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THE ROLE OF ARTIFICIAL INTELLIGENCE IN MEDICAL DIAGNOSIS AND TREATMENT

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Abstract
It is quite good at gathering homogeneous data from large amounts of data and can learn from any type of input, including photos, videos, and numbers. Learning data can provide you the background knowledge you need to look into and find pertinent information. Pre-screening for human diseases to extend life expectancy is a major challenge for the medical business today. Pre-screening is used in many medical applications, including as the automatic diagnosis and identification of MRI brain tumors, the detection of breast and lung cancers, and diabetic retinopathy. Selecting the right image processing methods is crucial for autonomous learning and information extraction.Techniques from artificial intelligence can effectively and efficiently offer more generic answers for a variety of significant issues. Through the use of artificial intelligence tools, computers can mimic human intelligence. Additionally, a physician's job is made more difficult by the abundance of factors accessible for analysis and diagnosis. An expert's best bet for identifying all the risk elements and displaying specific outcomes in ambiguous words will be an accurate tool.

Keywords: develop personalized, treatment plans, enhance patient

1. INTRODUCTION

The field of research at the nexus of healthcare and information technology is known as medical informatics. Medical informatics integrates disparate medical databases for use in medical research [1]. They contain medical records and imaging data, and they have certain characteristics. Thanks to imaging modalities, digital image data is composed of pixels that each represent a portion of an actual thing. Medical test findings, on the other hand, make up the biomedical record. Different analysis techniques must be used to distinguish between imaging data and biomedical records [2]. Methods and researchers have already been used to examine biomedical records. Imaging procedures produce data in the form of medical images.The topic of Computer-Aided Diagnosis (CAD) research is expanding and changing quickly due to new interpretation problems, special imaging modalities, and modern computer technologies[11]. CAD helps to reduce the number of false negatives reported by supporting radiologists in the lesion detection, sickness staging, and diagnostic processes. A CAD system's general components include segmentation and classification, area of interest labeling, feature extraction and selection, training sample selection, image preprocessing, and area of interest delineation [4].Image classification, the process of extracting features and classifying objects, is one of the main phases in automated CAD systems. In other words: usual or out of the ordinary [3]. Visually segmenting an image entails grouping pixels based on common characteristics. Issues with patient confidentiality and the requirement for in-depth explanations from medical practitioners make gathering and organizing medical data difficult [12]. One of the two main approaches is gathering fresh data; the other is looking at previous clinical reports or using crowdsourcing. [16].

2. REVIEW OF LITERATURE

Among the numerous uses of data mining are web mining, expert prediction, CRM, E&M analysis, market research, and mobile computing. Instead than using the knowledge-rich material hidden in databases, clinicians frequently rely on their own experience and intuition. Because of needless biases, errors, and increased healthcare costs, patients receive lower-quality care [5]. This is an interesting idea because data mining and other modeling

and analysis techniques could provide a knowledge-rich environment that greatly increases the precision of treatment choices [6].Successful data mining applications are being extensively utilized by the relevant parties as a result of the realization of the importance of data mining in gathering vital information for all healthcare-related businesses [15]. To properly use data mining algorithms to medical data, researchers must have a thorough understanding of data mining processes [13]. Descriptive (or unsupervised learning) and predictive data mining techniques are the two categories into which they fall [8]. Using descriptive data mining, which finds previously unnoticed patterns or correlations in the data and arranges information according to the similarities between objects (or records), users may make sense of a large data set. A descriptive framework is essential to investigative data mining [7].It includes grouping, associating, synthesizing, and identifying missing relationships [10]. The creation of predicting rules, such as non-as classification prediction models, and their subsequent application to data that has not yet been predicted or classified are necessary for data mining for prediction, which may include classification, regression time series analysis, and prediction. [14].

3. MATERIALS AND METHODS

In addition to raising the standard of care, AI-driven diagnostic advancements are empowering medical professionals to act more quickly and decisively. AI's use in medical diagnostics will surely grow as it develops, opening the door for even more important advancements in healthcare and medicine in general [9]. To stay on the cutting edge of medical innovation and give patients the best care possible, healthcare professionals must adopt new technologies.

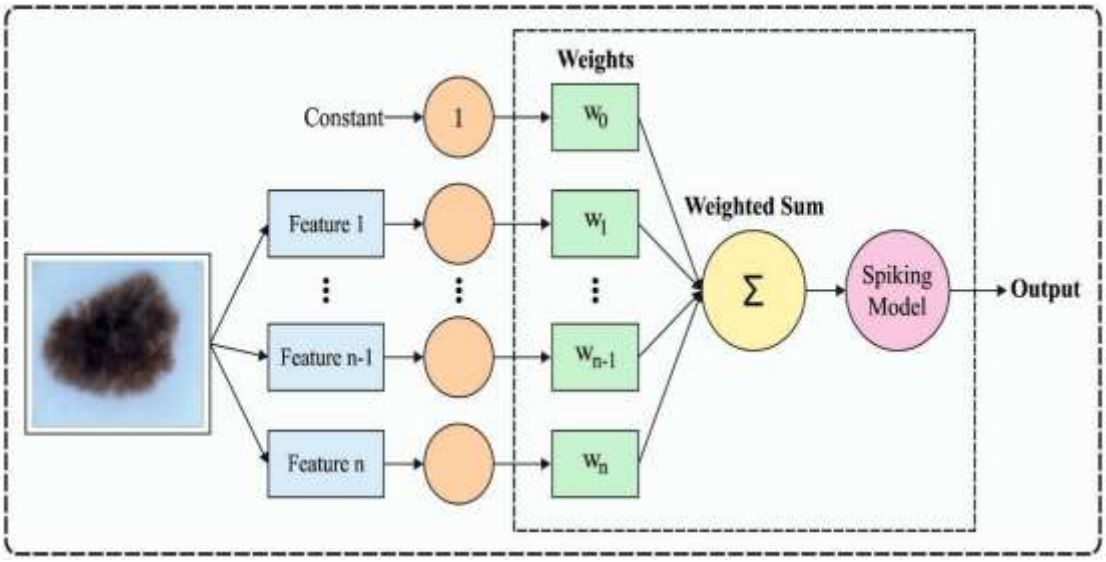

Figure 1: Framework of SNN model

Integrating information from several sources can decrease false positives, increase diagnosis accuracy, and give a more comprehensive view of a patient's health. Multimodal data can assist medical professionals in better treating and managing chronic illnesses by monitoring the course of an illness over time. By analyzing multimodal medical data, explainable XAI-based medical professionals can detect potential health problems early on, before they worsen and become potentially fatal.

4. RESULT AND DISCUSSION

The application of GAI in medical diagnosis of a private and sensitive dataset raises ethical questions about algorithmic transparency, data privacy, and accountability for AI algorithm decisions.

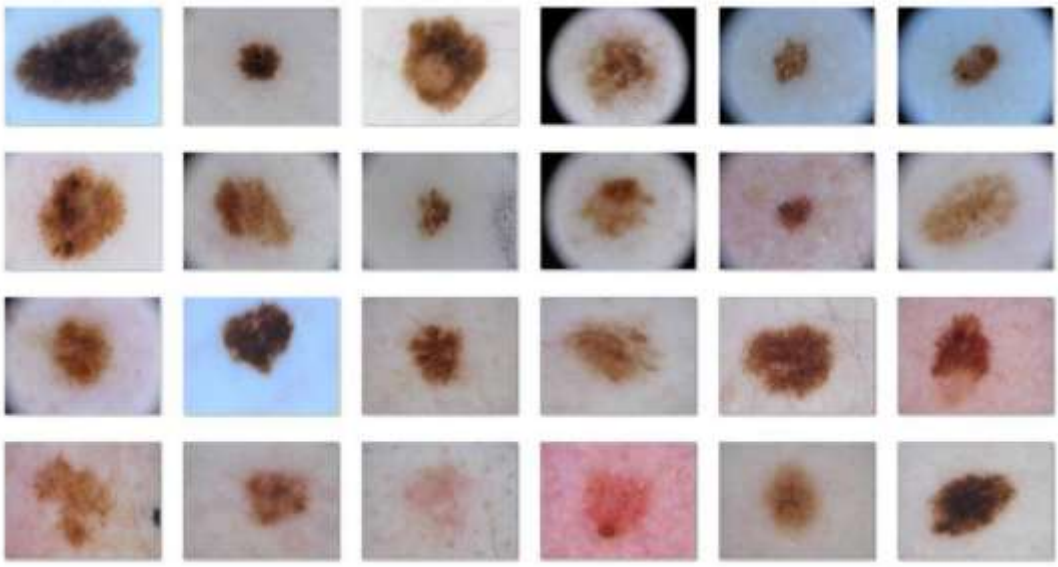

Figure 2: Sample Images

However, as AI-based medical diagnostics is still in its early stages, we strongly advise researchers to conduct further studies to increase the accuracy of the final predictions and speed up the learning process.

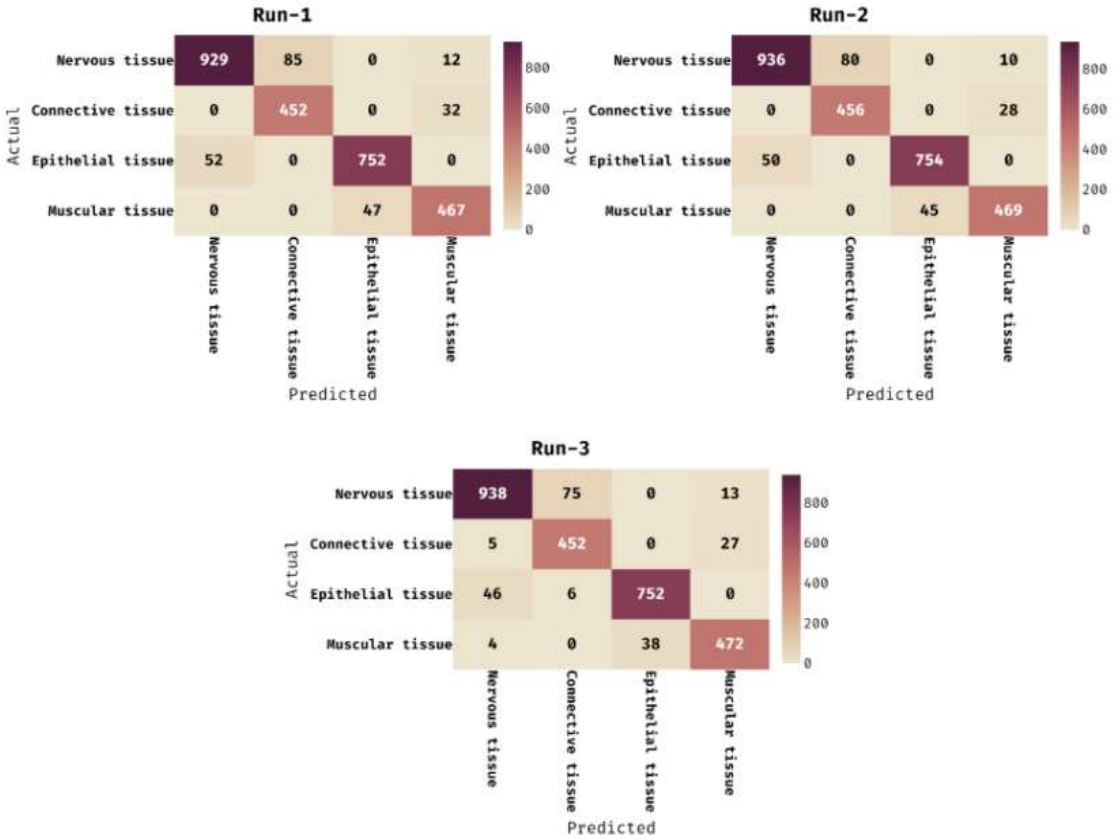

Figure 3: Confusion matrix

Even though a number of federated learning-based strategies have recently been proposed to address these problems, further research is necessary to validate the tool's suitability for use in medical research.

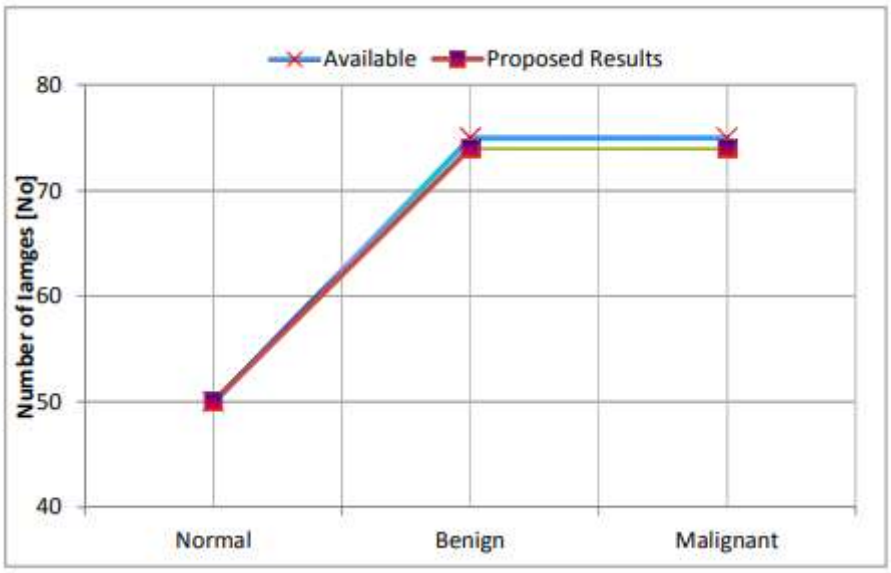

Figure 4: Classification performance of proposed approach

Additionally, interoperability standards and protocols are necessary for the AI-based medical diagnostic instruments that are regularly produced by numerous companies and organizations to work together effectively.

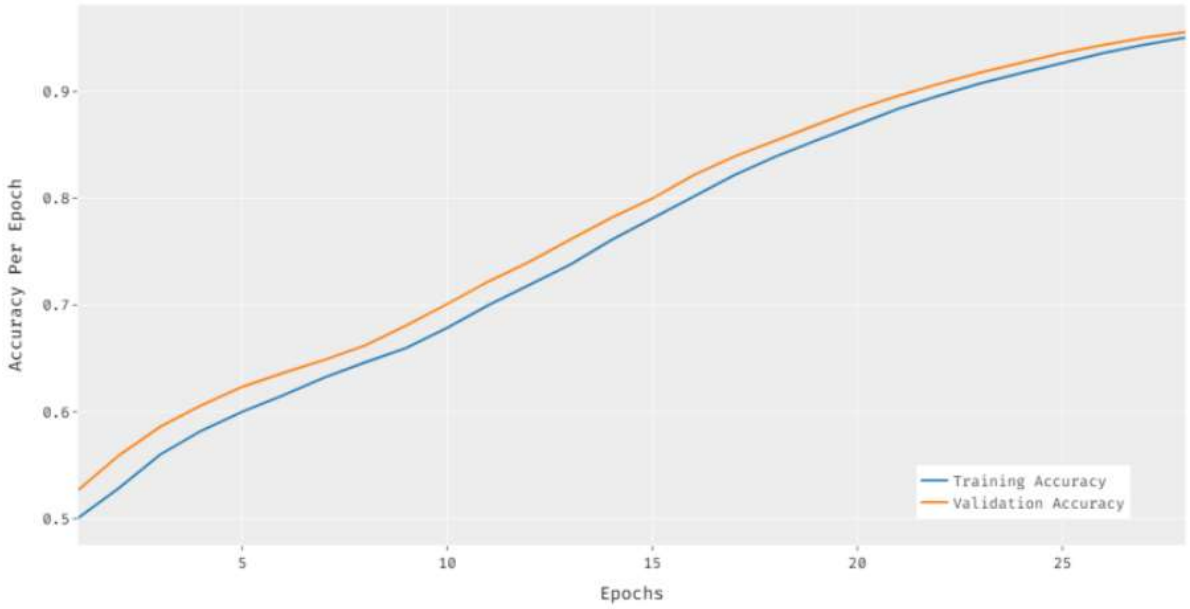

Figure 5: Accuracy analysis

Among other aspects of healthcare, AI has the potential to revolutionize diagnostics. One area of artificial intelligence that uses data as an input resource is machine learning (ML).

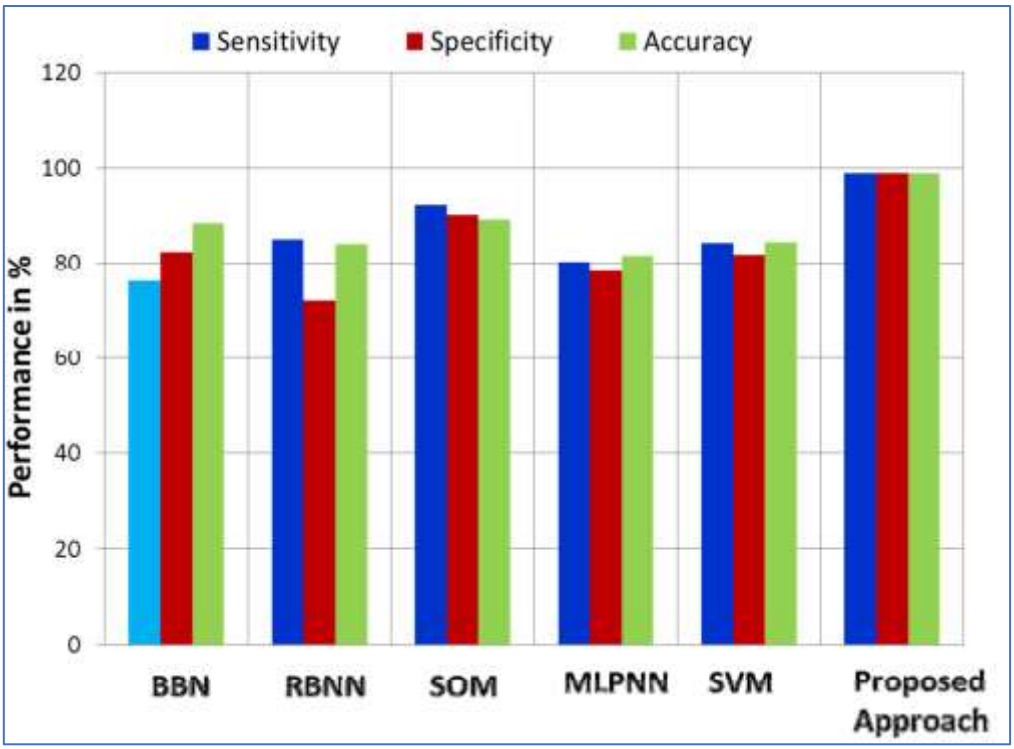

Figure 6: Performance evaluation of proposed approach comparing with existing systems

Although it can circumvent some of the difficulties and complexities of diagnosis, its accuracy is highly dependent on the volume and quality of the input data.

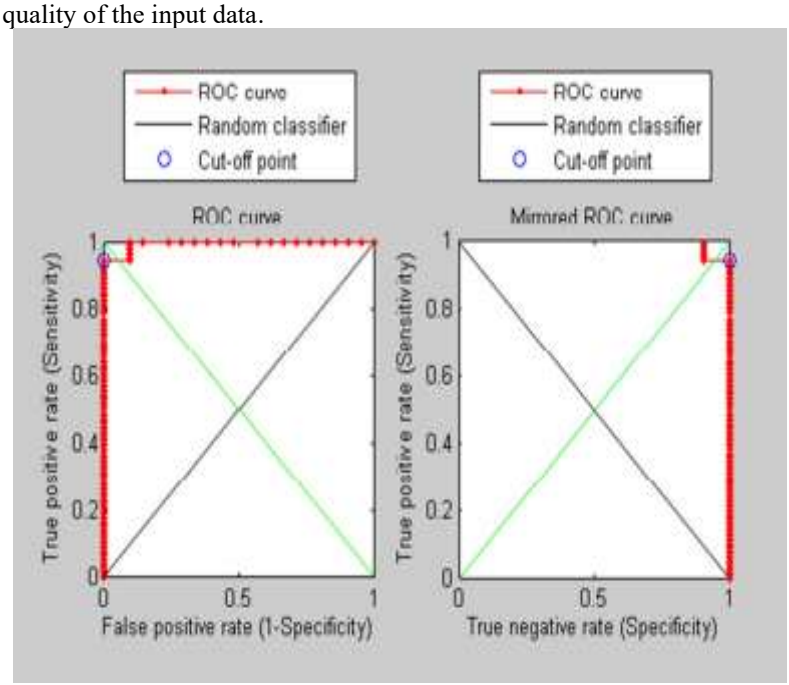

Figure 7: Curve evaluation

By automating repetitive tasks with XAI technologies, medical staff may concentrate on more complex patient care.

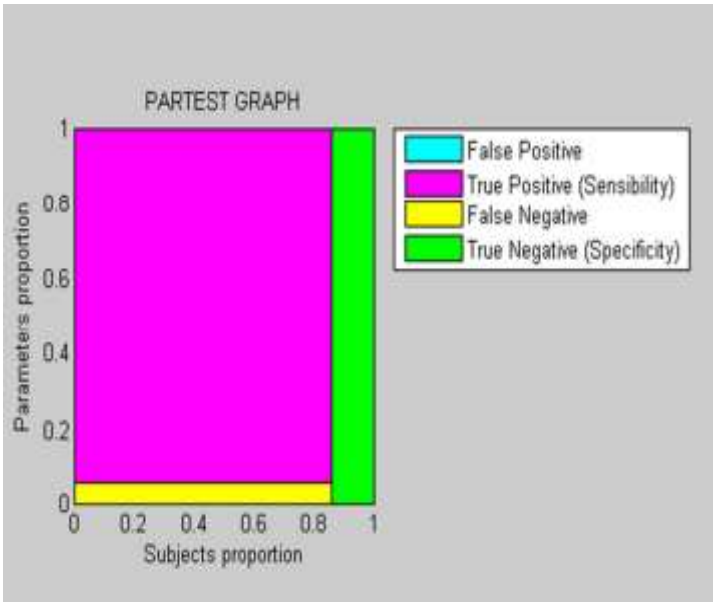

Figure 8: Par-test graph

OpenAI's continued expansion and advancement are expected to have an impact on future advancements in AI-based medical diagnostics.

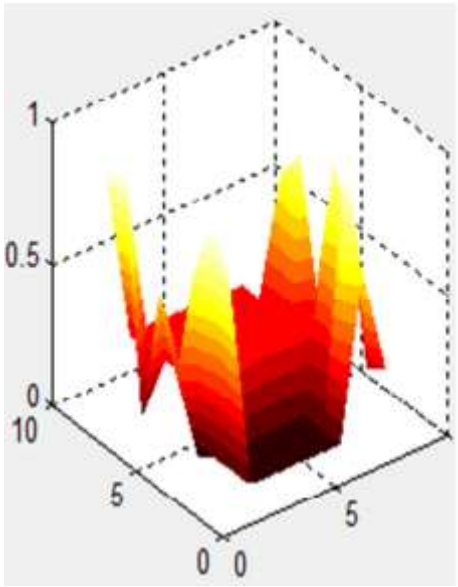

Figure 9: Clustered image

Quantum artificial intelligence (AI) systems may be able to analyze enormous amounts of medical data in real-time, yielding more accurate and useful diagnoses, because they have significantly more processing capacity than traditional computers.

5. CONCLUSION

In short, machine learning (ML) may help with task automation, workflow management, and quick and cost-effective decision-making. Furthermore, deep learning added layers that search for patterns in the data using Convolutional Neural Networks (CNN) and data mining. These are highly helpful in identifying diseases because they may identify significant trends in vast datasets. These techniques are highly advantageous for the diagnosis, prognosis, and classification of diseases in healthcare systems. AI's full application in medical diagnostics is still in its early stages. However, more details about AI's application in the diagnosis of several diseases, including cancer, are beginning to emerge. Using a large dataset of mammograms, researchers in the UK developed an artificial intelligence system to detect breast cancer. This study found that using an AI system to interpret mammograms resulted in a 5.7% absolute decrease in false positives and a 9.4% absolute decrease in

false negatives. In a different study, South Korean researchers contrasted artificial intelligence and radiologists' methods for diagnosing breast cancer.

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