International Journal of Recent Development in Engineering and Technology
Website: www.ijrdet.com (ISSN 2347-6435 (Online) Volume 15, Issue 04, April 2026)

AI-Based Veterinary Assistance System for Disease Prediction

Anirudh B Nair[1], Aswin Krishna K K[2], Jyothika A S[3], Liya Faby[4], Nived C V[5], Alpha Mathew[6]
Department of CSE, College of Engineering Kidangoor, Kottayam, Kerala, India

***Abstract*-- The rapid advancement of artificial intelligence (AI) in healthcare has created new opportunities for improving veterinary services through intelligent and accessible digital platforms. This paper presents an AI-based veterinary assistance system designed to support early disease prediction, remote consultation, and efficient health record management. The system enables pet owners to input symptoms and receive preliminary diagnostic suggestions using machine learning techniques, assisting in early identification of potential health issues. The platform integrates a user-friendly web interface with a robust backend to ensure efficient data handling, while veterinarians can provide timely guidance through real-time communication features such as chat and video consultations. In addition, the system maintains digital health records and supports notification services for improved healthcare management. The incorporation of AI enhances the speed and effectiveness of preliminary diagnosis and also enables analysis of disease trends for better decision-making. Overall, the proposed system provides a scalable and efficient solution to bridge the gap between pet owners and veterinary professionals.**

***Keywords*-- Artificial Intelligence, Veterinary Healthcare, Disease Prediction, Machine Learning, Telemedicine, Re-mote Consultation, Health Record Management, Predictive Analytics, Intelligent Systems, Digital Healthcare**

I. Introduction

Artificial Intelligence (AI) has emerged as a transformative technology in the healthcare domain, enabling faster diagnosis, improved accuracy, and better patient management [1]. While significant advancements have been achieved in human healthcare systems, the adoption of AI in veterinary healthcare remains relatively limited. Traditional veterinary practices still rely on physical consultations, which can lead to delays in diagnosis and treatment, especially in remote or underserved areas.

Pet owners often face challenges in identifying early symptoms of diseases and accessing timely veterinary support. In many cases, the lack of immediate guidance results in the progression of preventable conditions into serious health issues. Moreover, maintaining and accessing medical records manually can be inefficient and prone to errors. These limitations high-light the need for an intelligent and digital solution that enhances accessibility and supports early-stage diagnosis.

Recent developments in machine learning have demonstrated the capability of predictive models to analyze symptom patterns and provide preliminary disease classification [2]. At the same time, telemedicine systems have gained popularity by enabling remote consultations and reducing the dependency on physical visits [3], [9].

However, existing solutions often focus on either teleconsultation or data management and lack integration with intelligent diagnostic support.

To address these challenges, this paper proposes an AI-based veterinary assistance system that combines machine learning techniques with a web-based platform for seamless interaction between pet owners and veterinarians. The system allows users to input symptoms and receive predictive insights, which can as-sist veterinarians in making informed decisions. Additionally, the platform provides features such as appointment scheduling, digital health record management, and real-time communication. The main objective of this work is to develop a scalable and efficient veterinary healthcare system that leverages AI to improve early disease detection and enhance accessibility to medical ser-vices. By integrating modern technologies such as Node.js, Mongo DB, and AI-based prediction models, the proposed system aims to provide a comprehensive solution for smart veterinary care.

II. Related Works

The application of artificial intelligence in healthcare has been widely explored, particularly in the context of disease prediction and decision support systems. Several studies have demonstrated that machine learning algorithms can effectively analyze medical data and identify patterns that assist in early diagnosis [2]. These approaches have significantly improved the accuracy and efficiency of predictive healthcare systems.

In the field of veterinary medicine, recent research has emphasized the role of digital platforms and telehealth solutions in improving accessibility to medical services. AI-driven tele-health systems enable remote consultation, allowing veterinarians to provide guidance without the need for physical interaction [1], [3]. Such systems are especially beneficial in rural or under-served areas where veterinary services are limited.

International Journal of Recent Development in Engineering and Technology
Website: www.ijrdet.com (ISSN 2347-6435 (Online) Volume 15, Issue 04, April 2026)

Existing telemedicine platforms focus primarily on communication between patients and healthcare providers, offering features such as video consultations and appointment scheduling [9]. However, these systems often lack intelligent diagnostic capabilities, which are essential for early-stage disease identification. The integration of predictive models into such platforms can significantly enhance their effectiveness by providing pre-liminary insights before professional consultation.

Machine learning techniques such as decision trees, support vector machines, and neural networks have been successfully ap-plied in healthcare prediction systems [7], [8]. These models are capable of classifying diseases based on symptoms and historical data, making them suitable for implementation in veterinary applications.

Furthermore, data analytics techniques have been used to monitor disease trends and predict potential outbreaks, contributing to better healthcare planning [10].

Despite these advancements, most existing systems lack a unified approach that combines AI-based disease prediction, digital health record management, and real-time communication in a single platform. The absence of such integration limits the over-all efficiency and usability of veterinary healthcare systems.

To address these limitations, the proposed system integrates machine learning-based prediction with telehealth features and centralized data management, providing a comprehensive solution for modern veterinary care. This approach not only improves accessibility but also enhances the quality and speed of diagnosis-sis, making it a significant improvement over existing methods.

III. Proposed System

The proposed system is an AI-based veterinary assistance plat-form designed to provide intelligent disease prediction, remote consultation, and efficient health record management. The sys-tem integrates machine learning techniques with a web-based ap-plication to support both pet owners and veterinarians in delivering effective healthcare services. The primary objective is to enable early detection of diseases and improve accessibility to veterinary care through a centralized digital platform.

A. System Overview

The system allows pet owners to register, create pet profiles, and submit symptoms through a user-friendly interface. Based on the input symptoms, the AI module analyzes the data and pro-vides preliminary disease predictions.

Users can then schedule appointments and consult veterinarians through real-time com-munication features. Veterinarians can review cases, provide treatment recommendations, and update medical records within the system.

B. System Architecture

The overall architecture of the proposed system is illustrated in Fig. 1. The system is designed as a multi-layered architecture consisting of user, application, data, integration, and communication layers.

1. *Pet Owner Module:* This module allows pet owners to register and log in to the system, create and manage pet pro-files, and submit symptoms or upload images for analysis. Users can book appointments, participate in chat or video consultations, and access digital health records and notifications related to their pets.
2. *Veterinarian Module:* This module enables veterinarians to log in to the system, view consultation requests, and in-teract with pet owners. Veterinarians can provide diagnosis-sis, prescribe treatments, and update digital health records. It also supports real-time communication through chat and video consultation.
3. *Admin Module:* The admin module is responsible for managing the overall system operations. It includes monitoring user activities, managing user accounts, maintaining system data, and ensuring smooth functioning of all modules. The admin can also oversee records and handle system-level configurations.
4. *AI/ML Pre-Diagnosis Module:* This module is the core component of the system, utilizing a fine-tuned Efficient-NetB0 model for image-based disease prediction along with symptom analysis. It processes user inputs and generates preliminary diagnostic results, which assist veterinarians in making informed decisions

C. Working of the System

The workflow of the proposed system. Initially, users register and log into the system, followed by adding pet details. Symptoms are then entered into the system, which are processed by the AI module to generate possible disease pre-dictions. Based on the results, users can schedule consultations with veterinarians. The veterinarians review the case, provide diagnosis, and update the medical records, which are stored for future reference.

International Journal of Recent Development in Engineering and Technology
Website: www.ijrdet.com (ISSN 2347-6435 (Online) Volume 15, Issue 04, April 2026)

D. AI-Based Disease Prediction

The core component of the system is the AI-based prediction module, which uses machine learning algorithms to analyze symptoms and classify potential diseases. The model is trained on structured datasets containing symptom-disease relationships [2], [7]. The prediction results assist veterinarians in making in-formed decisions but do not replace professional medical judgment.

IV. Methodology

In this section, the overall research methodology and the development of the web-based veterinary assistance system are dis-cussed. The description of the dataset used for training the model, the EfficientNetB0-based classifier, and the integration of AI with system modules are presented. Additionally, the process of model fine-tuning, prediction workflow, and disease outbreak alert mechanism are explained.

A. Overview

The proposed system focuses on early disease detection in animals using both image-based and symptom-based analysis. Un-like traditional systems that rely only on manual diagnosis, this approach utilizes a deep learning model to classify diseases from uploaded images and user-provided symptoms. EfficientNetB0 is selected due to its high accuracy and efficiency in image classification tasks. The system workflow is divided into multiple stages including data input, preprocessing, model prediction, consultation, and record management. The overall architecture integrates AI prediction with real-time interaction between pet owners and veterinarians, as illustrated in Fig. **1**.

B. Dataset

The dataset used in this system consists of labeled animal disease images along with corresponding disease categories collected from reliable sources [1]. The dataset includes multiple classes representing different diseases and normal conditions. Each im-age is resized and normalized to match the input requirements of the EfficientNetB0 model. In addition to image data, symptom-based inputs provided by users are also considered for improving prediction accuracy. Data augmentation techniques such as rotation, flipping, and scaling are applied to increase dataset diversity and reduce overfitting.

C. Model Development and Evaluation

In this stage, the EfficientNetB0 model is fine-tuned using trans-fer learning techniques [8]. The base model is pre-trained on large-scale image datasets, and the top layers are modified to suit the specific classification problem.

The dataset is divided into training and testing sets to evaluate performance. The model is trained using optimized parameters to achieve better accuracy and generalization. Performance is evaluated using metrics such as accuracy, precision, and recall. The fine-tuned model provides improved classification results compared to baseline approaches, making it suitable for real-time disease prediction. The training and validation performance of the EfficientNetB0 model is illustrated in Fig. 2. It can be observed that the training accuracy increases steadily while the validation accuracy stabilizes, indicating effective learning with slight overfitting.

The confusion matrix of the proposed model is shown in Fig. 3, which represents the classification performance across different disease categories. The diagonal elements indicate correct predictions, while off-diagonal values represent misclassifications. The model achieves better performance for distinct dis-ease classes, while slight confusion is observed among visually similar conditions.

D. Disease Outbreak Alert Mechanism

An additional feature of the proposed system is the disease out-break alert mechanism, which analyzes collected data to identify patterns and trends in disease occurrence. The system monitors frequently reported symptoms and predicted diseases across different users and locations. If a sudden increase in specific dis-ease cases is detected, the system generates alerts to notify veterinarians and administrators. This helps in early identification of potential outbreaks and supports preventive measures. The out-break analysis module uses aggregated data and basic analytics techniques to detect anomalies and trends [10].

E. Web Application Development

The final stage involves integrating the trained model into a web-based application. The system allows users to upload images or enter symptoms, which are processed by the AI model to generate predictions. Based on the results, users can schedule consultations with veterinarians. The application also maintains digital health records and provides real-time communication through chat and video features. To improve efficiency, previously processed cases can be stored and reused for quick retrieval. The overall system ensures a smooth workflow from disease prediction to treatment and monitoring

V. Results And Discussion

The performance of the proposed system is evaluated based on both the efficiency of the AI-based disease prediction model and the functionality of the developed web application.

The fine-tuned EfficientNetB0 model demonstrates effective learning be-havior during training, as illustrated in Fig. 2. The training accu-racy increases steadily over epochs, while the validation accuracy stabilizes after a certain point, indicating that the model is able to generalize reasonably well. Similarly, the loss curves show a continuous decrease, confirming that the model is learning mean-ingful patterns from the dataset. A slight gap between training and validation performance suggests minor overfitting, which is acceptable given the complexity of the classification task.

The classification performance of the model is further analyzed using the confusion matrix shown in Fig. 3. The diagonal elements represent correct predictions, while off-diagonal elements indicate misclassifications. It can be observed that the model performs well for distinct disease classes such as dental disease, hot spots, and worm infections. However, some confusion occurs among visually similar diseases, which is expected in multi-class classification problems involving medical images. Overall, the model achieves satisfactory classification performance, with Top-1, Top-3, and Top-5 accuracies indicating its effectiveness in identifying probable diseases.

In addition to model evaluation, the functionality of the system is validated through the developed web-based interface. The sys-tem successfully integrates multiple modules, including user au-thentication, symptom input, AI-based prediction, appointment scheduling, and digital health record management.

The user interface for login and dashboard access is shown in Fig. 4, which enables secure access for different user roles. The symptom in-put and image upload interface, as shown in Fig. 6, allows users to provide necessary details for disease prediction.

The AI prediction output generated by the system is illustrated in Fig. 7, where the model provides probable disease classifications based on the given input. The system ensures seamless interaction by allowing users to proceed with consultation after receiving predictions. The appointment scheduling and consultation interface, enables communication between pet owners and veterinarians through video calls. Additionally, the digital health record module maintains historical data for future reference and monitoring.

Furthermore, the system incorporates a disease outbreak alert mechanism, which analyzes collected data to identify unusual patterns in disease occurrence. By monitoring frequently re-ported symptoms and predictions, the system can generate alerts when a sudden increase in specific diseases is detected. This feature enhances the system's capability beyond individual diag- nosis, contributing to preventive healthcare and large-scale monitoring.

Overall, the results demonstrate that the proposed system is capable of providing accurate disease predictions while ensuring efficient user interaction. The integration of deep learning with a web-based platform makes the system scalable, user-friendly, and suitable for real-world veterinary healthcare applications.

International Journal of Recent Development in Engineering and Technology
Website: www.ijrdet.com (ISSN 2347-6435 (Online) Volume 15, Issue 04, April 2026)

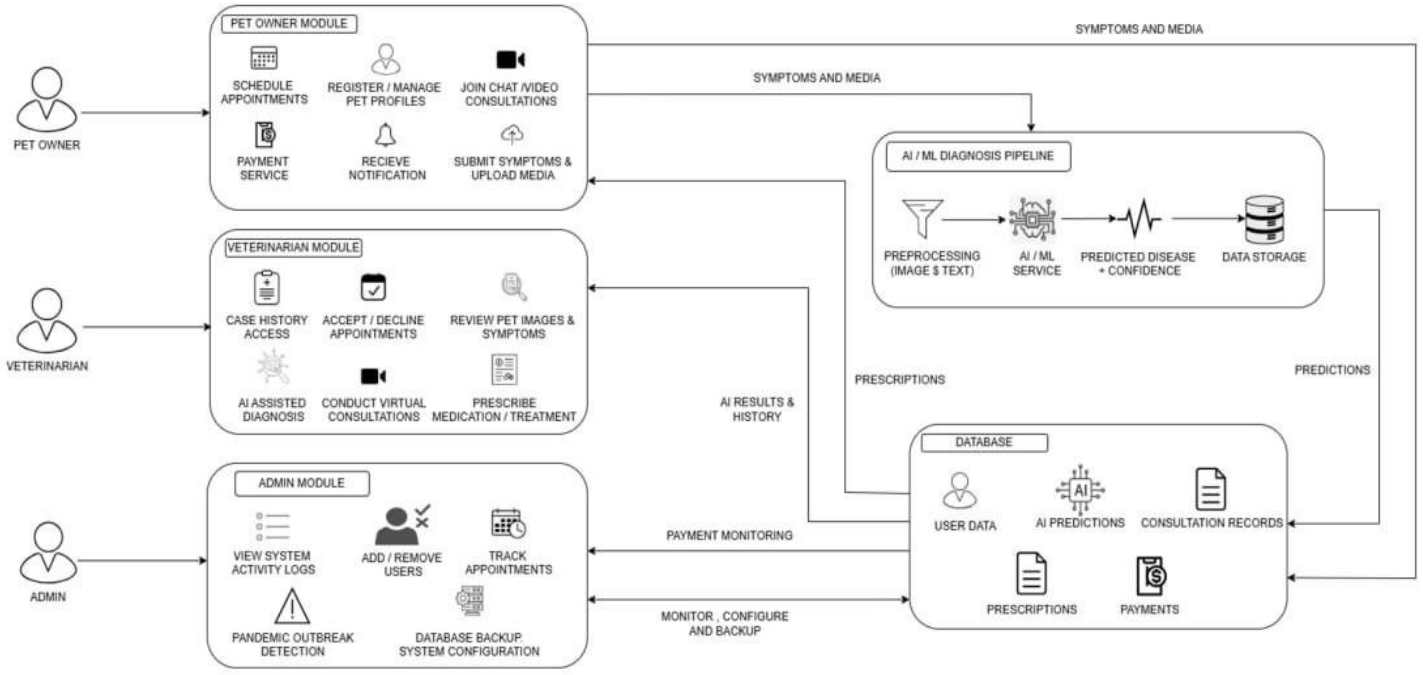

Figure 1: System Architecture of the Proposed Veterinary Assistance System

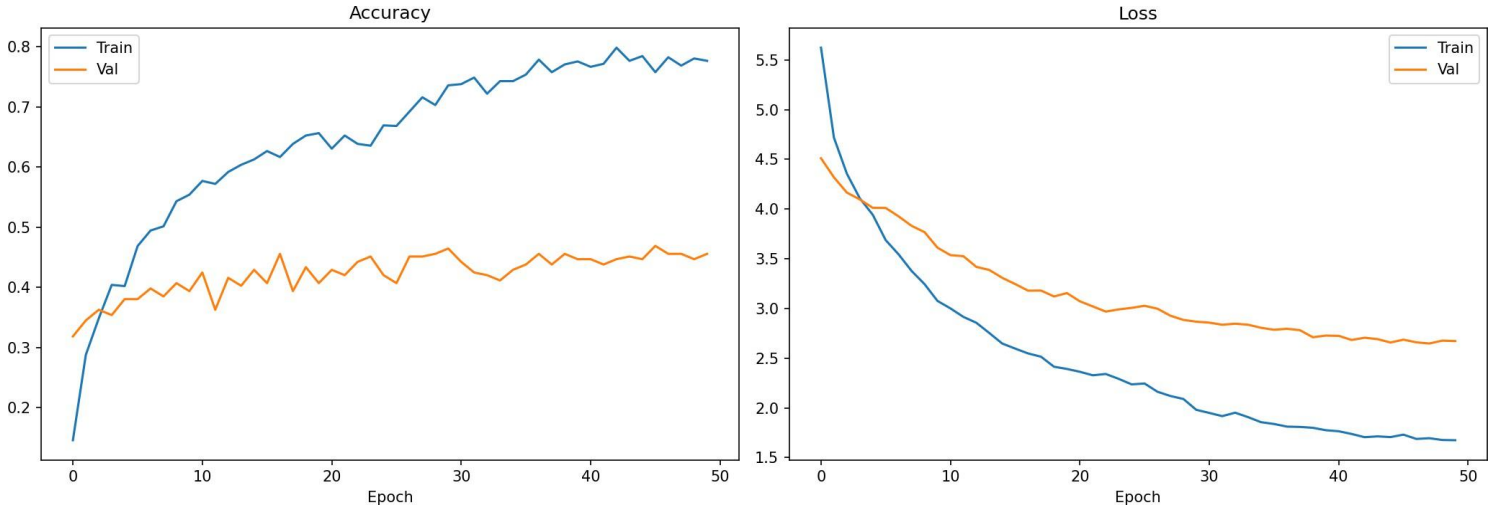

Figure 2: Training and Validation Accuracy and Loss of the EfficientNetB0 Model

International Journal of Recent Development in Engineering and Technology
Website: www.ijrdet.com (ISSN 2347-6435 (Online) Volume 15, Issue 04, April 2026)

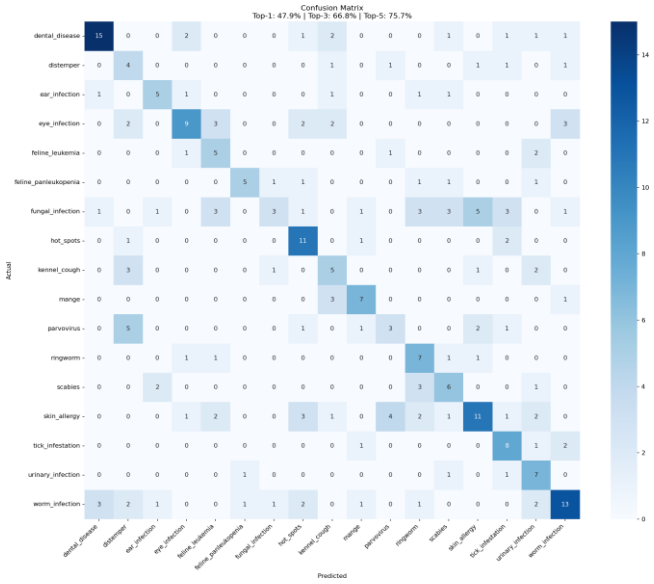

Figure 3: Confusion Matrix of the Proposed EfficientNetB0 Model for Multi-Class Disease Classification

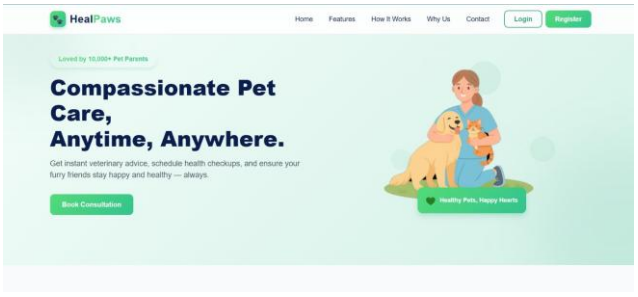

Figure 4: User authentication interface showing login functionality for pet owners, veterinarians, and admin.

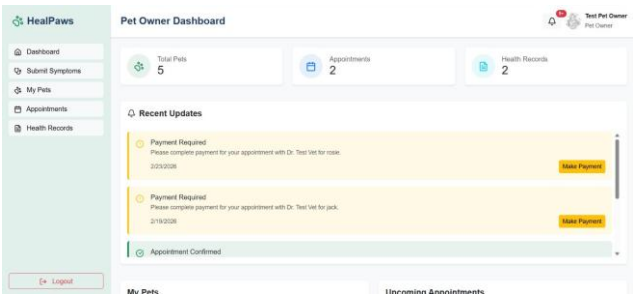

Figure 5: Pet owner dashboard displaying profile details and available services such as symptom submission, appointments, and record access.

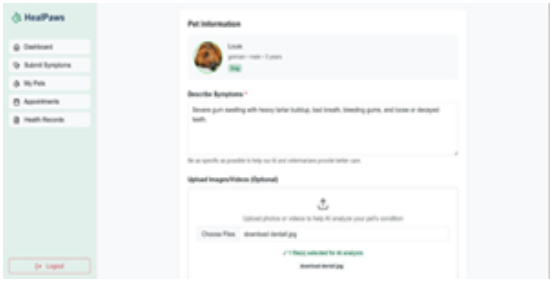

Figure 6: Interface for entering symptoms and uploading images for AI-based disease prediction.

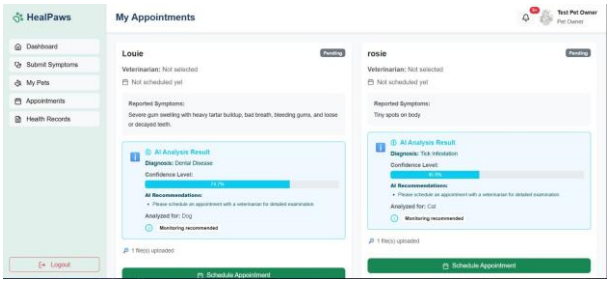

Figure 7: AI-based disease prediction output displaying probable disease classification based on user input.

VI. CONCLUSION

An AI-based veterinary assistance system has been developed us-ing a fine-tuned EfficientNetB0 model for disease prediction. A comprehensive study of existing approaches highlights the effectiveness of deep learning models in image-based classification tasks. In this work, the EfficientNetB0 model is utilized to classify animal diseases based on input images and symptoms, and its performance is evaluated using training curves and confusion matrix analysis. The results demonstrate that the proposed model achieves satisfactory accuracy and is capable of identifying multiple disease classes effectively, even in complex scenarios in-volving visually similar conditions.

In addition to model performance, a complete web-based sys-tem is implemented to provide real-time interaction between pet owners and veterinarians. The system integrates features such as symptom input, AI-based prediction, appointment scheduling, consultation, and digital health record management. Furthermore, a disease outbreak alert mechanism is incorporated to analyze patterns in reported cases and provide early warnings for potential outbreaks. The overall system enhances accessibility to veterinary healthcare services and supports informed decision-making.

Although the system performs well on the available dataset, its performance is dependent on the quality and diversity of the training data. In future work, the system can be extended by incorporating larger and more diverse datasets to improve gen-eralization. Additional improvements may include integrating advanced deep learning models, enhancing real-time analytics for outbreak prediction, and enabling support for multiple ani-mal species.

The proposed system demonstrates a scalable and efficient approach for intelligent veterinary healthcare solutions.

REFERENCES

[1] J. Smith and A. Kumar, “Artificial Intelligence and Tele-health in Veterinary Medicine: Comprehensive Review and Implementation Perspectives,” 2025.

[2] A. Sharma and R. Patel, “Machine Learning Techniques for Disease Prediction in Healthcare,” International Journal of Advanced Computer Science, vol. 12, no. 3, pp. 45–52, 2024.

[3] S. Verma and P. Nair, “Telemedicine Systems and Their Ap-plications in Modern Healthcare,” IEEE Access, vol. 11, pp. 12045–12060, 2023.

[4] MongoDB Inc., “MongoDB Documentation,” 2024. [On-line]. Available: https://www.mongodb.com/docs/

[5] OpenJS Foundation, “Node.js Documentation,” 2024. [On-line]. Available: https://nodejs.org/en/docs/

[6] Express.js, “Web Framework for Node.js,” 2024. [Online]. Available: http://expressjs.com/

[7] K. Thomas and L. George, “AI-Based Prediction Systems in Smart Healthcare,” Journal of Artificial Intelligence Re-search, vol. 18, no. 2, pp. 89–102, 2023.

[8] R. Singh and P. Gupta, “Deep Learning Approaches for Medical Diagnosis: A Survey,” International Journal of Computer Applications, vol. 180, no. 25, pp. 1–8, 2023.

[9] World Health Organization, “Digital Health and Telemedicine,” WHO Report, 2023.

[10] M. Brown and T. Wilson, “Data Analytics for Disease Out-break Prediction Using AI,” IEEE Transactions on Biomed-ical Engineering, vol. 70, no. 5, pp. 1450–1460, 2024.