A Study on the Emerging Technologies in the Security of Digital Images in Chennai

K. Siva Subramani

Student – B.A. LLB (Hons), Saveetha School of Law, Saveetha Institute of Medical and Technical Sciences (SIMATS), Chennai 600077,
E-Mail ID: sivasubramani762@gmail.com
DOI : https://doi.org/10.55248/gengpi.6.0225.1032

ABSTRACT:

The increasing use of digital images in India has led to a growing need for security measures to protect them from unauthorized access, modification, and distribution. In recent years, there have been a number of emerging technologies that have the potential to improve the security of digital images.This abstract explores cutting-edge technologies such as blockchain, watermarking, AI-based encryption, and biometric authentication, which are being employed to enhance the security of digital images in various applications across India.Secure platforms are being developed in India that enable encrypted sharing of digital images among authorized users. These platforms ensure end-to-end encryption, preventing intermediaries from accessing the images during transmission.As privacy concerns grow, technologies that enable secure sharing and processing of images without exposing sensitive information are gaining traction. With the rise of Internet of Things (IoT) devices like security cameras and smartphones, ensuring the security of these devices is crucial. In India, efforts are being made to implement strong security measures for image-capturing IoT devices to prevent unauthorized access and hacking.The total number of sample respondents in the age group of 18-50 years are collected .The overall sample size collected through queries 206.The statistical tools used are Graphical representation the independent variables are age groups,gender,educational Qualifications, occupation and Place of residence.As the nation undergoes rapid digitization across industries, safeguarding the confidentiality, integrity, and authenticity of digital images has become paramount.

Keywords: Digital images, privacy-preserving techniques, AI-based encryption, Public awareness, Legal Frameworks

Introduction:

The security of digital images is a major concern in India, as with many other countries. In recent years, there have been a number of high-profile cases of digital images being stolen or tampered with, with serious consequences for the individuals or organizations involved.As the use of digital images continues to grow, the demand for security solutions will also grow. This will create opportunities for Indian companies to develop and deploy new security technologies.There are a number of emerging technologies that offer potential solutions to the challenges of digital image security.Artificial intelligence (AI) and machine learning (ML) can be used to develop algorithms that can automatically detect and identify malicious content in digital images. AI can be used to identify faces that have been photoshopped or to detect images that have been tampered with.Government initiatives towards security of digital images are National Strategy for the Artificial Intelligence (AI), which was released in 2019,The National Cyber Security Policy, which was released in 2013,Digital India programme, which was launched in 2015.Several factors affecting emerging technologies in the security of digital images are the increasing sophistication of cyber attacks, lack of awareness of cyber security risks,Many organizations do not have the resources to invest in security solutions for digital images.Recent trends are the use of AI and machine learning it is used to develop algorithms that can automatically detect and identify malicious content in digital images.The use of blockchain helps to prevent images from being stolen or tampered with, as any changes to the image would be recorded on the blockchain and visible to all users.The use of quantum computing that has the potential to break many of the current security algorithms used to protect digital images.The use of zero trust architecture (ZIA) means that all access to digital images is strictly controlled and authenticated.India is one of the leading countries in the world in terms of research and development in emerging technologies.The government has made significant investments in this area, and there is a growing number of startups and research institutions working on developing new security solutions for digital images.The United States is another leading country in the field of research and development in emerging technologies. The government has also made significant investments in this area, and there are a number of well-established universities and research institutions working on developing new security solutions for digital images.The aim is to adopt emerging technologies in the security of digital images that will contribute to a safer digital environment in India.

OBJECTIVES

- To analyze challenges to the adopt and implement digital image security technologies in India

- To understand adequate training and education should be provided to individuals and organizations to effectively utilize emerging technologies for digital image security.

- To find a safer digital environment in India.

- To identify improvement of the quality of images, enhance their functionality, and make them more accessible.

Review of Literature

M Favaretto 2020 The study results highlight how most of the issues discussed by the retrieved literature are in line with the ethical challenges that digital technologies are introducing in healthcare such as privacy, anonymity, security, and informed consent. In addition, image forgery aimed at scientific misconduct and insurance fraud was frequently reported, together with issues of online professionalism and commercial interests sought through digital means.(Favaretto et al. 2020).I Mistry 2020 Internet-of-Things (IoT) has made ubiquitous computing a reality by extending Internet connectivity in various applications deployed across the globe. IoT connect billions of objects together for high speed data transfer especially in 5G-enabled industrial environment during information collection and processing. Most of the issues such as access control mechanism, time to fetch the data from different devices and protocols used may not be applicable infor future applications as these protocols are based upon a centralized architecture. (Mistry et al. 2020).B Manzoor 2021 Digital technologies (DTs) are proven helpful in the Architecture, Engineering and Construction (AEC) industry due to their varied benefits to project stakeholders, such as enhanced visualization, better data sharing, reduction in building waste, increased productivity, sustainable performance and safety improvement. Therefore, researchers have conducted various studies on DTs in the AEC industry over the year; however, this study explores the state-of-the-art research on DTs in the AEC industry by means of a bibliometric-qualitative review method.(Manzoor, Othman, and Pomares 2021).R Dwivedi, 2022 This review aims to identify the role of IoMT applications in improving healthcare system and to analyze the status of research demonstrating effectiveness of IoMT benefits to the patient and healthcare system along with a brief insight into technologies supplementing IoMT and challenges faced in developing a smart healthcare system.(Dwivedi, Mehrotra, and Chandra 2022)E Mbunge 2021 In light of this, emerging technologies for tackling COVID-19 become inevitable. Emerging technologies including geospatial technology, artificial intelligence (AI), big data, telemedicine, blockchain, 5G technology, smart applications, Internet of Medical Things (IoMT), robotics, and additive manufacturing are substantially important for COVID-19 detecting, monitoring, diagnosing, screening, surveillance, mapping, tracking, and creating awareness.(Mbunge et al. 2021)SK Jagatheesaperumal, 2022 The application areas of each of the emerging technologies, along with their security aspects, are explained.

Furthermore, an IoT-enabled smart pill bottle prototype is designed and illustrated as a case study for providing better understanding of the subject. Finally, various key research challenges are summarized with future research directions(Jagatheesaperumal et al. 2022)E Chukwu, 2020 Blockchain, a form of distributed ledger technology has attracted the interests of stakeholders across several sectors including healthcare. Its' potential in the multi-stakeholder operated sector like health has been responsible for several investments, studies, and implementations. (Chukwu and Garg 2020)T Dahlberg, 2008To facilitate the analysis of literature,, and organize the mobile payment research under the proposed framework. Consumer perspective of mobile payments as well as technical security and trust are best covered by contemporary research. The impacts of social and cultural factors on mobile payments, as well as comparisons between mobile and traditional payment services are entirely uninvestigated issues. (Dahlberg et al. 2008).H Salman 2020 This study found that the use of mobile health applications has a positive impact on health-related behaviours and outcomes. Application users were more satisfied with applying mobile health applications to manage their health condition in comparison with users who received conventional care.(Salmani, Ahmadi, and Shahrokhi 2020)S Kaur 2022 the rapid growth of multimedia technologies, many images are communicated over public channels. Therefore, significant interest has been given to providing secure transmission of images over public channels. Encryption approaches are extensively utilized to secure multimedia data.(Kaur et al. 2022)U Sugandh 2022 Blockchain technology swiftly rose to prominence in a wide range of applications within the smart agriculture field. The necessity to construct smart peer-to-peer systems capable of validating, securing, monitoring, and analyzing agricultural data has prompted discussions regarding the development of blockchain-based Internet of Things (IoT) systems in smart agriculture.(Sugandh, Nigam, and Khari 2022)J Frizzo-Barker 2020 Blockchain is the latest 'disruptive innovation' that has caught scholars' attention. It is the underlying technology for Bitcoin and other digital currencies. Stakeholders like developers, entrepreneurs, and technology enthusiasts claim blockchain has the potential to reconfigure the contemporary economic, legal, political and cultural landscape(Frizzo-Barker et al. 2020).C Gupta 2022 The capabilities of electronic devices are also increasing day by day, which leads to more generation and sharing of information. Similarly, as mobile network topologies become more diverse and complicated, the incidence of security breaches has increased. It has hampered the uptake of smart mobile apps and services, which has been accentuated by the large variety of platforms that provide data, storage, computation, and application services to end-users.(Gupta et al. 2022)S Khatri2021 A secure, smart and peer-to-peer transactions framework can be developed by Blockchain. Blockchain has enormous potential to turn health care systems as a horizontal technology, which has changed many fields of industry.(Khatri et al. 2021)HM Hussien, 2019 The present study systematically searches all relevant research articles on blockchain in healthcare applications in three accessible databases, namely, ScienceDirect, IEEE and Web of Science, by using the defined keywords 'blockchain', 'healthcare' and 'electronic health records' and their variations.(Hussien et al. 2019) J Memon 2020 Optical character recognition is a science that enables the translation of various types of documents or images into analyzable, editable and searchable data. During last decade, researchers have used artificial intelligence/machine learning tools to automatically analyze handwritten and printed documents in order to convert them into electronic format.(Memon et al. 2020)E Ismagilova, 2020 An increasing number of studies focus on the security, privacy and risks within smart cities, highlighting the threats relating to information security and challenges for smart city infrastructure in the management and processing of personal data. (Ismagilova et al. 2022).QI Sarhan 2020 Smart home safety and security systems have gained much importance over the last few years owing to their notable impact in reducing and preventing losses in resources

and human life caused by unwanted situations that could occur while homeowners are far away from their homes.(Sarhan 2020).AA Vazirani, 2019 Blockchain is a secure, decentralized online ledger that could be used to manage electronic health records (EHRs) efficiently, therefore with the potential to improve health outcomes by creating a conduit for interoperability.This study aimed to perform a systematic review to assess the feasibility of blockchain as a method of managing health care records efficiently.(Vazirani et al. 2019)S Bojjagani 2023 Mobile payments are playing a vital role in the fast growth of online markets and are revolutionizing the supply chain of businesses and industries. Mobile payments are becoming dominant compared to conventional off-line mode payment channels and online e-channels such as ATM, e-cheque, and e-card payments. (Bojjagani et al. 2023)

Methodology:

The nature of this study is mostly an empirical method. An attempt has been made in this research to assess the to the role on emerging technologies in the security of digital images in India. According to the data utilized in it, it is entirely derived from secondary sources.to the Significance of this research. The present study is based on primary data collection by the Researcher and the secondary data from books, journals, and online sources. The author Carried out empirical research by a convenient method. The total number of sample respondents in the age group of 18-50 years are collected. The overall sample size collected through queries 206.The statistical tools used are Graphical representation the independent variables are age groups, gender , educational Qualifications, occupation and monthly income. Dependent variables are Experience on cybercrime on digital images, emerging technologies holds the most promise for enhancing the security of digital images in India, The major barriers or challenges to the adoption and implementation of digital image security technologies in India, adequate training and education should be provided to individuals and organizations to effectively utilize emerging technologies for digital image security, safer digital environment in India.
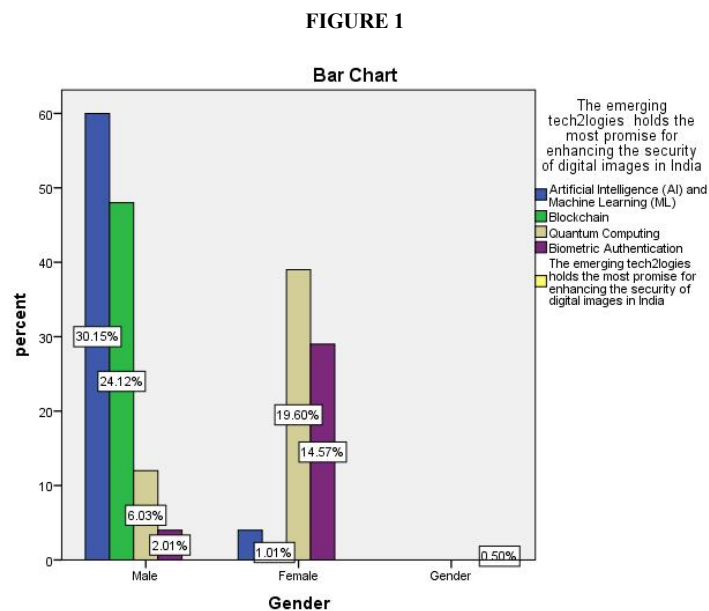
Analysis

FIGURE 1

Figure 1 represents the overall performance of the sample population with regards to gender and maximum respondents (30.15%) said artificial intelligence (AL) and machine learning (ML) are the emerging technologies that hold the most promise for the security of digital images in India.
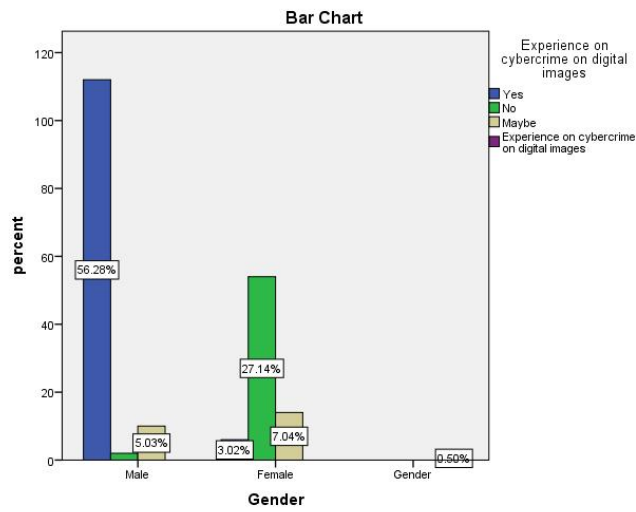
FIGURE 2

Figure 2 represents the overall performance of the sample population with regards to gender and maximum respondents (56.28%) agreed with experiencing cybercrime on digital images.
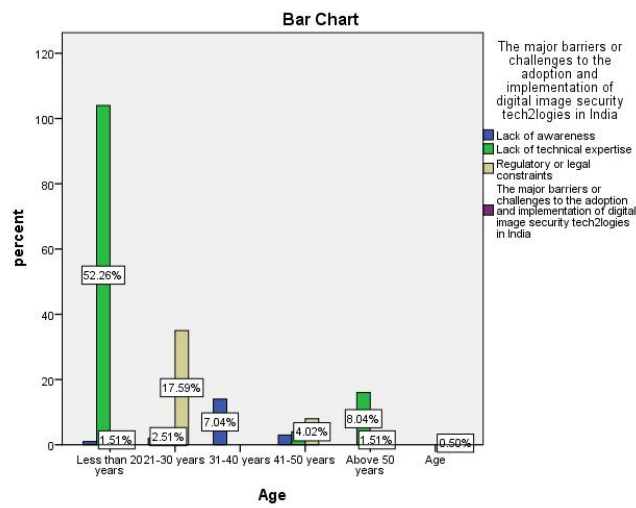
FIGURE 3

Figure 3 represents the overall performance of the sample population with regards to age and maximum respondents (52.26%) said that lack of technical expertise is the major barrier or challenge to the adoption and implementation of digital image security technologies in India.
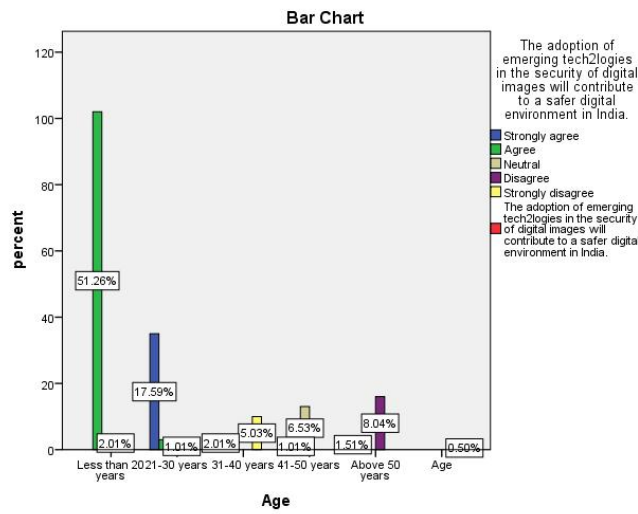
FIGURE 4

Figure 4 represents the overall performance of the sample population with regards to age and maximum respondents (51.26%) agreed that the adoption of emerging technologies in the security of digital images will contribute to a safer digital environment in India.
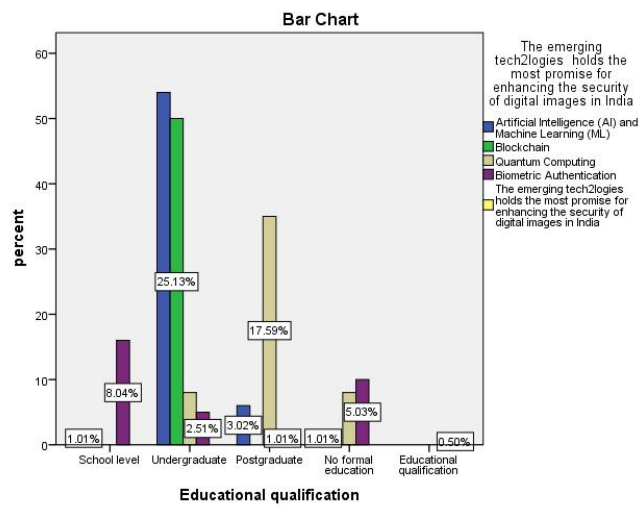
FIGURE 5

Figure 5 represents the overall performance of the sample population with regards to educational qualification and maximum respondents (25.13%)said artificial intelligence (AL) and machine learning (ML) are the emerging technologies that hold the most promise for the security of digital images in India.
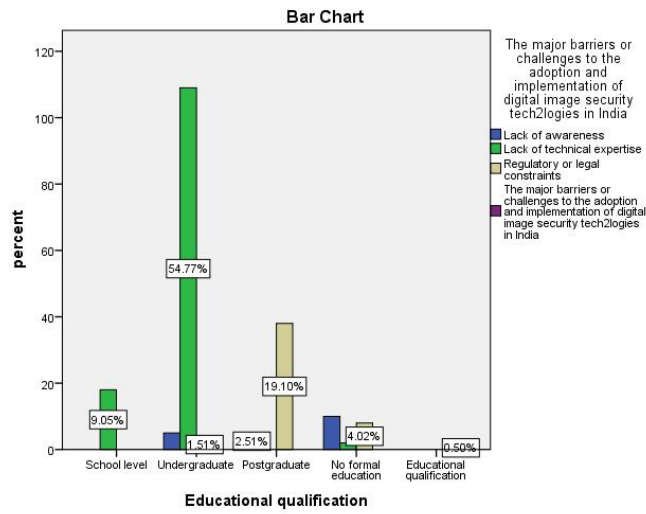
FIGURE 6

Figure 6 represents the overall performance of the sample population with regards to educational qualification and maximum respondents (54.77%) said that lack of technical expertise is the major barrier or challenge to the adoption and implementation of digital image security technologies in India.
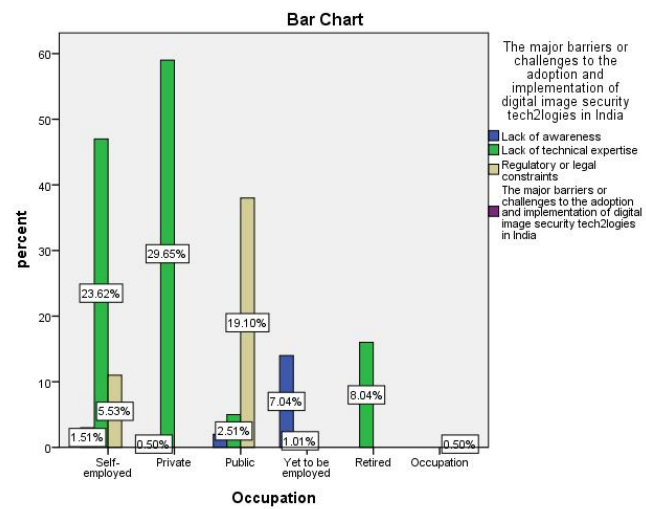
FIGURE 7

Figure 7 represents the overall performance of the sample population with regards to occupation and maximum respondents (29.65%)said that lack of technical expertise is the major barriers or challenges to the adoption and implementation of digital image security technologies in India.
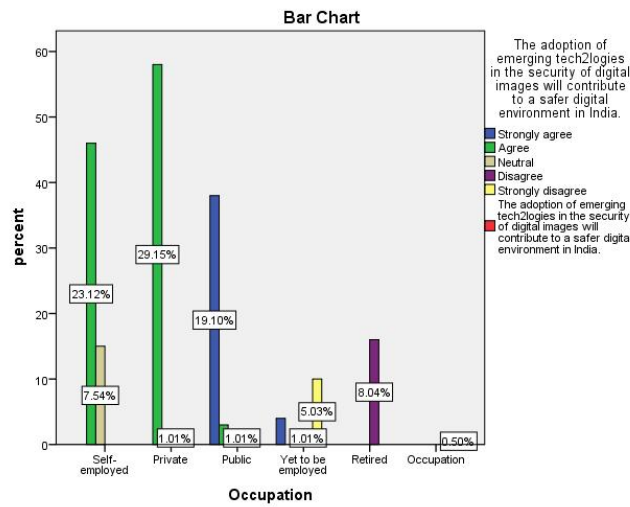
FIGURE 8

Figure 8 represents the overall performance of the sample population with regards to occupation and maximum respondents (29.15%)agreed that the adoption of emerging technologies in the security of digital images will contribute to a safer digital environment in India.
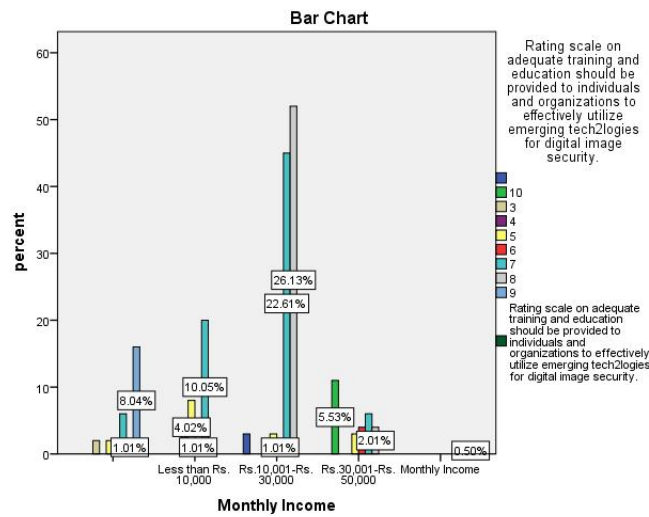
FIGURE 9

Figure 9 represents the overall performance of the sample population with regards to monthly income and maximum respondents(26.13%) said that adequate training and education should be provided to individuals and organizations to effectively utilize emerging technologies for digital image security.
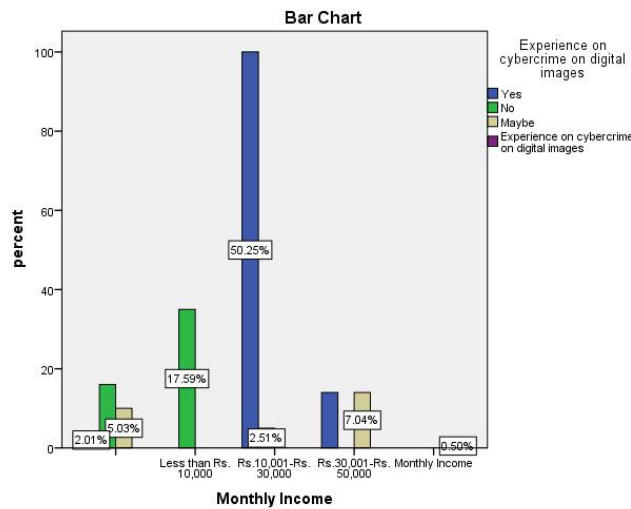
FIGURE 10

Figure 10 represents the overall performance of the sample population with regards to gender and the maximum respondent (50.25%) said that they have experienced cybercrime on digital images.

TABLE 1

The major barriers or challenges to the adoption and implementation of digital image security tech2logies in India * Gender

Crosstab

Count

		Gender			Total
		Male	Female	Gender	
The major barriers or challenges to the adoption and implementation of digital image security tech2logies in India	Lack of awareness	9	11	0	20
	Lack of technical expertise	101	28	0	129
	Regulatory or legal constraints	14	35	0	49
	The major barriers or challenges to the adoption and implementation of digital image security tech2logies in India	0	0	1	1
Total		124	74	1	199

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	239.669[a]	6	.000
Likelihood Ratio	53.174	6	.000
N of Valid Cases	199		

a. 6 cells (50.0%) have expected count less than 5. The minimum expected count is .01.

Table 1 represents the chi square test to find the significant relation between the major barriers or challenges to the adoption and implementation of digital image security technologies in India and gender.

Null hypothesis :There is no significant relation between the major barriers or challenges to the adoption and implementation of digital image security technologies in India and gender

Alternative hypothesis : There is a significant relation between the major barriers or challenges to the adoption and implementation of digital image security technologies in India and gender

Interpretation: The calculated p value is 0 .Since p value is <0.05, alternate hypothesis is rejected at 5% level of significance. So there is no significant relation between the major barriers or challenges to the adoption and implementation of digital image security technologies in India and gender

TABLE 2

➡️ **The emerging tech2logies holds the most promise for enhancing the security of digital images in India * Gender**

Crosstab

Count

		Gender			Total
		Male	Female	Gender	
The emerging tech2logies holds the most promise for enhancing the security of digital images in India	Artificial Intelligence (AI) and Machine Learning (ML)	60	4	0	64
	Blockchain	48	2	0	50
	Quantum Computing	12	39	0	51
	Biometric Authentication	4	29	0	33
	The emerging tech2logies holds the most promise for enhancing the security of digital images in India	0	0	1	1
Total		124	74	1	199

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	319.155[a]	8	.000
Likelihood Ratio	147.557	8	.000
N of Valid Cases	199		

a. 7 cells (46.7%) have expected count less than 5. The minimum expected count is .01.

Table 2 represents the chi square test to find the significant relation between the emerging technologies that holds the most promise, the security of digital images in India between genders.

Null hypothesis : There is no significant relation between the emerging technologies that holds the most promise the security of digital images in India and gender

Alternative hypothesis : There is a significant relation between the emerging technologies that holds the most promise the security of digital images in India and gender

Interpretation: The calculated p value is 0 . Since p value is <0.05, alternate hypothesis is rejected at 5% level of significance. So there is no significant relation between the emerging technologies that holds the most promise the security of digital images in India and gender

Findings

Figure 1 represents the overall performance of the sample population with regards to gender and maximum respondents (30.15%) said artificial intelligence (AL) and machine learning (ML) is the emerging technologies holds the most promises the security of digital images in India because it can be trained to identify patterns in images that are indicative of tampering, such as changes in brightness, contrast, or color. This can help to prevent malicious actors from altering images in order to deceive or mislead others. Figure 2 represents the overall performance of the sample population with regards to gender and maximum respondents (56.28%) agreed with experiencing on cybercrime on digital images because Social media platforms like Facebook, Twitter, and Instagram have made it easier than ever for people to share digital images. This has also made it easier for malicious actors to access and exploit these images. Figure 3 represents the overall performance of the sample population with regards to age and maximum respondents (52.26%) said that lack of technical expertise is the major barriers or challenges to the adoption and implementation of digital image security technologies in India because Digital image security technologies can be complex and require specialized knowledge to implement and use effectively. This can make it difficult for organizations in India to find and hire qualified personnel with the necessary expertise. Figure 4 represents the overall performance of the sample population with regards to age and maximum respondents (51.26%) agreed with the adoption of emerging technologies in the security of digital images will contribute to a safer digital environment in India because Watermarking is a technique that can be used to add invisible identifying information to an image. This information can be used to track the ownership of an image or to prevent it from being copied or shared without permission. AI and ML can be used to create watermarks that are more difficult to remove or alter. Figure 5 represents the overall performance of the sample population with regards to educational qualification and maximum respondents (25.13%)said artificial intelligence (AL) and machine learning (ML) is the emerging technologies holds the most promises the security of digital images in India because these technologies continue to develop, they are becoming more accurate and reliable at detecting and preventing image tampering, watermarking images, authenticating images, and protecting images from unauthorized access. Figure 6 represents the overall performance of the sample population with regards to educational qualification and maximum respondents (54.77%) said that lack of technical expertise is the major barriers or challenges to the adoption and implementation of digital image security technologies in India because Many organizations in India are not aware of the latest digital image security

technologies or the benefits of using them. This can make it difficult to convince them to invest in these technologies. Figure 7 represents the overall performance of the sample population with regards to occupation and maximum respondents (29.65%)said that lack of technical expertise is the major barriers or challenges to the adoption and implementation of digital image security technologies in India because The Indian government has not yet developed a comprehensive strategy for promoting the adoption of digital image security technologies. This lack of support can make it difficult for organizations to justify the cost of implementing these technologies. Figure 8 represents the overall performance of the sample population with regards to occupation and maximum respondents (29.15%)agreed with the adoption of emerging technologies in the security of digital images will contribute to a safer digital environment in India because AI and ML can be used to implement access control policies for images. This can help to ensure that only authorized users can access sensitive images. Figure 9 represents the overall performance of the sample population with regards to monthly income and maximum respondents(26.13%) said that adequate training and education should be provided to individuals and organizations to effectively utilize emerging technologies for digital image security because Training can teach individuals and organizations how to identify and mitigate the risks of cybercrime. This includes understanding the different types of cyberattacks that can target digital images, as well as the steps that can be taken to prevent them. Figure 10 represents the overall performance of the sample population with regards to gender and maximum respondent (50.25%) said that they have experienced cybercrime on digital images because Social media platforms like Facebook, Twitter, and Instagram have made it easier than ever for people to share digital images. Table 1 represents the chi square test to find the significant relation between the major barriers or challenges to the adoption and implementation of digital image security technologies in India and gender. Table 2 represents the chi square test to find the significant relation between the emerging technologies that holds the most promise, the security of digital images in India between gender.

Conclusion

Blockchain is a distributed ledger technology that can be used to record and track digital images. This can make it more difficult to tamper with or forge images. Blockchain can also be used to create tamper-proof watermarks for images. Quantum cryptography is a new technology that uses the laws of quantum mechanics to create secure communication channels. This technology could be used to protect images from being intercepted and read by unauthorized parties. Biometrics is the use of physical characteristics, such as fingerprints or facial features, to identify individuals. This technology could be used to authenticate users of image-sharing platforms and prevent unauthorized access to images. Artificial intelligence (AI) can be used to detect and flag suspicious images. This can help to prevent the spread of harmful content, such as child pornography or fake news. AI can also be used to improve the security of images by, for example, identifying and blocking images that contain sensitive content.

The security of digital images is becoming increasingly important in India, as the country's digital economy grows.Emerging technologies offer a number of potential benefits for improving the security of digital images includes Increased robustness against tampering and forgery, Improved tracking and tracing of images, Enhanced protection against unauthorized access and use, Increased ability to detect and flag suspicious images.AI can also be used to improve the security of images by, for example, identifying and blocking images that contain sensitive content. However, there are also a number of challenges to the adoption of emerging technologies in image security in India, including High cost, Complexity, Lack of standards, Cybersecurity risks,Lack of awareness.The use of emerging technologies in India is helping to make digital images more secure and trustworthy. This is essential for protecting individuals and organizations from a variety of threats, including cybercrime, fraud, and identity theft.The use of emerging technologies to improve the security of digital images is still in its early stages, but it is rapidly gaining traction in India. As these technologies continue to develop, they are expected to play an increasingly important role in protecting individuals and organizations from a variety of threats.

References:

1. 1.Bojjagani, Sriramulu, V. N. Sastry, Chien-Ming Chen, Saru Kumari, and Muhammad Khurram Khan. 2023. "Systematic Survey of Mobile Payments, Protocols, and Security Infrastructure." Journal of Ambient Intelligence and Humanized Computing 14 (1): 609–54.

2. 2.Chukwu, Emeka, and Lalit Garg. 2020. "A Systematic Review of Blockchain in Healthcare: Frameworks, Prototypes, and Implementations." IEEE Access 8: 21196–214.

3. 3.Dahlberg, Tomi, Niina Mallat, Jan Ondrus, and Agnieszka Zmijewska. 2008. "Past, Present and Future of Mobile Payments Research: A Literature Review." Electronic Commerce Research and Applications 7 (2): 165–81.

4. 4.Dwivedi, Ruby, Divya Mehrotra, and Shaleen Chandra. 2022. "Potential of Internet of Medical Things (IoMT) Applications in Building a Smart Healthcare System: A Systematic Review." Journal of Oral Biology and Craniofacial Research 12 (2): 302–18.

5. 5.Favaretto, Maddalena, David Shaw, Eva De Clercq, Tim Joda, and Bernice Simone Elger. 2020. "Big Data and Digitalization in Dentistry: A Systematic Review of the Ethical Issues." International Journal of Environmental Research and Public Health 17 (7). https://doi.org/10.3390/ijerph17072495.

6. 6.Frizzo-Barker, Julie, Peter A. Chow-White, Philippa R. Adams, Jennifer Mentanko, Dung Ha, and Sandy Green. 2020. "Blockchain as a Disruptive Technology for Business: A Systematic Review." International Journal of Information Management 51 (April): 102029.

7. 7.Gupta, Chaitanya, Ishita Johri, Kathiravan Srinivasan, Yuh-Chung Hu, Saeed Mian Qaisar, and Kuo-Yi Huang. 2022. "A Systematic Review on Machine Learning and Deep Learning Models for Electronic Information Security in Mobile Networks." Sensors 22 (5). https://doi.org/10.3390/s22052017.

8. 8.Hussein, H. M., S. M. Yasin, S. N. I. Udzir, A. A. Zaidan, and B. B. Zaidan. 2019. "A Systematic Review for Enabling of Develop a Blockchain Technology in Healthcare Application: Taxonomy, Substantially Analysis, Motivations, Challenges, Recommendations and Future Direction." Journal of Medical Systems 43 (10): 320.

9. 9.Ismagilova, Elvira, Laurie Hughes, Nripendra P. Rana, and Yogesh K. Dwivedi. 2022. "Security, Privacy and Risks within Smart Cities: Literature Review and Development of a Smart City Interaction Framework." Information Systems Frontiers 24 (2): 393–414.

10. 10.Jagatheesan Perumal, Senthil Kumar, Preeti Mishra, Nour Moustafa, and Rahul Chauhan. 2022. "A Holistic Survey on the Use of Emerging Technologies to Provision Secure Healthcare Solutions." Computers & Electrical Engineering 99 (April): 107691.

11. 11.Kaur, Sharanpreet, Surender Singh, Manjit Kaur, and Heung-No Lee. 2022. "A Systematic Review of Computational Image Steganography Approaches." Archives of Computational Methods in Engineering. State of the Art Reviews 29 (7): 4775–97.

12. 12.Khatri, Sabita, Fahad Ahmed Alzahrani, Md Tarique Jamal Ansari, Alka Agrawal, Rajeev Kumar, and Raees Ahmad Khan. 2021. "A Systematic Analysis on Blockchain Integration With Healthcare Domain: Scope and Challenges." IEEE Access 9: 84666–87.

13. 13.Manzoor, Bilal, Idris Othman, and Juan Carlos Pomares. 2021. "Digital Technologies in the Architecture, Engineering and Construction (AEC) Industry—A Bibliometric—Qualitative Literature Review of Research Activities." International Journal of Environmental Research and Public Health 18 (11): 6135.

14. 14.Mbunge, Elliot, Boluwaji Akinnuwesi, Stephen G. Fashoto, Andile S. Metfula, and Petros Mashwama. 2021. "A Critical Review of Emerging Technologies for Tackling COVID-19 Pandemic." Human Behavior and Emerging Technologies 3 (1): 25–39.

15. 15Memon, Jamshed, Maira Sami, Rizwan Ahmed Khan, and Mueen Uddin. 2020. "Handwritten Optical Character Recognition (OCR): A Comprehensive Systematic Literature Review (SLR)." IEEE Access 8: 142642–68.

16. 16.Mistry, Ishan, Sudeep Tanwar, Sudhanshu Tyagi, and Neeraj Kumar. 2020. "Blockchain for 5G-Enabled IoT for Industrial Automation: A Systematic Review, Solutions, and Challenges." Mechanical Systems and Signal Processing 135 (January): 106382.

17. 17.Salmani, Hosna, Maryam Ahmadi, and Nafiseh Shahrokhi. 2020. "The Impact of Mobile Health on Cancer Screening: A Systematic Review." Cancer Informatics 19 (October): 1176935120954191.

18. 18.Sarhan, Qusay I. 2020. "Systematic Survey on Smart Home Safety and Security Systems Using the Arduino Platform." IEEE Access 8: 128362–84.

19. 19.Sugandh, Urvashi, Swati Nigam, and Manju Khari. 2022. "Blockchain Technology in Agriculture for Indian Farmers: A Systematic Literature Review, Challenges, and Solutions." IEEE Systems, Man, and Cybernetics Magazine 8 (4): 36–43.

20. Vazirani, Anuraag A., Odhran O'Donoghue, David Brindley, and Edward Meinert. 2019. "Implementing Blockchains for Efficient Health Care: Systematic Review." Journal of Medical Internet Research 21 (2): e12439