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Artificial Intelligence-Based Computer-Aided Diagnosis of Neonatal Sepsis: Current Advances, Challenges and Clinical Opportunities in Nigeria

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ABSTRACT

The mortality rate of neonatal sepsis in Nigeria ranges from 26.7% to 33.3% because of the low accuracy of the available methods of diagnosis, owing to its nonspecific symptoms. Also, the long time required (48 to 72 hours) to complete laboratory tests using common diagnostic tools, such as blood cultures and biomarkers. These challenges often lead to delayed treatment of infected babies and, eventually, high mortality rates. This article presents a review focusing on the potential of Artificial Intelligence-Based Computer-Aided Diagnosis (AI-CAD) systems for early diagnosis and treatment of neonatal sepsis. Specifically, the paper discusses traditional diagnostic methods for neonatal sepsis and their limitations. In addition, artificial intelligence methods such as machine learning, artificial neural networks, Random Forest, XGBoost, Support Vector Machine, and Long Short-Term Memory were studied as potential diagnostic tools for neonatal sepsis prediction. The paper presents a conceptual proposal for an AI-CAD system and the evaluation metrics for it. Such metrics include the F1-Score, area under the precision-recall curve (AUPRC), and the area under the receiver operating characteristic curve (AUROC), which could distinguish true positives from false positives at a baseline of 0.5. The review highlights the capabilities of AI-CAD systems to revolutionize neonatal healthcare in developing countries, improving diagnostics and reducing infant mortality rates. Nonetheless, the successful incorporation of such technologies requires addressing several important considerations, including the development of an electronic medical database, ethical issues, and Medical-Tech (MediTech) professionals' collaborations.

INTRODUCTION

The most vulnerable period of life is the first 28 days of life; this is why children face the greatest risk of dying in the neonatal period. As of 2022, according to the World Health Organization (WHO) report, globally, 2.3 million children died in the first 28 days of life, and about 1 million newborns die within the first 24 hours; approximately 6500 newborn deaths occur daily. The 47% of children's deaths under the age of 5 years occurred in the newborn period (first 28 days of life) (Odeyemi *et al.,* 2024). Mostly premature birth, birth complications (birth asphyxia/trauma), neonatal infections, and congenital anomalies remain the leading causes of neonatal deaths. Neonatal Sepsis (NS) is defined as a systemic inflammatory response syndrome in the presence or following a suspected or established infection with or without associated bacteremia, documented by a positive blood culture during the first 28 days of life (Agnche *et al.,* 2020). According to Nyenga *et al.,* (2021), the term 'neonatal sepsis' is used to denote a condition of bacterial, viral or fungal origin associated with hemodynamic changes and other clinical manifestations resulting from the presence of pathogenic microorganisms (bacteria, viruses, or fungi) in normally sterile fluid, such as blood or cerebrospinal fluid (CSF) in the first month of life (Procianoy & Silveira, 2020). Under-five mortality rate in Nigeria is even higher, swinging between 56 deaths per 1,000 live births in urban areas and 87 deaths per 1,000 live births in rural areas. Nigeria failed to meet the World Health Organization's (WHO) 4th Millennium Development Goal (MDG), which aimed to reduce the under-5 mortality rate by two-thirds by 2015. 40% of deaths within this age group occur within the first 30 days of life, in a group classified as neonates (World Health Organization, 2015). Neonatal sepsis contributes greatly to neonatal mortality and has been tagged as one of the leading causes of neonatal mortality and neurocognitive sequelae (complications involving damage to the central nervous system) (Cantey & Lee, 2021) in the Neonatal Intensive Care Unit (NICU), especially in developing countries. The mortality rate associated with neonatal sepsis varies depending on factors such as birth weight, gestational age, and other co-morbidities. It can also lead to a range of long-term health consequences, including neurodevelopmental (Du, 2024; Sheikh, & Rinvee, 2025, Cherima, 2026) disabilities like cerebral palsy, visual or hearing impairments, and cognitive problems.

LITERATURE REVIEW

Despite the adverse effects of this disease on infants and

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its contribution to neonatal mortality and morbidity in society, unfortunately, Nigeria is making slow progress towards changing this narrative. According to Ogunlesi & Ogunfowora (2010), sepsis-related case fatality rates ranged from 26.7% in Abakaliki to 27.3% in Jos and 33.3% in Ile Ife over the past two decades, all within Nigeria. Olorukooba *et al.* (2020) and Onubogu *et al.* (2024) studied the prevalence of neonatal sepsis and its predisposing factors among neonates admitted to the Ahmadu Bello University Teaching Hospital (ABUTH). The assessment of the prevalence, clinical outcomes, and risk factors for neonatal sepsis among neonates in a tertiary facility will help provide information to policymakers and/or management to take more preventive measures in reducing the risk among neonates. Few studies have been done on the current methods to reduce the morbidity or mortality rate caused by neonatal sepsis among newborns in Nigeria.

Neonatal Sepsis can be classified according to the time of onset as Early Onset Neonatal Sepsis (EONS) and Late Onset Neonatal Sepsis (LONS). According to the majority of studies, EONS is defined as sepsis occurring within the first 72h of life, with LONS presenting after this time period. Early-onset neonatal sepsis remains a feared cause of severe illness and death among infants of all birth weights and gestational ages, with particular impact among preterm infants (Adedokun *et al.,* 2020). Early neonatal sepsis is acquired in the peripartum period, before or during childbirth; therefore, the microorganisms are usually from the maternal genitourinary tract. In this context, infection occurs in utero from transplacental transmission or more commonly vertically (ascending) from the vaginal environment after rupture of membranes. In addition, the newborn can become infected when exposed to pathogenic bacteria, viruses, or fungi during passage through the birth canal (Kim *et al.,* 2020). LONS is a postnatal acquired infection that usually begins after 72 hours of age. It occurs most often in infants who remain hospitalized for long periods, such as preterm or full-term infants who require prolonged hospitalization and invasive procedures, especially in infants with low birth weight. LONS has been associated with poor neurodevelopment and growth, as well as altered lung development (Eichberger *et al.,* 2022).

MATERIALS AND METHODS

This study employed a descriptive review to demonstrate the capabilities of AI-CAD systems for detecting and managing neonatal sepsis. Highly reputable publication databases, such as ResearchGate, Scopus, PubMed, Google Scholar, and Semantic Scholar, were explored to identify relevant articles covering publications from 2020 to 2025. These helped capture specific and recent advances in neonatal healthcare and AI.

The keywords used in the search include:

1. Artificial Intelligence in healthcare
2. Machine learning for neonatal sepsis diagnosis
3. Neonatal Sepsis
4. AI-enhanced neonatal healthcare techniques
5. Computer-Aided diagnosis of newborn diseases

The selected publications are experimental articles, reviews, and conference papers related to the diagnosis of neonatal sepsis and AI-based diagnostic tools. Attention was given to studies involving machine learning techniques such as XGBoost, Random Forest, and Support Vector Machine (SVM). Also considered are deep learning algorithms applied to neonatal diseases, such as Long Short-Term Memory (LSTM), Gated Recurrent Units (GRU), and Artificial Neural Networks (ANN). The articles obtained were carefully analyzed to identify current advances in neonatal healthcare, as well as the applications, challenges, and prospects of AI-CAD integration in this field, particularly in Nigeria and other developing nations.

RESULTS AND DISCUSSIONS

This section presents the observations of the review; conventional diagnostic procedures and the challenges and the limitations of the currently available AI models for detecting neonatal sepsis. The need for improved system and the proposed AI techniques for reducing sepsis-linked neonatal mortality was also discussed.

Conventional Diagnostic Methods and Their Limitations

The conventional diagnosis of sepsis is clinical, that is, initiation of empirical antibiotics. Often, the symptoms overlap with other neonatal diseases such as respiratory distress syndrome (RDS), cyanotic congenital heart

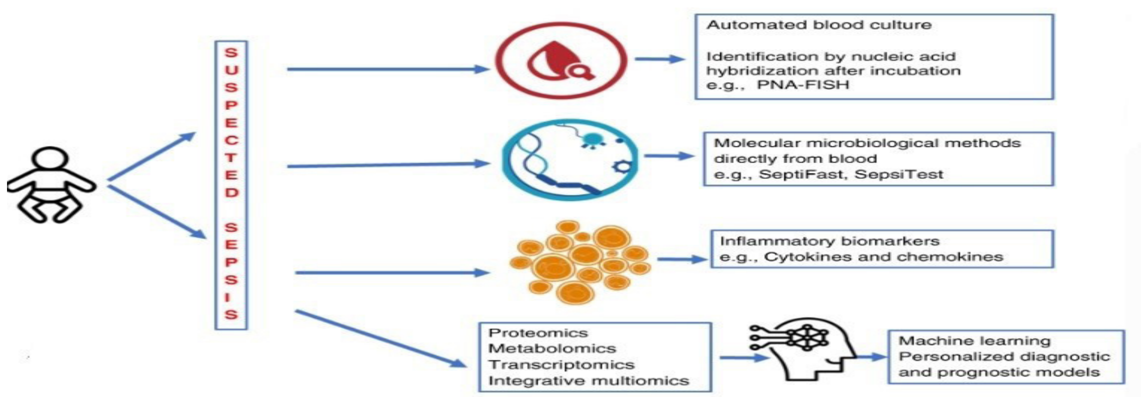

Figure 1: Neonates Sepsis Diagnosis Methods (Celik *et al.,* 2021)

disease, metabolic disorder, and so on. Some of the conventional diagnostic methods for neonatal sepsis, as presented in Figure 1, include Microbiological Culture Methods, Biomarker testing, and Molecular techniques, according to Charikleia *et al.* (2024). Studies revealed that there is a high prevalence of neonatal sepsis in Nigeria, with neonatal blood culture-positive rates ranging from 25% to 55% reported in various studies carried out in Nigeria (Olorukooba *et al.,* 2020).

Microbiological culture methods are considered the gold standard for sepsis diagnosis (Domenico *et al.,* 2024), as blood volume is the major factor influencing the likelihood of a positive blood culture (BC), and available recommendations suggest a wide range for optimal blood volume. However, blood cultures have important limitations. They may take 36 to 48 hours to become positive, and false-negative results can occur because of low-level bacteremia, prior maternal or neonatal antibiotic exposure, or inadequate sample volume. For neonates, the minimum blood volume recommended is 0.5mL; otherwise, a lower blood volume is associated with a higher rate of false-negative BC and a diagnosis of sepsis, with antibiotics administered immediately. Arowosegbe *et al.* (2017) conducted a study to determine the clinical presentation, etiological agents of sepsis, and antibiotic sensitivity patterns in neonates with suspected septicemia admitted to the neonatal unit of a Tertiary Hospital in Nigeria. The study found that 10 (11.8%) of the neonates recruited, including 2 with positive blood cultures, were discharged against medical advice. 48 (56.5%) of the neonates were discharged in good condition after appropriate interventions, including antibiotic therapy. Death occurred in 27 (31.8%) of the 85 neonates. Five (26.3%) of the neonates with positive blood culture died. The case-fatality rate was 26%. Maternal antibiotic therapy during birth, while important in the prevention of neonatal sepsis, has further been discussed as a possible confounder of blood culture results (Klingenberg *et al.,* 2018). According to Ahmed *et al.* (2019), a recent retrospective observational study, 40 positive blood cultures collected from late preterm and term infants showed bacterial growth within 24 hours (39/40, 98%). The possibility of cross-contamination or asymptomatic bacteremia may also lead to a misleading or inaccurate diagnosis.

Several laboratory investigations are used alongside cultures to diagnose neonatal sepsis, including inflammatory markers. Though complete blood count is effective and supports clinical diagnosis, it is not sufficiently sensitive and specific to detect sepsis on its own. Common laboratory inflammatory markers include C-reactive protein (CRP), white blood cell count (WBC), absolute neutrophil count (ANC), and the immature-to-total neutrophil ratio (IT-ratio), according to Eichberger *et al.* (2022). None of these listed still has enough sensitivity to detect all infected children; most of their diagnostic values are limited in the early course of the disease. Therefore, the use of these markers offers no improvement compared to blood culture. Therefore, current sepsis diagnosis in neonates is typically based on a combination of maternal risk factors, hematologic indices, and the judgment of the physician rather than their clinical presentation, and all these are not effective enough to reduce the rate of neonatal mortality caused by sepsis.

Diagnostic Challenges in Neonates (non-specific symptoms, delayed culture results) in Nigeria

Due to the risk and great effect of the diseases in neonates, precise diagnosis is extremely important. Under-diagnosis may lead to the development of overwhelming infection or central nervous system involvement, while over-diagnosis can result in inappropriate antibiotic use (Du, 2024). Diagnosing serious infections in neonates remains a profound clinical challenge because of the very nonspecific nature of symptoms and the limitations of current laboratory diagnostics, mostly in developing countries. The clinical manifestations vary considerably and are nonspecific, which makes the diagnosis of early neonatal sepsis difficult and predisposes to excessive antibiotic use. Newborns with sepsis or other bloodstream infections often present with subtle signs such as temperature instability, feeding intolerance, respiratory distress, lethargy, or poor perfusion that overlap with (Celik *et al.,* 2021) normal transitional physiology and non-infectious conditions, particularly in preterm infants. These presentations lack specificity and can easily be mistaken for a wide range of benign or unrelated pathologies, complicating early clinical recognition and often leading to either delayed treatment or unnecessary empirical antibiotic use.

Biomarkers and routine laboratory tests such as complete blood counts, C-reactive protein (CRP), and procalcitonin have been studied extensively but generally offer limited diagnostic accuracy due to low sensitivity, changing normal ranges in early life, and influence by non-infectious inflammatory states, making them unreliable as stand-alone tools for early diagnosis in neonates. The gold standard for confirming neonatal sepsis and other bacterial infections, such as microbiological culture, is also fraught with challenges, further delaying definitive diagnosis. Traditional blood cultures may take 48–72 hours or longer to yield results, and often longer for pathogen identification and susceptibility data, during which clinicians must decide on or continue broad-spectrum antibiotics. In neonates, especially preterm or very low birth weight infants, obtaining sufficient blood volume (≥0.5–1 mL) for culture is technically difficult. It may reduce the likelihood of pathogen recovery, contributing to high rates of false-negative cultures (Narasimha *et al.,* 2024). Additionally, low bacterial load in neonatal bacteremia and prior maternal or neonatal antibiotic exposure can further reduce culture sensitivity. These delays and uncertainties in culture not only delay targeted therapy but also contribute to increased empirical antibiotic use, with downstream consequences for antimicrobial resistance and microbiome disruption.

Artificial Intelligence Techniques Applied to Neonatal Sepsis Diagnosis

With advances in computer technology and its application across sectors, interest in the use of artificial Intelligence in medicine and healthcare has grown drastically in the last few years. A particularly interesting and widely studied branch of artificial Intelligence is artificial neural networks (ANNs). Healthcare facilities, such as hospitals, have recognized the benefits of digitizing data and of collecting and managing it. The ability to process large datasets and develop efficient algorithms makes machine learning a secret weapon in health (Gojak *et al.,* 2022). The major causes of death in sickly newborns or preterms have been traced to late detection or misdiagnosis of the affected diseases. In contrast, traditional methods are prone to delays and can be time-consuming. The role of artificial Intelligence in the early detection of sepsis in neonates is diverse and multidimensional, as machine learning can identify patterns and predict a high risk of clinical deterioration in sepsis-like illnesses (Sullivan *et al.,* 2022).

Helguera-Repetto *et al.* (2020) developed a model for diagnosing neonatal sepsis (including EONS and LONS) at the time of clinical suspicion in the NICU using an artificial neural network, for which medical records were collected from mothers and neonates. Lyra *et al.* (2023) demonstrate the potential of Machine Learning-based prediction models for the detection of sepsis to improve the early diagnosis of life-threatening conditions in neonatal intensive care units. The work used three clinical datasets: adult PhysioNet/Computing in Cardiology (CinC) data, patients with blood-test-diagnosed sepsis, and adults without sepsis to train, optimize, and evaluate four prediction models (Logistic Regression, Long Short-Term memory, XGBoost, and Random Forest). Yohanes & Tilahun (2023) developed a machine learning stacking model capable of early predicting the four main neonatal diseases: sepsis, birth asphyxia, necrotizing enterocolitis (NEC), and respiratory distress syndrome. The machine learning models employed were XGBoost (XGB), Random Forest (RF), and Support Vector Machine (SVM), achieving 97.04% accuracy with the architecture shown in Figure 2.

Sepsis prediction was performed by Honoré *et al.* (2023) using the Naïve Bayes algorithm in a maximum a posteriori framework up to 24 hours before clinical sepsis prediction. The result shows that combining multiple vital signs improved algorithm performance compared with heart rate characteristics alone and enabled sepsis prediction up to 24 hours before clinical prediction, with an area under the receiver operating characteristic curve of 0.82. Another work on the diagnosis of sepsis using artificial Intelligence is the development of a predictive algorithm by Van *et al.* (2023) to aid doctors in the early detection of LOS in very preterm infants. Three machine learning (ML) techniques (generalized additive models, logistic regression, and XGBoost) were used to build a classification algorithm and to simulate its performance in clinical practice. A simulation using multiple alarm thresholds was performed on hourly predictions for the total hospitalization period.

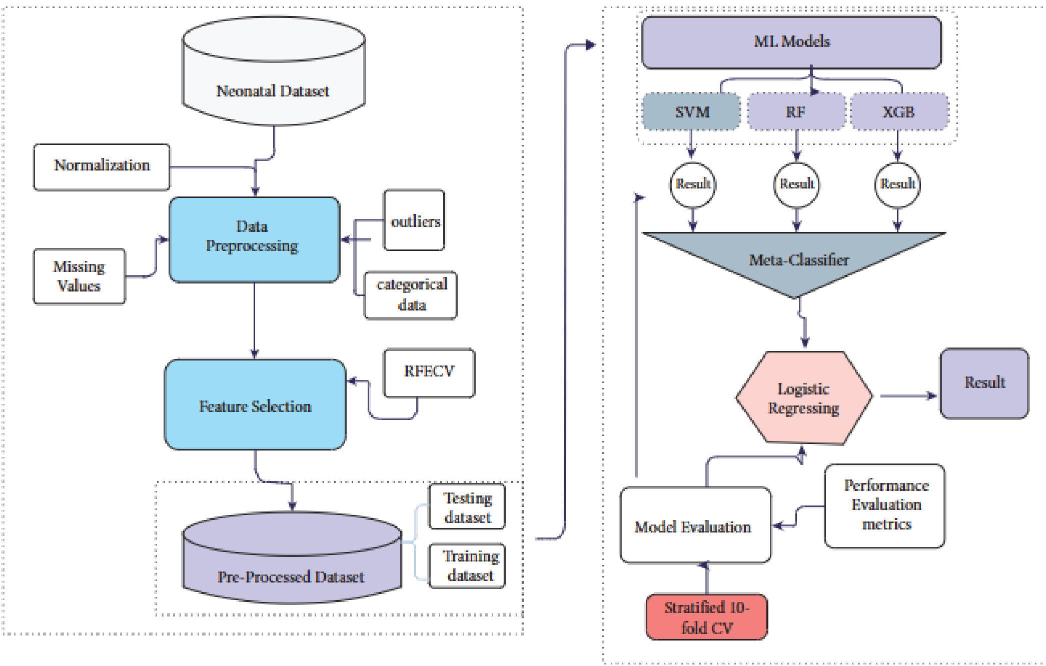

Figure 2: Neonatal disease prediction architecture (Yohanes & Tilahun 2023)

Rationale for Artificial Intelligence-Based Computer-Aided Diagnostic (AI-CAD) Systems

Despite neonatal sepsis being the major cause of neonatal death globally, accurate and timely diagnosis still stands as a great challenge, especially in developing countries. Sepsis can be difficult to identify, especially in its early stages, posing a considerable diagnostic challenge for emergency department and intensive care clinicians (Ogbara *et al.,* 2021). Different computational models have been developed to predict adult, pediatric, and neonatal sepsis. Traditional diagnostic methods are largely hindered by the limited performance of current clinical approaches, imperfect laboratory biomarkers, and the long turnaround time of blood cultures (Agarwal, 2025). The emergence of artificial intelligence (AI) and computer-aided diagnostic (CAD) systems in neonatal care has marked a transformative shift in how clinicians assess, monitor, and predict outcomes for critically ill newborns. Traditionally, neonatal intensive care units (NICUs) relied primarily on clinician experience and basic monitoring devices to interpret vast streams of physiological data. Still, recent advancements in machine learning (ML) and deep learning (DL) have enabled far more sophisticated analysis. These AI models can process multidimensional electronic health record (EHR) data, vital signs, imaging, and biosignals to identify patterns associated with sepsis, respiratory failure, retinopathy of prematurity, and other serious conditions with greater sensitivity and earlier than conventional methods allow, potentially reducing morbidity and mortality among high-risk infants. Such decision-support systems, integrated with clinical workflows, aim not to replace clinicians but to augment their diagnostic accuracy, streamline early detection, and support real-time monitoring, especially in data-rich NICU settings where human interpretation alone is stretched thin. Agarwal & Kainth (2025) discuss the concept of AI, its potential applications in neonates with sepsis, the steps involved in model development, available AI models, and their performance.

Recent literature highlights not only predictive analytics for neonatal disease outcomes but also standardized reporting frameworks for clinical AI models, underscoring the growing maturity and clinical relevance of these tools in neonatology. Computer-aided diagnostic systems, specifically powered by AI, have also evolved from early rule-based tools to dynamic learning models that continuously improve diagnostic precision through exposure to large datasets. In neonatal care, CAD systems enhanced by convolutional neural networks and other DL architectures are being explored for image-based assessments and pattern recognition that might escape traditional interpretation, such as subtle indicators on medical imaging or complex signal variations in biosensors. These systems support clinicians by flagging anomalies, automating parts of the diagnostic process, and reducing the cognitive load associated with interpreting large volumes of patient data. Sullivan *et al.* (2022)

In a bid to alleviate the consequences of late diagnosis in neonatal diseases in Nigeria, Odeyemi & Olaniyan (2026) proposed a machine learning-driven framework that leverages long short-term memory (LSTM) networks for multi-diseases classification in neonates using clinical data sourced from government healthcare facilities in southwestern Nigeria. The framework lays a solid foundation for adopting an AI-assisted platform for a neonatal clinical decision support system. Also, similar literature by Dissaneevate *et al.* (2022) proposes a Mobile Computer-Aided Diagnosis (mCADx) tool to identify the symptoms of Neonatal Hyperbilirubinemia using advanced digital image processing and data mining techniques.

Moreover, contemporary research emphasizes not only the potential for improved diagnostic and prognostic accuracy but also the need to address ethical, infrastructure, and integration challenges to ensure AI-CAD tools are reliably and equitably deployed in everyday neonatal practice. As NICUs continue to generate vast amounts of structured and unstructured data, AI and CAD hold promise for enhancing individualized care, optimizing clinical decision-making, and ultimately improving neonatal outcomes worldwide (Lima *et al.,* 2022).

Ethical Considerations and Implementation Challenges of AI-CAD in Neonatal Healthcare

Although there are prospects for Artificial Intelligence-Based Computer-Aided Diagnosis (AI-CAD) systems in improving neonatal sepsis diagnosis, several ethical and implementation challenges must be considered before full clinical adoption can be achieved. One of the major ethical concerns is data privacy and security, as AI systems rely heavily on sensitive neonatal and maternal medical records (Hall *et al.,* 2020; Ngolah *et al.,* 2024). Ensuring the confidentiality and secure handling of patient information is essential to maintaining trust and complying with healthcare data protection standards.

Another critical issue is algorithmic bias, which may arise when AI models are trained using limited datasets. Biased datasets can reduce diagnostic accuracy across different populations and healthcare environments, particularly in low-resource societies. These could lead to inaccurate predictions and delayed treatment or unnecessary medical interventions, thereby affecting patient safety. Model interpretability is also a significant challenge. Many advanced deep learning models function as "black-box" systems, making it difficult for clinicians to fully understand how diagnostic decisions are generated (Hall *et al.,* 2020). For AI-CAD systems to gain acceptance among healthcare professionals, they must provide explainable, trusted outputs.

Other implementation challenges include inadequate healthcare infrastructure, lack of electronic health record systems, insufficient computational resources, limited technical expertise, and irregular electricity or internet connectivity in some healthcare facilities. Also, neonatal clinicians need to be trained on this new technology, and a collaboration system between health and computing professionals should be established before integrating AI-CAD systems into the neonatal intensive care unit. Then, continuous system monitoring must be in place to ensure reliability and effectiveness. The implementation of AI-CAD technologies presents promising opportunities for enhancing neonatal healthcare; addressing these ethical and implementation concerns is essential for efficient and sustainable adoption in clinical practice.

Architecture Diagram of the proposed AI-CAD system

The proposed architecture for the system is shown in Figure 3. A notion for AI-CAD to detect and easily diagnose sepsis in newborn will assist specialists in effectively evaluating big medical data, improving diagnosis accuracy and consistency while reducing analysis time. The architecture illustrated in Figure 3 is expressed in equations (1) to (3).

If the neonatal input data is X,

$$X=\sum x_1, x_2, x_3,\ldots x_n \quad (1)$$

where x_1, x_2, x_3,….xn are the various features of the neonatal sepsis features. Then the AI diagnostic function is expressed as:

$$Y=f(X;\theta) \quad (2)$$

where :

$Y \in 0,1$

0 implies no neonatal sepsis

1 implies neonatal sepsis detected

f is the AI predictive model

θ is the trained model parameters

Since medical information are in texts and images formats, the more complex machine learning (deep learning) models would be required, thus, the diagnostic function Y becomes:

$$\tilde{Y}=\sigma(Vh_t+b) \quad (3)$$

where:

V is the weight

ht is the hidden layer

b is the bias

σ is the sigmoid activation function

The CAD system is cost-effective and efficient, and it may be utilized by professionals in the diagnosis and treatment of neonatal diseases, also serves as a decision support system. The techniques used are data preprocessing, feature extraction and classification.

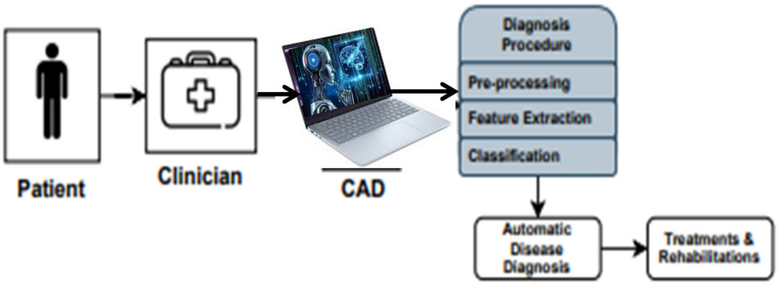

Figure 3: Proposed AI-CAD system for neonatal sepsis diagnosis

Evaluation Metrics

The area under the receiver operating characteristic curve (AUROC), the F1 score, and the area under the precision-recall curve (AUPRC) are frequently used metrics for classifier performance (Raaino *et al.,* 2024). The AUROC illustrates the model's capacity to distinguish true positives from false positives (baseline at 0.5), whereas the F1 score is the harmonic mean of precision and recall. Since the baseline for AUPRC is equal to the fraction of positives, it permits accurate evaluation using precision and recall, whereas ROC curves can be deceptive when assessing imbalanced datasets.

Practical and Clinical Usability

The AI-CAD technique is emerging as an effective technology for improving medical diagnosis, especially in delicate and difficult cases such as sepsis in neonates. Neonatal sepsis, which has been adjudged as one of the leading causes of death of early infants, especially in low-income nations, can be detected early and accurately by integrating AI-CAD techniques into the clinical diagnosis procedure, in that:

1. It has the potential for speeding up the neonatal sepsis diagnosis process because of its ability to detect the disease at the early stage before it results in clinical deterioration.
2. The system is capable of auto-diagnosis by eliminating most tedious clinical procedures.
3. AI-CAD can be integrated with other technologies, such as edge computing and the Internet of Things, to enable real-time infant health monitoring.
4. The technology is not subject to fatigue and stress, which limits the accuracy of human decisions. Therefore, AI-CAD systems would improve clinical diagnosis, thereby increasing newborn survival.

CONCLUSION

Neonatal sepsis is one of the major challenges in public health, especially in developing nations, due to delays and errors in diagnosis. Current methods used in the diagnosis of neonatal sepsis are essential in practice but face limitations such as low sensitivity, a slow testing process, and the difficulty of differentiating between sepsis and other neonatal diseases at an early stage. It is imperative to develop smarter, faster, and more accurate methods to improve the diagnosis and management of this disease.

Artificial Intelligence-Based Computer-Aided Diagnosis systems offer an exciting approach to revolutionize the management of neonatal sepsis by enabling early prediction, supporting clinical decision-making, providing real-time monitoring, and achieving high diagnostic accuracy. With recent advancements in machine learning and deep learning, there has been a remarkable increase in the ability to detect intricate clinical patterns that may not be easily identified with conventional methods.

Nigeria's healthcare system still records a relatively high rate of neonatal mortality and lacks adequate diagnostic technologies; the application of such AI-CAD systems can contribute significantly to enhancing neonatal intensive care services. However, for the technology to be widely adopted in the medical field, certain essential issues must be considered, among them are the availability of high-quality clinical data, model interpretability, thorough clinical validation, ethical considerations, proper training of healthcare providers, and seamless incorporation into hospital operations.

The integration of artificial Intelligence into the diagnosis of neonatal sepsis will mark a significant step toward precision medicine in neonatal healthcare. Given adequate cooperation among medical professionals, engineers, researchers, and policymakers, AI-CAD technologies can greatly reduce morbidity and mortality associated with neonatal health conditions while simultaneously improving the delivery of neonatal healthcare in Nigeria and other resource-limited countries.

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