International Research Journal on Advanced Engineering and Management
https://goldncloudpublications.com
https://doi.org/10.47392/IRJAEM.2025.0348
e ISSN: 2584-2854
Volume: 03
Issue:06 June 2025
Page No: 2207-2211

Enhancing Accessibility in Health Care: Voice and Data Controlled Medical Assistant Especially Abled Persons

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Abstract
Healthcare accessibility remains a significant challenge for specially abled individuals who face barriers in communicating symptoms and accessing timely medical support. This research introduces a novel solution a Voice and Data-Controlled Medical Assistant powered by machine learning aimed at improving healthcare access for specially abled persons. The assistant takes input in both voice and text formats, analyzes the provided symptoms using a trained model, and outputs predicted diseases along with detailed symptom descriptions, preventive measures, medication recommendations, suitable workouts, and diet plans. This system not only bridges the communication gap but also promotes self-reliance in managing health.
Keywords: *Voice and Data-Controlled Medical Assistant, specially abled persons.*

1. Introduction
Accessibility in healthcare is a critical concern, particularly for individuals with incapacities. Physical, sensory, or cognitive diminishing often make it difficult for them to explain symptoms or comprehend complex medical procedures. Our project addresses this problem by developing a smart medical assistant capable of understanding voice and textual symptom input to provide medical advice and information. Leveraging machine learning and natural language processing (NLP), the system offers a holistic response— predicting possible diseases, describing symptoms, suggesting medications, and recommending lifestyle changes. This project strives to enhance autonomy, ensure timely assistance, and improve the quality of life for specially abled individuals.

2. Literature Review
Advancements in artificial intelligence (AI), machine learning (ML), and natural language processing (NLP) have led to the emergence of intelligent healthcare systems that assist in diagnosis, treatment, and accessibility. Several studies have provided the foundation for developing medical assistants, particularly to support specially abled individuals. Studies into smart medical aides have indicated strong promise. IBM's Watson for Health, for instance, employs AI to read both structured and unstructured medical data in order to support clinicians during diagnosis and treatment planning [1]. Analogously, technologies such as Ada Health and Buoy Health employ AI-driven conversational agents in order to obtain user symptoms and identify potential Advancements in artificial intelligence (AI), machine learning (ML), and natural language processing (NLP) have led to the emergence of intelligent healthcare systems that assist in diagnosis, treatment, and accessibility. Several studies have provided the foundation for developing medical assistants, particularly to support specially abled individuals. Studies into smart medical aides have indicated strong promise. IBM's Watson for Health, for instance, employs AI to read both structured and unstructured medical data in order to support clinicians during diagnosis and treatment planning [1]. Analogously, technologies such as Ada Health and Buoy Health employ AI-driven conversational agents in order to obtain user symptoms and identify potential

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3. Problem Formulation

Especially abled individuals often face difficulties in accessing healthcare services due to physical limitations and the lack of accessible medical platforms. Most existing systems require manual input and are not optimized for users with disabilities. The core problem is to create an intelligent system that allows users to speak or type symptoms, and in return, the system should: Predict the disease using machine learning, provide symptom descriptions, precautions, medications, workouts, and diet plans, Be easily accessible through a voice-controlled interface. [1]

4. Methodology

The proposed system integrates voice recognition, text processing, and a machine learning model to deliver an accessible healthcare assistant tailored for specially abled users. The Block Diagram of the Proposed System are shown in following (Figure 1)

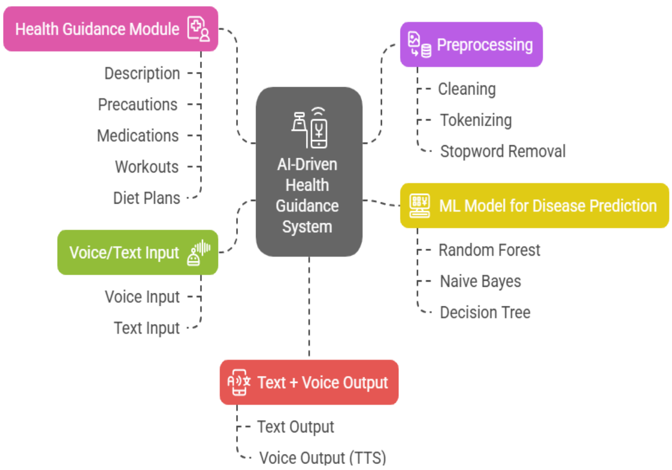

Figure 1 **Block Diagram of the Proposed System**

The methodology is divided into several key stages:

4.1. Voice and Data Input

The system allows users to input symptoms either through voice commands or by typing. For voice input, speech recognition tools such as the Google Speech API or Python's Speech Recognition library are used to convert spoken words into text. This ensures users with physical disabilities can interact with the system without the need for manual typing. Typed text inputs are also accepted for users who prefer keyboard-based interaction.

4.2. Preprocessing

Once symptoms are received, they undergo a text preprocessing phase. This includes cleaning the input by removing irrelevant characters, converting text to lowercase, tokenizing the text into individual words, and removing common stopwords that do not contribute to meaning. This step ensures the input is structured and standardized for further analysis by the machine learning model.

4.3. Disease Prediction Model

The processed symptoms are then passed to a machine learning-based disease prediction model. This model is trained on a healthcare dataset containing mappings of symptoms to various diseases. Algorithms such as Decision Tree, Random Forest, or Naive Bayes are evaluated and implemented to identify the most probable disease based on the input. The chosen model outputs a disease label along with a confidence score. (Figure 2)

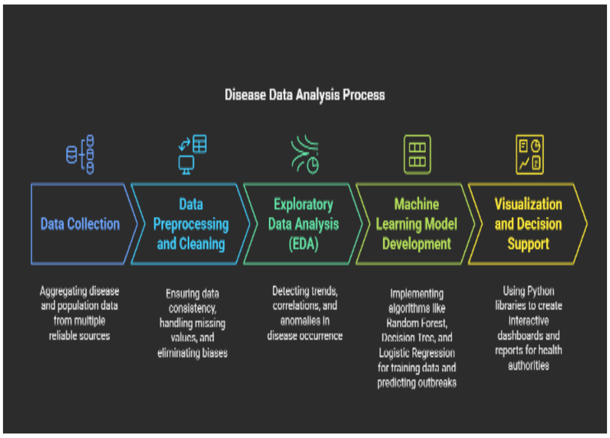

Figure 2 **ML Model for Disease Prediction**

4.4. Health Guidance Module

After predicting the disease, the system provides comprehensive health guidance. This includes a description of the disease, possible symptoms, necessary precautions, commonly used medications, suitable workouts or physical therapies, and diet plans. The information is retrieved from a pre-curated knowledge base or through integration with medical APIs and datasets. This ensures that users receive reliable and relevant healthcare advice. [2]

4.5. Output Delivery

The final output, including the disease prediction and

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health recommendations, is displayed in text format and optionally converted into speech output using Text-to-Speech (TTS) technology. This dual-mode output enhances accessibility, allowing specially abled individuals to receive information through both visual and auditory means, ensuring ease of use and improved user experience. [3]

5. Results

The proposed system, "Enhancing Accessibility in Healthcare: Voice & Data-Controlled Medical Assistant for Specially Abled Persons," successfully predicts disease based on symptoms provided either through voice or text input. The system integrates machine learning to deliver not only the disease name but also comprehensive health suggestions. (Figure 3) [4]

5.1. User Interface Output

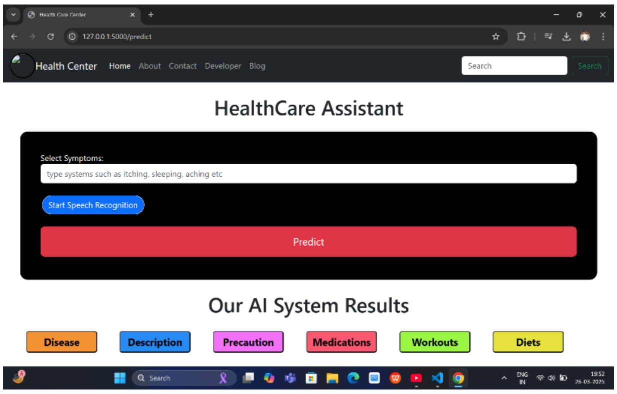

Figure 3 Frontend of the HealthCare Assistant

As shown in Figure 3, the web-based user interface allows the user to enter symptoms using text or initiate voice-based symptom input using the "Start Speech Recognition" button. Upon clicking "Predict," the system processes the input and displays the AI-generated health report. [5]

5.2. Backend Processing & Prediction

The backend is powered by a trained machine learning model that analyzes the provided symptoms and predicts the disease. As illustrated in Figure 4, for the input symptoms, the model predicted the disease as Impetigo. The proposed system, "Enhancing Accessibility in Healthcare: Voice & Data-Controlled Medical Assistant for Specially Abled Persons," successfully predicts disease based on symptoms provided either through voice or text input. The system integrates machine learning to deliver not only the disease name but also comprehensive health suggestions.

5.3. User Interface Output

Figure 3: Frontend of the HealthCare Assistant

As shown in Figure 3, the web-based user interface allows the user to enter symptoms using text or initiate voice-based symptom input using the "Start Speech Recognition" button. Upon clicking "Predict," the system processes the input and displays the AI-generated health report.

5.4. Backend Processing & Prediction

The backend is powered by a trained machine learning model that analyzes the provided symptoms and predicts the disease. As illustrated in Figure 4, for the input symptoms, the model predicted the disease as Impetigo. The system not only identifies the disease based on the given symptoms but also provides detailed descriptions, suggested precautions, relevant medications, appropriate workouts, and suitable dietary plans. This holistic approach helps users understand their health conditions better and take preventive or corrective measures in a timely manner. The integration of AI models with user-friendly web interfaces ensures that the platform is accessible even to those with limited technical expertise. The use of Support Vector Classifier (SVC) for disease prediction showed promising accuracy, which was validated through a confusion matrix and performance metrics such as precision, recall, and F1-score. Overall, the project successfully bridges the gap between specially abled individuals and accessible healthcare, offering a step forward toward inclusive and intelligent medical assistance The system also generates the following results: [6]

- **Description:** Brief explanation of the predicted disease.
- **Precautions:** Suggestions to prevent the spread or worsening of the disease.
- **Medications:** Recommended treatment including topical and oral antibiotics.
- **Workouts:** Health-focused behavioral practices.
- **Diets:** Nutritional guidelines for effective recovery. (Figure 4) [7]

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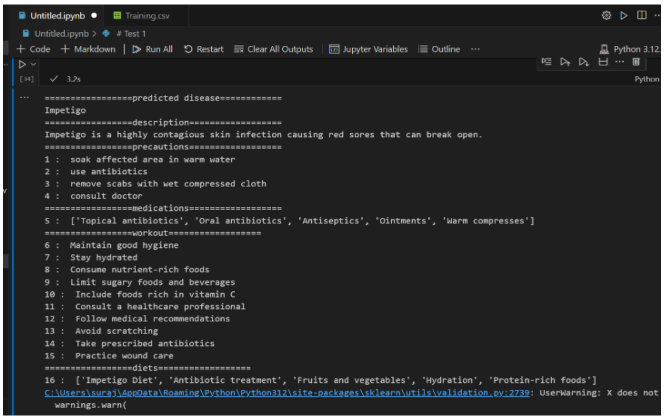

Figure 4 **Backend Output that Predicted Disease and Generated Recommendations**

5.5. Model Evaluation Using Confusion Matrix

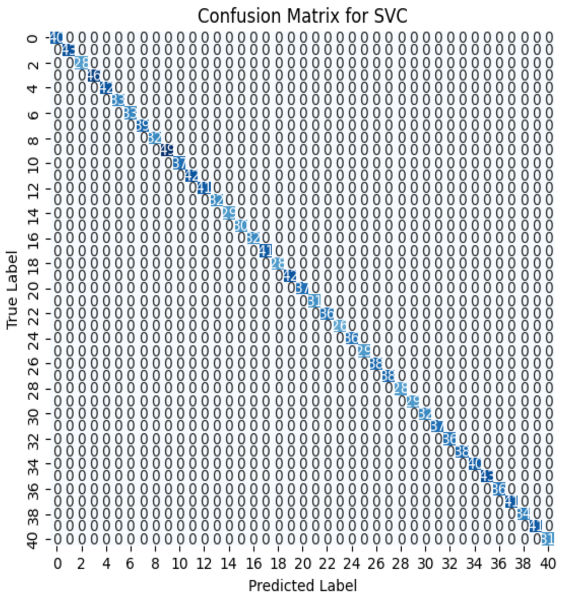

Figure 5 **Confusion Matrix for SVC**

Conclusion

In this project, we proposed and developed a voice and data controlled medical assistant aimed at enhancing healthcare accessibility for specially abled individuals. By leveraging machine learning techniques and voice recognition technology, the system allows users to input symptoms through speech or text and receive accurate predictions of potential diseases along with comprehensive health recommendations. The system not only identifies the disease based on the given symptoms but also provides detailed descriptions, suggested precautions, relevant medications, appropriate workouts, and suitable dietary plans. This holistic approach helps users understand their health conditions better and take preventive or corrective measures in a timely manner. The integration of AI models with user-friendly web interfaces ensures that the platform is accessible even to those with limited technical expertise. The use of Support Vector Classifier (SVC) for disease prediction showed promising accuracy, which was validated through a confusion matrix and performance metrics such as precision, recall, and F1-score. Overall, the project successfully bridges the gap between specially abled individuals and accessible healthcare, offering a step forward toward inclusive and intelligent medical assistance. [8]

Future Scope

The proposed system, "Enhancing Accessibility in Healthcare: Voice & Data-Controlled Medical Assistant for Specially Abled Persons," presents significant potential for future development and real-world impact. In the coming years, this project can be extended to integrate real-time telemedicine capabilities, enabling users to consult with healthcare professionals instantly through video calls. Support for regional and international languages can enhance accessibility for users from diverse linguistic backgrounds. Additionally, integration with IoT-based health monitoring devices like heart rate sensors, glucose monitors, and blood pressure devices can provide real-time data-driven medical recommendations. The system can also incorporate advanced deep learning algorithms to continuously learn from new symptoms and disease patterns, improving prediction accuracy over time. A mobile application version can offer more portability and ease of use, while the addition of an emergency alert system can ensure user safety by notifying caregivers or emergency services during critical conditions. Furthermore, enhancing the platform with robust data privacy and security features compliant with healthcare regulations will help build user trust and ensure confidentiality. These improvements will transform the assistant into a comprehensive, intelligent, and inclusive healthcare support system for specially-abled individuals.

Acknowledgment

We extend our sincere gratitude to the faculty and staff of the Department of Electronics and Communication Engineering, Greater Noida Institute of Technology, for their invaluable guidance and support throughout this project. Special thanks to Ms. Bhawna Sachdeva for her mentorship and constructive feedback, which were instrumental in shaping the direction of this work. We are also deeply grateful to our peers and participants for their input during testing phases, which helped refine the system to better meet user needs..

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