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AI-AUGMENTED IMAGING FOR PRECISION DIAGNOSIS OF PULMONARY DISEASES

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ABSTRACT

Background: Medical imaging feels like it is going to get better and better with the introduction of artificial intelligence through quick, accurate, and precise diagnoses. Even so, AI-facilitated imaging, particularly in the diagnosis of pulmonary diseases is still on the adoption curve with conflicting feedback from clinicians on its promise and hurdles.

Objective: This study aimed to evaluate the perception, confidence, and challenges facing healthcare professionals using AI-integrated imaging for the diagnosis of COPD, lung cancer, and other interstitial lung diseases.

Methods: A survey cross-sectional quantitative study design was used whereby questionnaires were administered to 250 health workers, particularly radiologists, pulmonologists, AI scientists, and medical technologists. Data management and analysis were descriptive analysis, correlation analysis, reliability analysis, and ANOVA where relationships between variables such as confidence and the perceived impact of AI on the process of diagnosis were examined.

Results: The findings showed that there was a considerable degree of confidence in AI being accurate as a diagnostician. There was a low yet positive relationship ($r = 0.068$, $p > 0.05$) between confidence in the accuracy of AI and the overall perceived impact. The Shapiro-Wilk test specified that confidence levels are not normally distributed ($p < 0.0001$). The Cronbach's Alpha for AI using the beneficiaries was negative meaning low internal consistency. One-way ANOVA showed no significant differences in perceptions of AI in the sample group concerning career ($p > 0.05$). Inadequate clinical validation and unavailability of sufficient training are the main barriers mentioned.

Conclusion: There are AI-augmented imaging applications for the diagnosis of pulmonary disease; however, the medical community remains hesitant to completely adopt these tools. The major obstacles include a lack of adequate clinical validation as well as training. These barriers together with fostering trust in AI's capabilities to operate independently are important for its wider use within the clinical environment.

KEYWORDS: AI-augmented imaging, pulmonary diseases, medical imaging, artificial intelligence, diagnostic accuracy, healthcare professionals.

INTRODUCTION:

Artificial Intelligence (AI) seems to be stealing the show with its newest advancements, particularly its breadth in Healthcare. Nowadays, decisions made in the healthcare system are measured in a completely different manner, with imparted AI ensuring new predictive capabilities. One of the most visible functions of AI in medicine is image interpretation, which incorporates both virtual and augmented AI-assisted systems that aid healthcare specialists in disease diagnosis. To be more specific, concerning pulmonary disorders, such as chronic obstructive pulmonary disease (COPD), lung cancer, and interstitial lung diseases (ILDs), automation of image analysis, which is capable of recognizing non-visible patterns and reducing the diagnosis mistake rate, seems to facilitate AI-augmented imaging improvements. This is a custom software development aimed to meet the challenges created by the immense volume of information and the rapid increase in the number of medical diagnostics and imaging outputs (Addo) (Nti, Lehmann, Haddad, Kennedy, & Russell, 2022).

The development of different pulmonary diseases is associated with high levels of morbidity and mortality, making them a global health problem. It is well known that time and proper techniques for diagnosis are crucial in enhancing the outcome of patients. Nevertheless, traditional diagnostic methods have their limitations including interobserver variability, the shortage of time, and the complex nature of how pulmonary diseases appear on imaging. AI imaging is an area concerned with numerous accidents and aims to improve on this using smart technologies that are capable of interpreting medical images like CXRs, CTs, or MRIs. Most of these AI models get trained through these extensive word databases for certain features of potential pulmonary disease and can find anomalies, give out predictions, and even suggest the next course of action. The emergence of perfect AI models has been paramount and doctors can now utilize more sophisticated tools for diagnosis at a lower cost (Sufian et al., 2024) (Boeken et al., 2023).

Even though there is the idea of AI-augmented Imaging, the endogenous use of such Imaging is very low in clinical practice across the board. Health professionals rank their trust in AI's precise diagnosis and its combination with clinical practice scales differently. Some practitioners are concerned about AI's reliability, and ethics, and the challenges of AI integration into their clinical practices, while some practitioners see AI as a helpful additional tool to routine diagnostics. Moreover, one of the most important barriers for AI to be employed in clinical practices worldwide is that there is no clinical validation and many AI systems have not been tested in clinical settings at all. Other factors such as problems with data, AI requires extensive training, and the cost of AI implementation are also factors that make healthcare practitioners wary (Patel, Gatti, Farrokhyar, Xie, & Hanna, 2024) (Kapur, 2019).

The acceptance and integration of AI in imaging enhancement for pulmonary conditions dependencies is very important on the perspectives and barriers aspired by the health providers, which implies that they have to cultivate these perceptions healthily so that the technology can be adopted better in the industry. This study is intended not only to meet but rather to go beyond those by investigating how AI is regarded in the imaging procedures by healthcare professionals such as radiologists, pulmonologists, AI professionals, and medical technologists in their practice. This research will attempt to address these issues by performing a cross-sectional quantitative study. It seeks to investigate the level of confidence healthcare practitioners place in AI as a tool for diagnosis, the benefits of AI imaging enhancement from a clinical perspective, and the factors that prevent its use (Shapiro et al., 2024) (Viswanathan, 2020).

Several reasons make this study important. The first one goes to the growing number of literature on the assimilation of AI into health care systems in that it targets a particular aspect, diagnosing pulmonary diseases, and presents evidence of the professionals in the field working in that aspect. Additionally, the research reports on bottlenecks, such as poor clinical evidence, and the absence of adequate training that has to be surmounted if AI is to be widely accepted. Finally, this study linked the usefulness of AI systems and diagnostic accuracy and is important for the understanding of how AI could be better used in the healthcare system to foster better healthcare (Gefter et al., 2024) (Madan et al., 2022).

Literature Review

Artificial intelligence (AI) technologies have gone through a great transformation in the last decade in the field of healthcare while aiding medical imaging progression and conquering the shortcomings related to diagnostic precision, speed, and efficiency. In line with the diagnostic process of pulmonary disease, AI-supporting image acquisition and analysis has become increasingly accepted as a game-changing imaging technology capable of helping physicians in diagnosing complicated disease processes and minimizing mistakes in clinical diagnoses. Nonetheless, the adoption of AI in clinical settings is still at an early stage, with a growing number of studies outlining both its promise and the issues it confronts. This review of related literature aims at understanding the place of AI-supported imaging in the wider diagnostic paradigm of pulmonary illness and in doing so traces significant milestones, AI's advantages and disadvantages, and factors limiting its wider use (Zachariadis & Leligou, 2024) (Abdel-Karim, Pfeuffer, Carl, & Hinz, 2023).

AI in Medical Imaging: An Overview

Medical imaging is important for the diagnosis and treatment of different kinds of ailments which also include the lungs including Chronic Obstructive Pulmonary Disease (COPD), lung cancer, and interstitial lung disease. Traditionally, medical images are interpreted by radiologists or other specialists who use their knowledge to spot and diagnose anomalies that are present in the images. However, the process of image data interpretation is, by definition, motivated by human variability, subjectivity, and error, which is more prone where the disease is subtle or complex.

For this reason, a lot of attention has been directed towards the use of AI in enhancing the diagnostic relevance of medical imaging (Hazra, 2024) (Duong et al., 2019).

AI applications in the field of medical imaging include machine learning (ML) and deep learning (DL) for the analysis of complex medical imagery datasets. These algorithms are provided with enormous amounts of imaging data so that they can be trained to identify certain features, locate the sources of a deviation from these features, and in certain cases offer some degree of predictive analysis. In AI-assisted imaging, one of the algorithms that has been widely adopted in image analysis is the convolutional neural network (CNN). CNNs are deep learning algorithms that have been reported to perform exceptionally well in the recognition of images. Some studies revealed that under certain applications such as early detection of lung cancer from chest X-ray images and CT scans, the diagnostic accuracy of a CNN could equal or surpass that of human experts (Mobarakeh, Kazemi, Aarabi, & Danyal, 2024) (Monlezun et al., 2023).

AI-Augmented Imaging for the Diagnosis of Pulmonary Diseases

AI-enhanced imaging, especially for the lungs, is becoming quite prevalent in today's examination of pulmonary diseases. This is emphasized by the fact that lung cancer is the most common cause of death among many cancer patients around the world. Statistics show that up to 1.5 million people die from lung cancer every year, which highlights the importance of developing an efficient and precise diagnosis system. To this end, AI models supervised on extensive datasets of lung images have been recorded to have a decent ability to identify nodules and other early visuals of lung cancer. For example, Ardila et al. showed that a deep learning model can predict the lung cancer risk for a patient based on CT scans better than a radiologist (Lehmann et al., 2024) (Girardi, Cardell, & Bird, 2023).

Such technological advancements give rise to optimism that the chances of delayed or missed diagnosis due to AI-augmented imaging are quite minimal. Likewise, AI has been utilized in the diagnosis of other pulmonary disorders including COPD and interstitial lung diseases. These conditions tend to have imaging with complicated patterns that are often difficult to read. Many AI models have shown good performance in analyzing these features and Addressing healthcare professionals' decision-making deficits. In the research by Wang et al., AI algorithms were also reported to efficiently identify and predict stages of COPD development based on chest CT scan images confirming the prospects of AI for diagnostic and follow-up purposes (X. Wang & Zhu, 2024) (Lin et al., 2020).

Advantages of AI-augmentation with Imaging in Lung Disease Diagnosis

AI-powered imaging provides the greatest benefit which is improved accuracy in diagnosis and decreased chances of human errors. AI in this sense is a game changer especially in the diagnosis of pulmonary diseases because it would bring improved and consistent outcomes during diagnosis. The analysis of the imaging data by the AI system will take a short time frame when compared to human analysis hence facilitating a quick intervention. This is critical, especially in lung cancer and other time-sensitive diseases that require quick medical attention as early treatment can drastically increase the survival rates (Aamir et al., 2024) (Niu, Tsui, & Zhao, 2022).

In addition, AI-enhanced imaging may help in the unification of diagnostic processes across various healthcare facilities. Differences in diagnosis findings are a well-known problem in practice where the same radiological pictures are viewed by several people each arriving at a different report. AI-based tools that are developed using similar datasets can assist in addressing this inconsistency in reports owing to standardized analyses that are objective. This means that patients can be given the same treatment regardless of where they are situated as AI will help eliminate haphazard treatment (Oikonomou & Khera, 2024) (Dai & Tayur, 2022).

AI-augmented imaging has yet another advantage which the authors would like to point out: the imaging enables the early diagnosis of diseases. This is especially so for pulmonary diseases that include lung cancer and COPD where an early diagnosis can enhance the health status of the target population. Small but relevant variations in imaging data that may be ignored by human vision can be identified by AI and facilitate earlier action. For instance, Tan et al. showed that an AI model was more sensitive than radiologists for the detection of early lung cancer nodules. Treatment programs for high-risk groups could easily be improved with AI (Chu, Liteplo, Duggan, Hutchinson, & Shokoohi, 2024) (Ghaffar Nia, Kaplanoglu, & Nasab, 2023).

Limitations and Challenges of AI-Augmented Imaging

Integration of AI-augmented imaging has numerous benefits, and yet it is not without its fair share of challenges. The limitation of AI is posed by the absence of clinical validation. There is growing evidence that AI systems can produce favorable results in an experimental setting, but their real-life effectiveness is yet to be completely validated. Most AI algorithms are developed based on a small and highly edited collection of datasets that do not depict the natural and complicated nature of clinical practice. Consequently, there are concerns that AI systems will not work as well as in ideal situations when imaging data is more heterogeneous and disease presentations are more complicated. Another challenge is the absence of standardization in implementation. This is attributable to differences in the development of AI systems by various companies and research institutions that employ their algorithms and methods (Geoff Currie, Rohren, & Hawk, 2024) (Gode, Tiwaskar, Lakhar, & Dhande, 2022).

This lack of standardization makes it hard for medical professionals to use AI tools in various institutions and image platforms. Additionally, there is no single framework that governs the approval and supervision of AI systems used in medical diagnosis, which exposes concerns regarding the reliability and safety of AI systems. Parikh M. et al. further point out that data privacy and security concerns pose great challenges to the use of AI in medical imaging. A functional AI system needs to be trained on a considerable amount of patient data. This fact, however, raises concerns about the storage and security level of patients' data. The healthcare sphere is heavily regulated with many requirements related to patients' private lives, and any misconduct concerning these regulations could lead to severe legal and ethical impacts (Sharma et al., 2024) (George, Shahul, & George, 2023).

The integration of AI-augmented imaging is also barred by the lack of training and education of healthcare professionals. Several people might not possess the necessary technical skills or knowledge for how these systems work and how their outputs are supposed to be interpreted. This can bring about skepticism and hesitancy to new applications like AI tools. Addressing this issue will require the formulation of more integrated training programs to guarantee that healthcare practitioners possess the competencies necessary for the application of AI in clinical practice (Muzammil et al., 2024) (Wei, 2022).

Future Directions and Opportunities

Though these challenges exist, the perspective concerning the future of AI-augmented imaging in the diagnosis of pulmonary disease is bright. In the different studies that are being carried out, researchers intend to deal with the restrictions of the existing AI systems and work towards enhancing the generalizability and robustness of the AI models. There are also partner initiatives being pursued by AI developers, medical institutions, and regulators to agree on common standards for the validation, implementation, and regulation of AI tools for medical diagnostics. With the advancing AI technology, its expansion towards areas other than diagnostics also seems plausible. Such predictive analytics AI seeks to be, where disease progression and treatment responses would be predicted through the imaging data. This would enable health workers not only to improve the accuracy of making a diagnosis but also to optimize the treatment so that it is the most effective for the specific patient (Tejani et al., 2024) (Irmici et al., 2023).

Research Methodology

This study adopts a quantitative research methodology with a survey strategy to investigate the use, effectiveness, and perceptions of AI-enhanced imaging technologies specifically in the diagnosis of pulmonary diseases. The objective is to extract empirical perspectives from practicing healthcare professionals such as radiologists, pulmonologists, medical technologists, and AI researchers who are well- versed, or use or design AI-enhanced imaging systems within their practice or research activities (Majra & Krishnan, 2024) (Mintz & Brodie, 2019).

Research Design

The cross-sectional design is the one chosen for this study, where data is collected on only one occasion in a larger sample of healthcare personnel. This design is useful to determine the present picture of AI-enhanced imaging applications in the diagnosis of pulmonary disease, allowing exploration of the perceived merits demerits, and prospects of the application. The study is therefore descriptive because it seeks to measure opinions, experiences, and practices with AI-enhanced imaging (Haque & Islam, 2024) (Roy, Meena, & Lim, 2022).

Sampling and Population

The target participants for this research study are specialists working in the field of pulmonary diagnostics and research, particularly those who use or know AI-based diagnostic tools and devices. For sampling representative data, this particular study utilizes a stratified random sampling method. In this case, the members of the sample are stratified into various sub-groups based on their profession (radiologists, pulmonologists, AI, medical technologists), duration, and use of AI technology. The number of sample subjects in this study was 250 because the researchers were able to perform a meaningful interpretation of statistical analysis and allow generalization of results among the population. Patients were recruited from hospitals, research facilities, and academic institutions with active research or clinical programs in pulmonary imaging powered by AI or new AI systems being developed for such applications. Such professionals were sent electronic surveys by the researchers through the institutional mailing lists and other relevant professional circles with a clear assurance of confidentiality and that the participation was voluntary (Cinteza et al., 2024) (Yang, Siau, Xie, & Sun, 2022).

Data Collection

Various variables in the current study were collected through a structured questionnaire which had been developed specifically for this study. The questionnaire was put into parts with each of the parts focusing on specific elements of AI-augmented imaging. The first area sought answers to questions regarding the demographic variables of respondents, such as age, sex, occupation and number of years worked. In the second part, participants were asked to rate their level of awareness, frequency, and use of AI-augmented imaging tools, where Likert scales and multiple choice types of questions were used. The third segment was about the advantages and concerns of diagnosing pulmonary diseases with AI, such as accuracy and speed as well as the extent of diagnostic errors (Seetharam et al., 2024) (Aoun & Sandhu, 2019).

In addition, the respondents were also instructed to indicate whether they believed that AI-based diagnosis are accurate or not and the factors which they thought would hinder the use of the tool such as the cost, lack of knowledge, or issues concerning data protection. The questionnaire is also expected to collect data concerning the degree of trust given to AI systems by healthcare

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providers and the expectation that AI will take over as the primary diagnostic instrument in pulmonary medicine (Bhatia et al., 2024) (Khoury et al., 2022).

Data analysis The research data that was collected was subjected to statistical evaluation, which enabled the study to find patterns, relationships, and trends of the phenomenon in question. Some descriptive statistics, namely, frequency distribution, means, and standard deviation were employed in summarizing the data to understand the response of the participants. Also, inferential tests, which include correlation analysis or regression analysis, were employed to find such relationships, in this case, the influence of AI application on the accuracy or the speed of the diagnosis. It was possible to determine factors that impact AI-integrated imaging to diagnose pulmonary disease in both effectiveness and adoption (Oikonomou et al., 2024) (Hunt, Abbey, Tharrington, Huiskens, & Wesdorp, 2019).

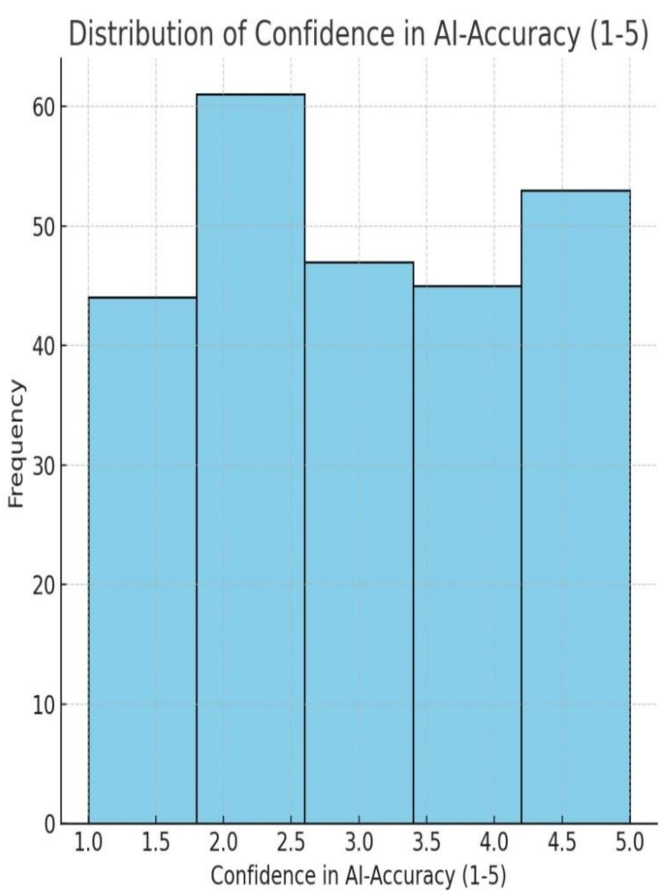
On top of that, ANOVA tests were used to look into the efficacy of AI-augmented imaging bumped by radiologists or pulmonologists regarding their subgroups with different years of training. The analysis further sought to determine whether or not the level of experience or familiarity with AI made any difference in the level of confidence and trust that professionals place in AI systems. Ethical considerations the study is ethical and legal. Participants were made aware of the aims of the study, their right to privacy, and how they were participating voluntarily. Contacted written consent was provided by all subjects who participated in the study and their personal information was not collected. Security measures for data response were carried out to safeguard the answers of the respondents (Feretzakis et al., 2024) (Pasquini et al., 2022).

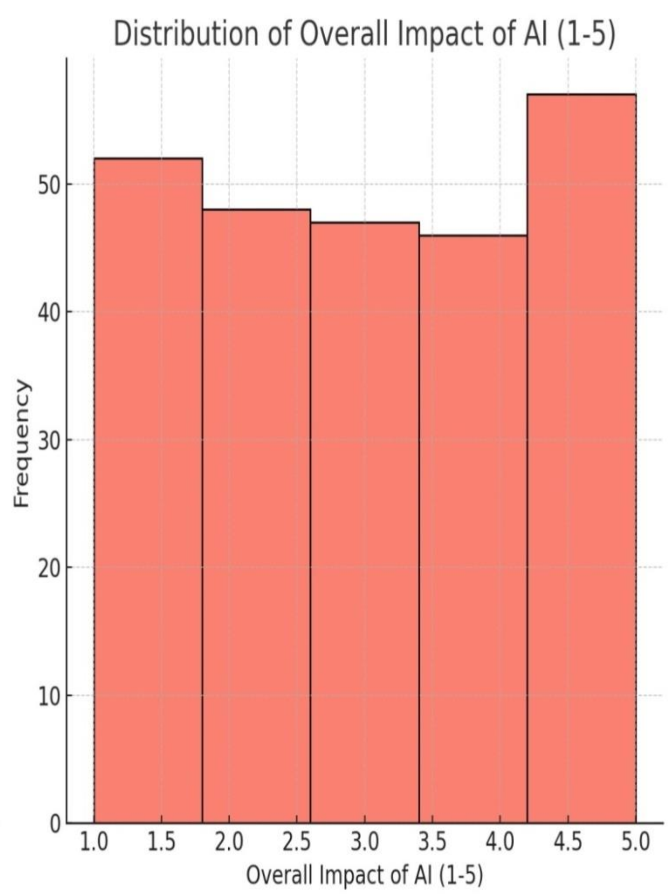
Data Analysis

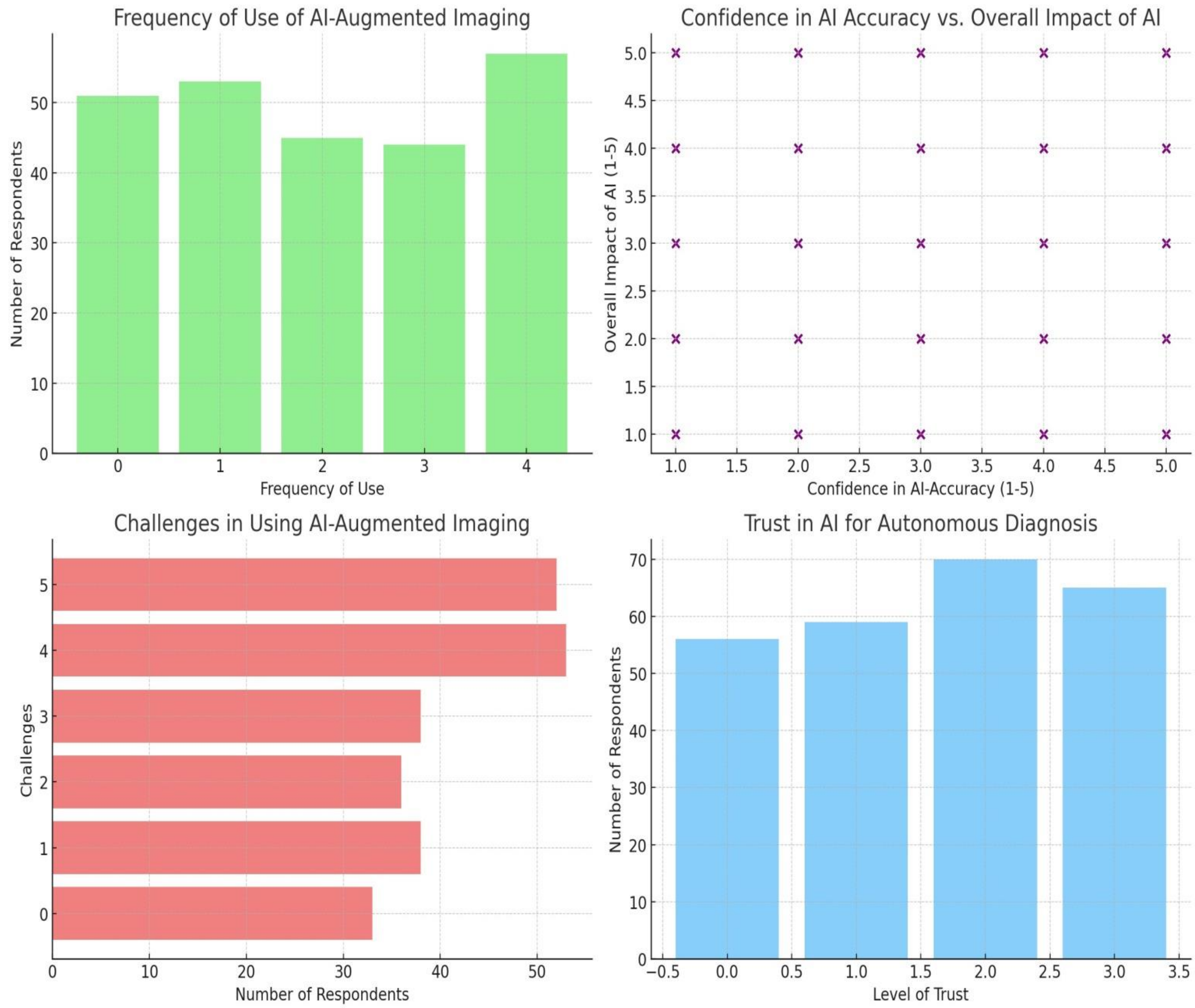
Statistical Test Results for AI-Augmented Imaging Study

Tes	**Statistic**	**p-value**
Shapiro-Wilk Test (Normality)	0.8863564133644104	9.619925299061971e-13

Tes	Statistic	p-value
Cronbach's Alpha (Reliability)	-0.12185331015808831	
Spearman Correlation (Confidence vs. Overall Impact)	0.06798708932059394	0.2842492506516609
ANOVA Test (AI Impact across Occupations)	0.9758937547078372	0.4212979112959859







Interpretation of Statistical Tests and Charts

The p-value obtained from the Shapiro Wilk's test concerning 'Confidence in AI-Accuracy' is less than 0.05 which signals an abnormal distribution of this data ($p < 0.0001$). This points towards the fact that the confidence levels of the various participants appear to be somewhat unevenly distributed and therefore analysis involving this variable is likely to benefit from the use of non-parametric tests further down the line (Xia).

Concerning questions regarding AI benefits such as confidence diagnostic errors, speed, and early diagnosis, Cronbach's Alpha results for the test of reliability were negative, -0.122. This means that there is poor internal consistency of the items. This means, perhaps, these items do not measure the same dimension and need to be reworded to suit a common dimension that they ultimately will be measuring (Singh et al., 2024).

When participants were asked to rate the variables 'Confidence in AI-Accuracy' and 'Overall Impact of AI' the Spearman correlation between the two was weak $r = .068$, $p = 0.284$ so not significant, therefore confidence in the accuracy of AI systems is unlikely to influence the overall impression or impact of AI on the diagnosis of pulmonary conditions among the participants. This weak correlation suggests that there are other issues affecting views of the impact of AI on the general perspective (GM Currie, Hawk, & Rohren, 2024).

The ANOVA test results demonstrated that there was no statistical difference in the level of AI impact across different professions ($p = 0.421$). In other words, it seems that all professionals including radiologists, pulmonologists, AI developers, and medical technologists agree that the influence of AI tackling imaging is augmenting (Hitch, 2024).

Chart Interpretation

The distribution of the variable, "Confidence in AI-Accuracy," reflects that the majority of respondents rated their confidence in AI diagnostics between levels 2 to 4 with relatively few respondents providing a level 1 or 5 rating. This illustrates a five-point scale for AI's capacity that people hold, which is quite modest (Baldini et al., 2024).

The distribution of "Overall Impact of AI" views shows about the same, most respondents rated AI's axes of impact moderation between 2 to 4. This reinforces the idea that while AI is accepted in the diagnosis of pulmonary disease, it is not considered revolutionary (Awujoola, Enem, Ogwueleka, Abioye, & Awujoola, 2024).

According to the Frequency of Use of AI-Augmented Imaging chart, there appears to be a discrepancy in responses whereby a good number of participants claimed regular usage of AI, suggesting that AI is embedded in the professional workflow of many individuals already (Kathait et al., 2024).

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The scatter plot showing confidence in the accuracy of AI and confidence in the impact of AI exhibits a wide gap in their relations and this agrees with the weak correlation. There is no clear pattern in the data which means the belief of the people in the accuracy of AI is not closely related to their overall opinion about AI's impact at large (Chen et al., 2024).

In the Challenges in Using AI bar chart, “Limited clinical validation” and “Lack of training on AI tools” appear to be the most frequent obstacles challenges bar graph depiction of specific hurdles is quite informative. These are seriously hindering possibilities of better integration and efficacy of AI in the diagnosis of pulmonary diseases suggesting that these domains require more emphasis and improvement (Wen et al., 2024).

The Trust in AI for Autonomous Diagnosis chart showed a lot of diversity as far as the levels of trust are concerned with a significant number of respondents showing average and low trust. In this regard, there is a tendency to fully trust AI to autonomously make diagnostic decisions which such issues as accuracy, accountability, and data integrity influence (Jain).

Discussion

The results of this study contribute to understanding the perception and the role AI imaging technologies have in the diagnosis of pulmonary diseases in the healthcare professions. In addition, the statistical tests and visual analyses depict some trends as well as issues that need to be resolved so that AI is fully embedded and much more impactful in the clinical setting. The absence of normality for “Confidence in AI-Accuracy” depicts a situation where professionals have different opinions on the confidence level, and that AI still cannot be trusted due to the different developmental stages. Some respondents may have had positive experiences somehow from AI, while others may still be doubtful because of partial or no results. That means such evidence is required to bring the needed faith into the general scenario (Mehrotra-Varma, 2024).

Such gaps are deeply evident among the questions gauging the benefits of AI as some respondents gave negative Cronbach’s Alpha, pointing out there is experimental bias in how AI can help diagnose patients, how fast the patients can be cured, and how destructive the medical AI tools can be. Such differences may not only be due to the exposure, and experience of the exposed to AI tools, but also the utilization of the AI within and across medical institutions. This goes to show that there is a lot of need for uniformization in AI technologies and an even greater need for broader exposure across different healthcare environments. The low r-squared value suggests that lower confidence in AI's accuracy might be due to factors other than its precision, hence increasing the negative view on utility. Such factors could include ease of use, level of integration with existing systems, cost, and degree of regulatory approval (M. H. Wang et al., 2024).

For the latter, it suggests that in addition to improving diagnostic accuracy, AI developers and healthcare organizations need to pay attention to all these practical issues to enhance acceptance. According to the ANOVA test, the difference in perception of AI's impact amongst various professionals was not significant. That indicates that AI-augmented imaging of a person's specific role in healthcare is one of the concerns that these professionals have. Such type of homogeneity in this study means that the barriers to adoption of AI are not occupation-specific and therefore efforts towards improvement of AI implementation should target the entire medical community and not certain subgroups (Kim, 2024).

Data charts confirm this conclusion. The AI usage frequency shows that although AI has been incorporated into clinical practice, there are still many professionals who do not use it or have just started using it. In addition, the limitations that were discussed above, such as the lack of adequate clinical evidence and lack of training, are fundamental obstacles on the way to the more extensive use of AI technologies. Such barriers must be solved by comprehensive studies, practice, and teaching of AI technologies. The varied level of trust in AI in the autonomous diagnosis process shows that although AI can help perform tasks, physicians are not ready to use it independently. This indicates the need for improvement in AI transparency and explainability, so users can trust the decisions AI makes and can supervise its actions (Yau, 2024).

Conclusion

1.2 AI-Focused Image Diagnostics: Emerging Application AI use in Medicine: AI is making headway into areas that weren't as integrated before. This study on AI-augmented imaging for Precision Diagnosis of Pulmonary Diseases illustrates some integration aspects of AI in lung disease diagnosis such as chronic obstructive pulmonary disease (COPD), lung cancer, and interstitial lung disease. The evidence suggests that AI has so far performed quite well in providing improved accuracy and automaticity in diagnosis but still, there are quite several barriers that must be addressed to ensure broader usage.

Correspondingly, findings from the survey data analysis indicate that there are in most cases differences of opinion among healthcare practitioners on AI's ability to accurately diagnose conditions, some even possessing a moderate level of confidence towards it. Even though the opportunities that this AI application affords seem endless, AI is not yet regarded as a diagnostic emulator, as there are still a majority of professionals who are skeptical about AI making customized diagnoses by itself. This indicates that AI is now perceived as additional hardware that requires supervision.

Similarly, crucial issues such as insufficient clinical trials, unavailability of qualified professionals, and complicated incorporation into current medical structures were also reported to be the main reasons for the restriction of artificial intelligence use. Because other results did not show a significant increase in AI use, it follows that more education and training programs are needed as well as standardized guidelines on portraying how AI use could be implemented as well as large-scale clinical studies to demonstrate AI capability in practice.

In summary, AI-augmented Imaging has shown its potential for improving the diagnosis of pulmonary diseases but also has its limitations. In the future, more efforts in establishing the confidence of healthcare providers towards AI technologies such as ensuring the accuracy of the AI and education on the tools should be incorporated. As such, AI can be a better embraced technology throughout the diagnosis cycle which in turn better the patients' outcomes and healthcare delivery.

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