooms to ensure its potential is fully realized.

The outlook for artificial intelligence in education is promising, offering the potential to reshape teaching and learning processes within higher education institutions. AI is capable of not only transforming education but also many other sectors, fundamentally changing our interactions with technology. By enhancing the accuracy and efficiency of tasks, AI can significantly reduce the likelihood of human error.

Nonetheless, responsible AI development requires attention to ethical issues and the establishment of accountability and trust. It's crucial for AI systems to incorporate human oversight and control. Addressing both the ethical and practical challenges posed by AI is essential to ensuring that its advantages are accessible to all participants in the educational ecosystem.

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