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Research Article

Exploring Explainable AI (EXAI) – An Emerging Trend in Healthcare Sector

Chaitali Pal^{*1}, M. Yashvanth² and K. S. Srinivasa Rao³

¹ School of Engineering, Department of Basic Science, JAIN (Deemed-to-be) University, Bangalore, Karnataka, India

² Department of Statistics, Mysore University, Karnataka, India

³ CMS Business School, Faculty of Management Studies, JAIN (Deemed-to-be) University, Bangalore, Karnataka, India

*Corresponding author: cpal134@gmail.com

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Abstract. Industry 4.0 and COVID-19 drove businesses to adopt AI/ML amid VUCA, advancing toward Industry 5.0. Explainable AI (EXAI) fosters trust in healthcare's digital shift, enhanced remote care, and chronic-disease management, ushering smarter decisions and better patient outcomes. The authors used snowball sampling via Google Forms, surveying hospitals, practitioners, vendors, and customers on healthcare technology adoption. Data were visualized and analyzed descriptively. Explainable AI (EXAI) shows significant promise in managing NCDs, with ML tools aiding better diagnosis and treatment. Once EXAI is integrated nationwide in healthcare, Indian businesses will pivot, analyzing new challenges, enabling data-driven solutions that enhance well being and innovation.

Keywords. Artificial Intelligence (AI), Machine Learning (ML), Healthcare sector, Explainable AI (EXAI), Trend, Business, Non-communicable diseases

Mathematics Subject Classification (2020). 62-02

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1. Introduction

Artificial Intelligence (AI), as a part of Industry 4.0, has made a big change in all directions across sectors and business verticals. Pandemic breakdown added fuel to the fire and the usage of AI became multifaceted. When countries are working on international standards, AI supporting governments across the globe to meet the *UN Sustainable Development Goals* (SDGs). In India, three emerging sectors were identified before the pandemic: banking sector, healthcare sector and educational sector. Banking sector got its reforms through demonetization and digitization followed by consolidation of public sector banks from 27 to 12 in number, Healthcare got its popularity and digitization due to pandemic and education Sector got its digital facet and services during pandemic (AlQashouti *et al.* [3], Bhasin and Gulati [5], and Chandra *et al.* [8]).

In India, healthcare sector has several tentacles – from medical colleges to hospitals, private and government controlled, and by location-wise urban and rural. Awareness plays an important aspect before usage of any product or service, according to the norms of Marketing. So, AI awareness is important before it's usage. The strength of the country is its demography – size of population with two prominent spikes of younger as well as older groups, which generates different requirements of demands. Another important point is the purchase power of an individual, due to the majority of its average and middle-income group of people, they wish to fulfil their dreams and so try to spend money on various trendy products through EMI, credit card, or loans etc. (Nagvadia [25]).

Industry 4.0, as a technology revolution, brought IoT and Artificial Intelligence. Using these new technologies, and with the flexibility in start-ups by the support by the government, India as a country, using various innovative products based on AI technologies. VUCA (*Volatility, Uncertainty, Complexity and Ambiguity*) world created an environment for threat as well as opportunities. In order to sustain the businesses, innovative products with AI technology are entering into the market every day (Agrawal *et al.* [2]).

Healthcare, in India has taken different routes and now it has come close to the customer due to technology innovations and pandemic impact. Door step service became the order of the day due to innovative technology in healthcare (Rajkumar *et al.* [28]).

Any business product, either service or technology, awareness is important before going for usage. This made the authors to develop interest in AI based technologies and their awareness and usage in healthcare sector (Zhou *et al.* [39]).

2. Review of Literature

AI technology has impacted people's daily lives and how it can be used for social welfare in various sectors.

The application of AI in healthcare can help address issues of high barriers to access to healthcare facilities, particularly in rural areas of India, that suffer from poor connectivity and a limited supply of healthcare professionals and other facilities. This can be achieved through the implementation of use AI-driven diagnostics, personalized treatment, early identification of potential pandemics, and imaging diagnostics, among others (*National Strategy for Artificial Intelligence #AIFORALL*, Niti Aayog, (2018)¹). The analysis of the reports concludes that the

¹*National Strategy for Artificial Intelligence #AIFORALL*, Niti Aayog, Government of India, India, 114 pages (2018), URL: <https://www.niti.gov.in/sites/default/files/2023-03/National-Strategy-for-Artificial-Intelligence.pdf>.

reports adequately address various ethical, social, and economic topics, but come short of providing an overarching political vision and long-term strategy for the development of a ‘good AI society’. In order to contribute to fill this gap, the conclusion suggests a two-pronged approach (Cath *et al.* [6]). Organizations are trying to implement recruitment techniques that lead to acquiring talented employees. Now, HR managers implement Artificial Intelligence technology to recruit, retain and inspire proficient manpower which leads to success and growth for both the employer and employee (Geetha and Reddy [12]). Artificial Intelligence research in India through a scientometric assessment of publications output during 2007-16 has examined in terms of publications output by India in Artificial Intelligence research. India accumulated a total of 9730 publications in 10 years during 2007-16, registered an annual average growth rate of 27.45 percent, averaged citation impact to 2.76 citations per paper, and contributed 10.34 percent share of its total country output as international collaborative publications during 2007-16 (Gupta and Dhawan [14]). A comprehensive background regarding EXAI was done but, however, throughout this work the lack of formalism in terms of problem formulation and clear unambiguous definitions. Furthermore, it has been noted that the human role is not sufficiently studied in existing explainability approaches (Adadi and Berrada [1]).

Developments and applications in the field of *Machine Learning* (ML) has become a key enabling technology for the sciences and industry and makes an appeal for the wider use of explainable learning algorithms in practice (Samek and Müller [30]). The overall impact of AI on businesses - from research, innovation, and market deployment to future shifts in business models. To access this overall impact, the authors design a three-dimensional research model, based upon the neo-Schumpeterian economics and its three forces viz. innovation, knowledge, and entrepreneurship. However, we can see that AI is confined only to a few regions in the world creating an “AI divide”. The further expansion of technology in AI-enabled countries and the nonparticipation of other countries will widen this divide (Soni *et al.* [34]). There is a potential use of *Explainable Artificial Intelligence* (XAI) for the India Healthcare system, mainly exploring diabetes datasets (Hentzen *et al.* [15]).

Innovative manufacturing processes using AI-based technology are trending for sustainable manufacturing in the manufacturing industry. AI research is an important intellectual tool for both refocusing the work and creating new intellectual opportunities in AI and ML. AI provides a starting point for integrating knowledge across research in this domain and suggests paths for future research (Cioffi *et al.* [9]). AI has the potential to alter healthcare services, retail, and consumer services, communication and entertainment services, and financial services (Pemer [27]). With recent advances in computational technology, big data, and increased industry demand, AI is rapidly transforming customer experiences, organizations, and industries (Xu *et al.* [38]). The current applications of AI in the banking industry has brought revolutionary changes in banking and its impact on human manpower and, how it is changing the face of banking in India (Kaur *et al.* [18]). AI technologies have the potential to assist with necessary healthcare challenges, however, could be restricted by the standard of obtainable health knowledge, and by the shortcoming of AI to possess some human characteristics, like empathy (Irkhede *et al.* [16]). In spite of the wide available literature on the noteworthy potential of *Artificial Intelligence* (AI), there are no reports on its effectiveness in improving patient safety in *Robot-Assisted Surgery* (RAS). The purposes of this work are to systematically review the published literature on AI in RAS, and to identify and discuss current limitations and challenges (Amann *et al.* [4]). A complete interpretation of the current XAI landscape in deep learning is essential by providing mathematical summaries of pivotal work with opportunities

and challenges in *Explainable Artificial Intelligence* (XAI) (Das and Rad [10]). By including *Explainable Artificial Intelligence* (EXAI) to aid, *Machine Learning* (ML) in the Healthcare domain usage is enhanced. A simple, yet powerful solution for increasing the explainability of AI-based solutions to individuals from non-CS domains (such as medical practitioners) is essential. This could aid medical practitioners in comprehending AI-based systems and enhance their understanding of ML models' applicability and utility (Pawar et al. [26]).

Predictive Business Process Monitoring (PBPM) offers a set of methods to achieve diverse prediction tasks in running business processes, such as the next activity, the process outcome, or the remaining time. The current state of explainable PBPM techniques can be examined by performing a structured and descriptive literature review (Stierle et al. [35]). The use of AI is to create a search strategy through refined keywords, and complementing the subject AI. The search strategy development and suggestions of lines for further research by tracking developments in Artificial Intelligence research through constructing and applying a new search strategy (Liu et al. [20]). It has been argued that explainable AI will engender trust in the healthcare workforce, provide transparency into the AI decision-making process, and potentially mitigate various kinds of bias (Ghassemi et al. [13]).

A methodology to develop reliable, resilient, and personalized healthcare services that address the identified weaknesses of existing approaches and thus the use of AI and the modern Healthcare Internet of Things (HIoT) can be helpful for a comprehensive healthcare system (Taimoor and Rehman [36]). The explainability factor opens new opportunities to the black-box models and brings confidence in healthcare by focusing on improving clinical health practices and bringing transparency to the predictive analysis. But surveys on EXAI in healthcare have not significantly focused on the data analysis and interpretation of models, which lowers its practical deployment in this area of clinical application. The proposed survey highlights the scope of EXAI in Healthcare 5.0 through supported techniques, architectures, and proposed models (Saraswat et al. [31]). An overall review of the development of AI by scrutinizing traditional literature reviews and bibliometric methods by describing the evolution of AI in the past and current developments is essential. Though AI has developed swiftly in the past few years, some aspects of it need to be improved for the current stage of AI, especially connectionist approaches. Connectionist approaches are associated with neural networks and provide a discrete alternative to cognitive models of the digital computer (Zhou et al. [39]). A systematic review of the literature on *Artificial Intelligence* (AI) in customer-facing financial services by providing an overview of explored contexts and research foci, identifying gaps in the literature, and setting a comprehensive agenda for future research is essential. One has to investigate back-office and operations contexts (Hentzen et al. [15]). Designing ECG monitoring healthcare system with federated transfer learning and explainable AI is a study to address the above-mentioned challenges by designing a novel end-to-end framework in a federated setting for ECG-based healthcare using explainable *Artificial Intelligence* (XAI) and deep convolutional neural networks (CNN) (Raza et al. [29]). Several XAI-driven healthcare approaches from Blackbox to Explainable AI in Healthcare: Existing Tools and Case Studies and their performances are important to understand. The toolkits used in local and global post hoc explainability and the multiple techniques for explainability pertaining to the rational, data, and performance explainability are the order of the day (Srinivasu et al. [31]). One has to keep an aim to highlight the reasons for adopting XAI in the healthcare domain using Explainable Artificial Intelligence in Sustainable Smart Healthcare and how it can contribute towards reliant AI-based solutions to healthcare (Mohiuddin et al. [23]). A systematic review of last

decade (2011-2022) on the application of explainable artificial intelligence for healthcare has discovered that detecting abnormalities in 1D biosignals and identifying key text in medical notes are zones that need more care from the XAI research community. This will encourage the development of a holistic cloud system for a smart city (Loh *et al.* [21]). The application of Artificial Intelligence in the payment system at shopping malls in Mysore city describes the impact of Artificial Intelligence and its use in minimizing the queue system for their payment system (Divya *et al.* [11]). One can conclude that EXAI is a great development in the implementation of AI due to its translucent nature, by addressing the challenges in EXAI, as well as the future potential in various fields (Kangra *et al.* [17]). An automatic diabetes prediction system has been developed using a private dataset of female patients in Bangladesh and various Machine Learning techniques using the Pima Indian diabetes dataset by collecting additional samples from 203 individuals from a local textile factory in Bangladesh. prediction using machine learning and explainable AI techniques (Tasin *et al.* [37]).

An computerized system for water-quality forecast that deals with the missing values professionally and attains good exactness for water-quality forecast. Using an explainable AI technique, SHAP the participation of each feature in prediction is explained. SHAP discloses the quantity to which each feature contributes in the forecast of drinking water quality. Though SHAP feature importance is a superior approach to traditional alternatives, in isolation, it provides little additional value (Madhni *et al.* [22]). One has to study by characterizing the microbial pathogenesis involved in developing cervical cancer. *SHapley Additive exPlanations* (SHAP), a game theoretic approach, is employed to analyze the results predicted by the model that the increase in Ralstonia has a higher probability of predicting the sample as cervical cancer (Sekaran *et al.* [32]). Survey of explainable AI techniques in healthcare shows the most recent XAI techniques used in healthcare and related medical imaging applications. By summarizing and categorizing the XAI types, one can highlight the algorithms used to increase interpretability in medical imaging topics. In addition, it focuses on the challenging XAI problems in medical applications and provides guidelines to develop better interpretations of deep learning models using XAI concepts in medical image and text analysis (Chaddad *et al.* [7]). One has to examine critically, if the contributions of artificial intelligence (AI) in healthcare adequately represent the realm of women's healthcare. This would be relevant for achieving and accelerating the gender equality and health sustainability goals (SDGs) defined by the United Nations (Lau *et al.* [19]). A rich source of explainability classifications and summaries have been developed, along with their applications and real-world use in different cases (Nagahisarchoghaei *et al.* [24]).

3. Research Gap

In India, the basic awareness about *Artificial Intelligence* (AI) is lacking among Healthcare professionals, even though Healthcare sector usages AI enabled Technology directly or Indirectly.

4. Research Methodology

In India, the healthcare sector is of great importance due to the size of its population. Also, Indian Healthcare services are affordable, and enhanced technologies have been used to treat complicated diseases. In an earlier survey conducted by Karnataka Infrastructure Development

Department in 2013, Bangalore ranked 2nd among the 593 districts in the country for high-class health facilities. Bangalore rural district stood at a rank of 67, which is quite impressive.

The authors have taken a thorough review of the Literature using secondary sources and developed questionnaires to meet the target audience. A current survey was conducted using a questionnaire through Google forms using a snowball (non-random) sampling method and data was collected from different professionals like medical practitioners, medical laboratory technicians, medical researchers, radiologic technologists, healthcare IT companies, telehealth and telemedicine services, and customers. The data was collected from Bangalore and Mysore about the awareness of the use of Artificial intelligence and to understand the services/facilities in the healthcare sector with the usage of AI and EXAI.

The survey highlights and exercises the problem definition and outline systematically. The critical points incorporated such as awareness of the benefits of AI and EXAI, the importance of and ML, and collaboration between humans and robots for upgraded service.

The research questions to assess the survey's objectives are mainly focused on (i) the evolution and technology trends of AI in healthcare applications, (ii) the awareness on the seamless integration of technological advancements like AI, ML, and EXAI in various applications to ensure a quality improvement, and (iii) lessons learned from the survey and identification of the future scope of the survey in various human-centric applications.

5. Data Analysis

Survey Conclusion: Exploring the Landscape of Explainable Artificial Intelligence and Its Transformative Applications in Healthcare

5.1 Awareness and Impact of Industry 4.0 and the Pandemic

Table 5.1.1. Awareness and impact of Industry 4.0 and the pandemic

Conclusion (Mysuru)	Conclusion (Bengaluru)
The survey results indicate that the respondents have varying levels of familiarity with Industry 4.0, with the majority being not at all familiar (86%). This suggests that there is room for education and awareness-building about Industry 4.0 concepts in the healthcare sector	A notable percentage of respondents lack awareness about Industry 4.0 (67%), indicating the necessity for enhanced dissemination of information and knowledge

Table 5.1.2. Perception of Industry 4.0 impact

Conclusion (Mysuru)	Conclusion (Bengaluru)
The survey participants showed a positive perception regarding the potential impact of Industry 4.0 on businesses. The majority agreed that Industry 4.0 could enhance efficiency and automation (36%) and improve product and service offerings (11%). However, there was a lack of awareness about the potential of new business models and revenue streams	A significant portion of participants (67%) recognize the transformative potential of Industry 4.0 in reshaping business processes and operations

Table 5.1.3. Positive impact on healthcare during the pandemic

Conclusion (Mysuru)	Conclusion (Bengaluru)
Respondents recognized the positive impact of Industry 4.0 on healthcare during the pandemic. Enhanced data analytics (7%), IoT-enabled medical devices (4%), and faster drug discovery (7%) were among the recognized ways Industry 4.0 has positively influenced the healthcare sector during the crisis	16% of respondents agree that Industry 4.0 positively affected healthcare by leading to faster drug discovery, and 11% believe AI-based diagnostics positively impacted the healthcare sector

5.2 Understanding UN 17 Sustainable Development Goals (SDGs) 2030

Table 5.2.1. Awareness of UN SDGs

Conclusion (Mysuru)	Conclusion (Bengaluru)
A significant portion of the respondents were not familiar with the UN SDGs 2030 and their relevance to the healthcare sector (63%). This highlights the need for increased awareness and education about the sustainable development goals	A substantial percentage of respondents (62%) are unaware of the UN SDGs 2030, pointing towards a need for greater awareness and education

Table 5.2.2. Healthcare sector's contribution to UN SDGs

Conclusion (Mysuru)	Conclusion (Bengaluru)
The survey showed that the participants were not aware of the UN SDGs and their potential relevance to the healthcare sector, with all respondents falling in the "Not Aware" category (100%). This indicates a lack of knowledge about how healthcare can contribute to these goals	A noteworthy proportion of participants (19%) identify the healthcare sector's potential contribution to the UN SDGs 2030, particularly through health education

5.3 Experience with VUCA and Technology Adoption

Table 5.3.1. Experience with VUCA

Conclusion (Mysuru)	Conclusion (Bengaluru)
Most respondents were not familiar with the concept of VUCA in the healthcare sector (78%). This suggests that there is an opportunity to educate healthcare professionals about the impacts of volatility, uncertainty, complexity, and ambiguity on decision-making	A significant majority of respondents (57%) lack familiarity with the VUCA concept, indicating a requirement for improved understanding

Table 5.3.2. VUCA influence on decision-making

Conclusion (Mysuru)	Conclusion (Bengaluru)
Among the participants, the recognition of VUCA's influence on healthcare decision-making was limited, as indicated by the majority being "Not Aware" (93%). However, a small portion acknowledged that VUCA led to exploration of new business models and partnerships (7%)	A notable segment of participants (14%) recognizes VUCA's influence on fostering agile decision-making and strategic planning

Table 5.3.3. Advanced technologies coping with VUCA

Conclusion (Mysuru)	Conclusion (Bengaluru)
Respondents reported a lack of awareness about the integration of advanced technologies like AI and automation to address VUCA challenges (100%). This suggests that healthcare organizations might not have fully explored these technologies to manage uncertainty	A considerable proportion of respondents (59%) have yet to incorporate advanced technologies to address VUCA challenges effectively

5.4 Perception of AI and Explainable AI (EXAI) in Healthcare

Table 5.4.1. Familiarity with AI

Conclusion (Mysuru)	Conclusion (Bengaluru)
Respondents generally showed moderate familiarity with AI and its applications in healthcare (89%), with most falling in the 'Moderately Familiar' category	Approximately 27% of respondents exhibit high familiarity with the applications of AI in the healthcare sector

Table 5.4.2. Awareness of EXAI

Conclusion (Mysuru)	Conclusion (Bengaluru)
The majority of respondents were not familiar with Explainable AI (EXAI) (74%), suggesting that there is a need to enhance awareness and understanding of this concept in the healthcare sector. However, a small portion acknowledged that VUCA led to an exploration of new business models and partnerships (7%)	Almost half of the respondents (49%) lack awareness regarding Explainable AI (EXAI), highlighting the need for greater promotion and education

Table 5.4.3. Benefits and concerns of EXAI

Conclusion (Mysuru)	Conclusion (Bengaluru)
The survey revealed a significant lack of awareness about the potential benefits of EXAI in healthcare (89%). Respondents also expressed concerns about implementing EXAI, with a majority indicating uncertainty about its application	A significant 38% of respondents acknowledge the potential benefits of utilizing Explainable AI (EXAI) in making complex medical decisions

Table 5.4.4. Concerns about EXAI implementation

Conclusion (Mysuru)	Conclusion (Bengaluru)
The majority of participants expressed reservations about implementing EXAI in healthcare, particularly concerns about ensuring ethical use and lack of awareness and education about EXAI (93%)	A substantial 73% of respondents express concerns about the insufficient awareness and education surrounding the implementation of Explainable AI (EXAI)

5.5 Adoption of Machine Learning (ML) in Healthcare

Table 5.5.1. Essentiality of ML

Conclusion (Mysuru)	Conclusion (Bengaluru)
Respondents recognized the essentiality of Machine Learning (ML) for the healthcare sector's advancement, with the majority believing it to be moderately (56%) to very (19%) essential	A notable percentage (41%) of respondents consider Machine Learning (ML) to be of great importance in advancing healthcare services

Table 5.5.2. Impact areas of ML

Conclusion (Mysuru)	Conclusion (Bengaluru)
Respondents perceived that ML can significantly impact disease diagnosis and early detection (4%), patient risk prediction and management (4%), and predictive analytics for population health management (12%)	Approximately 19% of respondents recognize the potential impact of Machine Learning (ML) on improving disease diagnosis

Table 5.5.3. Adoption of online systems during pandemic

Conclusion (Mysuru)	Conclusion (Bengaluru)
Respondents indicated a moderate level of adoption of online systems or technologies to support patient health issues and treatment during the pandemic (15%)	Around 24% of respondents' institutions have embraced online systems to provide enhanced support to patients

5.6 Human-Robot Co-working and Industry 5.0

Table 5.6.1. Perception of Industry 5.0

Conclusion (Mysuru)	Conclusion (Bengaluru)
Respondents expressed diverse opinions regarding the concept of Industry 5.0, with a majority recognizing concerns about job displacement and unemployment (81%)	A significant 41% of respondents hold concerns about potential job displacement in the context of Industry 5.0

Table 5.6.2. Enhancement of healthcare services through collaboration

Conclusion (Mysuru)	Conclusion (Bengaluru)
Respondents recognized the potential of human-robot co-working to enhance the quality of healthcare services, particularly improved patient safety and reduced human errors (26%)	About 38% of respondents acknowledge the promise held by collaborative efforts between humans and robots within the healthcare domain

5.7 Application of EXAI in Healthcare for NCDs

Table 5.7.1. Leveraging EXAI for NCD data analysis

Conclusion (Mysuru)	Conclusion (Bengaluru)
The majority of respondents agreed that EXAI can be leveraged to identify patterns and risk factors in Non-Communicable Diseases (NCDs) data (52%)	Approximately 24% of respondents recognize the potential of Explainable AI (EXAI) in identifying patterns related to Non-Communicable Diseases (NCDs)

Table 5.7.2. Benefits of EXAI in Indian healthcare

Conclusion (Mysuru)	Conclusion (Bengaluru)
Respondents recognized the benefits of using EXAI to analyze NCD-related data in the Indian healthcare context, particularly improved disease diagnosis and accuracy (22%)	A considerable 38% of respondents believe that Explainable AI (EXAI) could contribute to the early detection of non-communicable diseases in the Indian healthcare context

5.8 Challenges and Opportunities

Table 5.8.1. Challenges in implementing advanced technologies

Conclusion (Mysuru)	Conclusion (Bengaluru)
Respondents acknowledged the challenges of implementing AI, ML, and EXAI in healthcare, particularly high initial implementation costs (30%) and limited understanding of AI and ML among healthcare staff (44%)	A significant proportion (41%) of respondents identify the challenge of limited understanding of AI and ML in the healthcare sector

Table 5.8.2. Integration of technologies in healthcare

Conclusion (Mysuru)	Conclusion (Bengaluru)
Respondents foresaw several advantages in integrating these technologies in healthcare, such as predictive analytics for proactive patient care (37%) and enhanced diagnostic accuracy and precision (19%)	Around 19% of respondents acknowledge the potential opportunities linked with the integration of technologies to enhance diagnostic accuracy in healthcare

5.9 Future Outlook

Table 5.9.1. Envisioning the future

Conclusion (Mysuru)	Conclusion (Bengaluru)
Respondents generally expressed optimism about the future of the healthcare industry with the widespread adoption of AI, ML, and EXAI, envisioning enhanced precision in diagnosis and treatment (11%) and improved patient-centric healthcare services (19%)	A notable 16% of respondents envision a revolutionary, patient-centric healthcare future through the integration of AI, ML, and Explainable AI (EXAI)

Table 5.9.2. Support and resources for implementation

Conclusion (Mysuru)	Conclusion (Bengaluru)
Respondents recognized the need for AI/ML expertise and training for healthcare professionals (56%) as a crucial resource for the successful implementation of these technologies	Approximately 32% of respondents emphasize the importance of providing expertise and training to facilitate the effective implementation of technologies in the healthcare sector

6. Mysuru: General Information

Table 6.1. Gender

Gender	Count	Percentage
Male	19	70
Female	8	30

Table 6.2. Qualification

Qualification	Count	Percentage
Medical Doctor (MD)	20	75
Medical Specialist (e.g., Cardiologist, Oncologist, etc.)	7	25

Table 6.3. Company/Organization

Company/Organization	Count	Percentage
Hospital	25	93
Others	2	7

Table 6.4. Job Title/Role

Job Title/Role	Count	Percentage
Doctor/Physician	1	4
Medical Specialist (e.g., Cardiologist, Oncologist, etc.)	24	88
Healthcare Consultant	1	4
Others	1	4

Table 6.5. How long have you been working in the healthcare industry?

Response	Count	Percentage
Less than 1 year	1	2
More than 5 years	26	98

This analysis is based on data collected from 27 respondents. The majority of the respondents are related to the healthcare sector directly or indirectly. They agree that AI and EXAI are useful and need of the time for better diagnosis and treatment. From Mysore, 70% of males and 30% of females participated in the survey. 93% of people are related to hospitals and the remaining 7% are from other areas. Out of all healthcare-associated people, 4% are Doctors, 88% are medical specialists, 4% are healthcare consultants, 4% are from other categories. 98% of the people from the healthcare sector have more than 5 years of experience.

7. Bengaluru: General Information

Table 7.1. Gender

Gender	Count	Percentage
Male	15	40
Female	22	60

Table 7.2. Qualification

Qualification	Count	Percentage
Medical Doctor (MD)	29	78
Nurse/Nurse Practitioner (RN/NP)	0	0
Medical Specialist (e.g., Cardiologist, Oncologist, etc.)	7	18
Surgeon	1	4
Medical Laboratory Technician	0	0
Pharmacist/Pharmacy Technician	0	0
Medical Researcher/Scientist	0	0
Medical Assistant	0	0
Radiologic Technologist	0	0
Physical Therapist/Occupational Therapist	0	0
Others	0	0

Table 7.3. Company/Organization

Company/Organization	Count	Percentage
Medical Device Manufacturers	0	0
Healthcare IT Companies	0	0
Research Institutions and Laboratories	0	0
Telehealth and Telemedicine Services	0	0
Healthcare Consulting Firms	0	0
Home Healthcare Services	0	0
Hospital	33	89
Others	3	11

Table 7.4. Job Title/Role

Job Title/Role	Count	Percentage
Doctor/Physician	15	39
Nurse/Nurse Practitioner	0	0
Medical Specialist (e.g., Cardiologist, Oncologist, etc.)	18	47
Surgeon	0	0
Medical Laboratory Technician	1	2
Pharmacist/Pharmacy Technician	0	0
Healthcare Administrator/Manager	0	0
Healthcare IT Specialist	0	0
Medical Researcher/Scientist	0	0
Medical Assistant	0	0
Health Informatics Specialist	0	0
Medical Billing and Coding Specialist	0	0
Radiologic Technologist	0	0
Physical Therapist/Occupational Therapist	0	0
Healthcare Consultant	0	0
Patient Care Coordinator	0	0
Healthcare Analyst	0	0
Others	4	10

Table 7.5. How long have you been working in the healthcare industry?

Response	Count	Percentage
Less than 1 year	1	2
1 to 2 years	0	0
3 to 5 years	0	0
More than 5 years	36	98

This analysis is based on data collected from 37 respondents. Most of the respondents are related to the healthcare sector directly or indirectly. They agree that AI and EXAI are useful and need of the time for better diagnosis and treatment. From Bengaluru, 40% of males and 60% of females participated in the survey. 89% of people are related to hospitals and the remaining 11% are from other areas. Out of all healthcare-associated people, 39% are Doctors, 47% are medical specialists, 2% are medical lab technicians, and 10% are from other categories. 98% of the people from the healthcare sector have more than 5 years of experience.

Exploratory Data Analysis

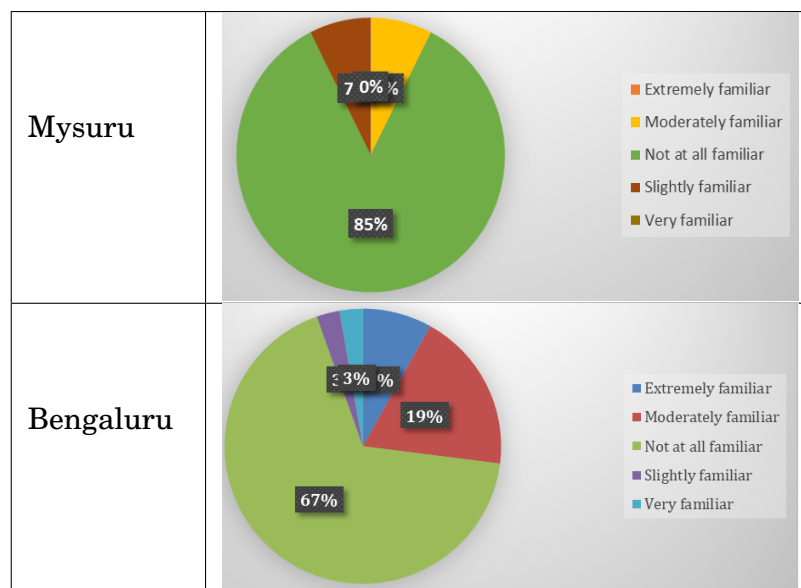


Figure 7.1. Awareness and impact of Industry 4.0 and the pandemic

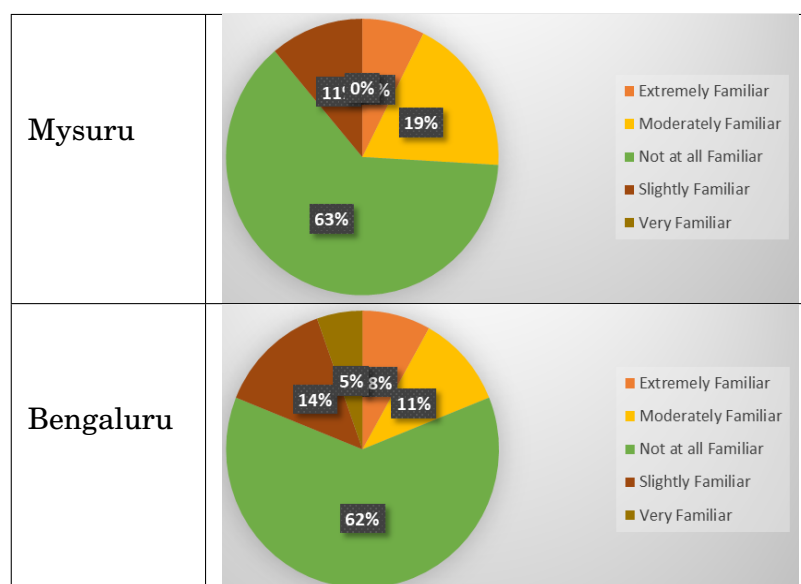


Figure 7.2. Are you aware of the UN 17 Sustainable Development Goals (SDGs) 2030 and their relevance to the healthcare sector?

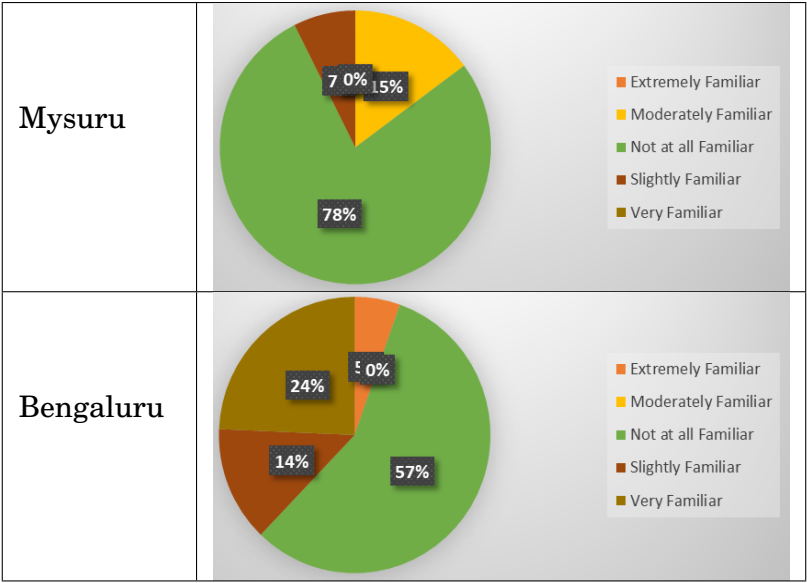


Figure 7.3. Have you experienced YUCA (Volatility, Uncertainty, Complexity, and Ambiguity) in the healthcare sector?

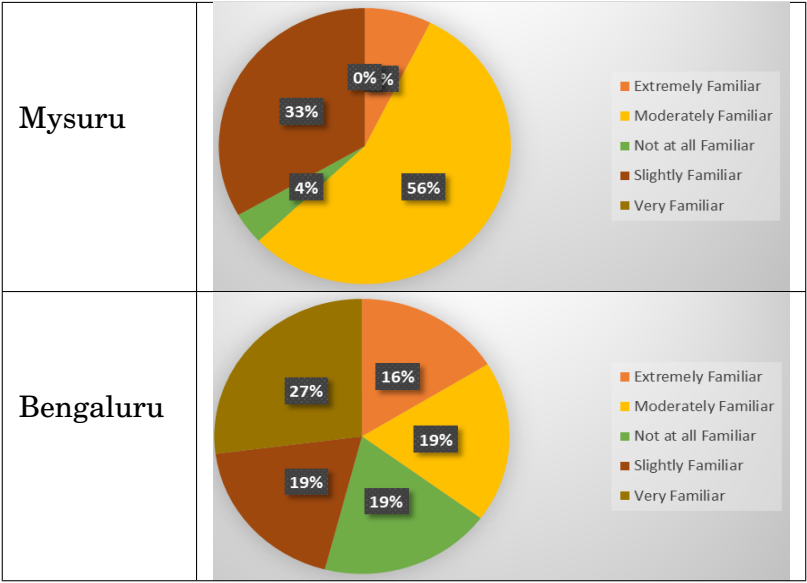
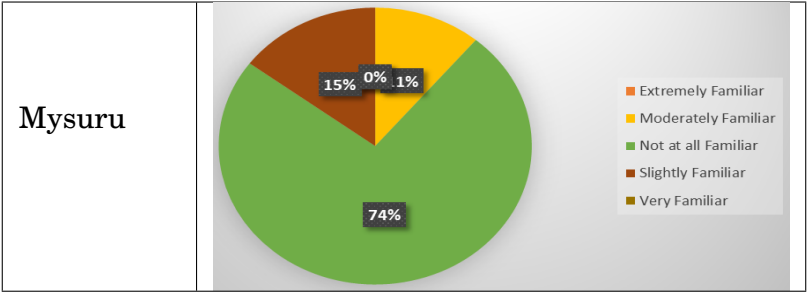


Figure 7.4. How familiar are you with Artificial Intelligence (AI) and its applications in the healthcare sector?



(Figure Contd.)

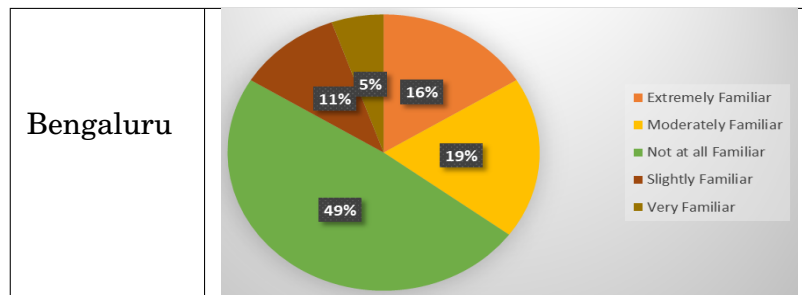


Figure 7.5. Are you familiar with Explainable AI (EXAI)?

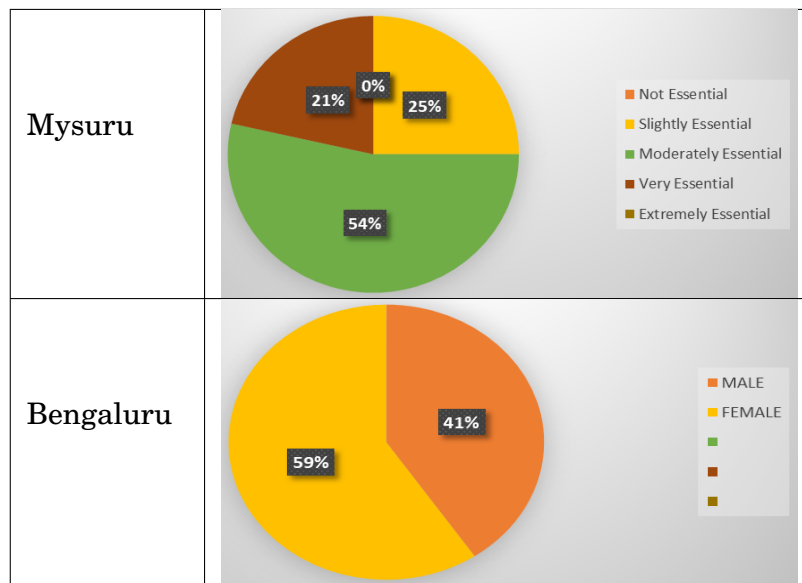


Figure 7.6. How essential do think Machine Learning (ML) is for the healthcare sector's advancement?

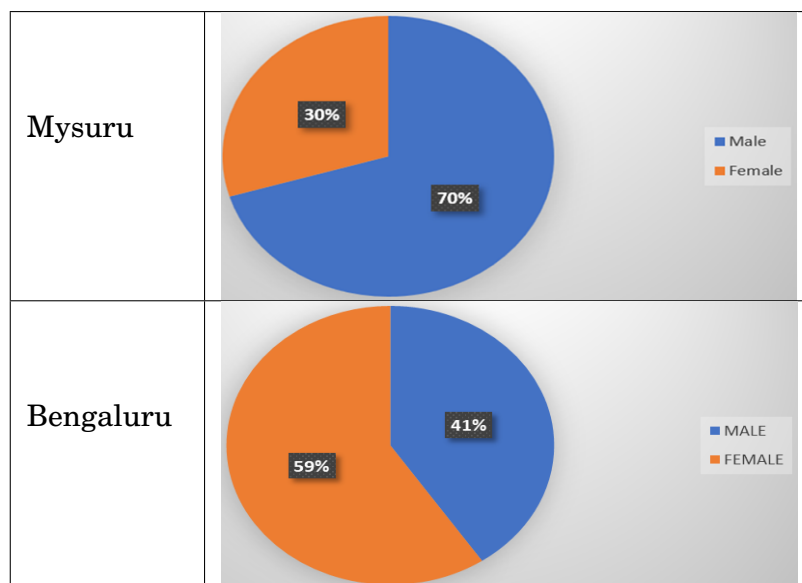


Figure 7.7. Gender ratio

8. Conclusions

The domain of the Healthcare sector is changing faster than ever, with *Artificial Intelligence* (AI) leading the way in bringing in a turnaround in the Healthcare industry. Various AI technologies and the EXAI have been applied in this field, such as faster diagnosis, operational performance, patient care support and disease analysis, and prediction of disease at an early stage. Due to AI, the Healthcare sector is not limited to just physical visits to hospitals, but a new world of modern online technology that helps people for online consulting a doctor. The introduction of new services by modern-day hospitals is helping them to grow and expand in terms of business as well. Many medical research institutions are working on low-cost surgery with the help of various cutting-edge technologies. This is due to the fact that the Government of India is also encouraging to adopt the new technology. Most of the medical college hospitals in India are doing research on the use of AI and EXAI, but more awareness needs to be created among medical practitioners, lab technicians, and customers to understand its impact on the Healthcare sector.

Competing Interests

The authors declare that they have no competing interests.

Authors' Contributions

All the authors contributed significantly in writing this article. The authors read and approved the final manuscript.

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