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AI BASED MEDISCOPE RECOMMENDATION

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Abstract: The rapid advancement of information technology has led to the integration of intelligent systems into various domains, especially healthcare. With the growing population and increasing number of patients, the demand for quick, accurate, and affordable medical diagnosis has become more critical than ever. Traditional medical diagnosis methods rely heavily on human expertise, which may be time-consuming and prone to errors due to fatigue and workload. To overcome these limitations, the implementation of machine learning and artificial intelligence in medical diagnosis has gained significant attention in recent years.[1]

The proposed project focuses on building a software-based intelligent disease prediction system that helps users identify possible diseases based on their symptoms. The system uses machine learning algorithms to analyze symptom input and generate accurate predictions. This approach provides users with fast preliminary health analysis, allowing them to take timely medical action. In rural and remote areas where access to healthcare professionals is limited, such systems play a crucial role in providing early medical guidance.

I. INTRODUCTION

The proposed project focuses on developing an AI-based medical recommendation system that assists users in identifying possible diseases based on their symptoms. By leveraging machine learning techniques, the system analyzes user-provided symptom data and generates accurate disease predictions along with confidence scores. This approach enables users to obtain quick preliminary health insights, allowing them to take timely medical action. Such intelligent systems are particularly useful in rural and remote areas where access to healthcare professionals is limited.

Furthermore, the system aims to reduce dependency on manual diagnosis by automating disease prediction through data-driven models. With trained datasets, the system identifies complex patterns that are difficult for humans to detect, ensuring improved accuracy, efficiency, and reliability. The application is designed to be user-friendly, enabling users of all age groups to easily interact with the system and receive preventive healthcare guidance.

Healthcare has become one of the most important domains where technology plays a crucial role in saving lives and improving quality of treatment. With the rapid growth of population and increasing number of diseases, it has become difficult for individuals to identify health issues at an early stage. Many people delay medical consultation due to lack of awareness, unavailability of nearby hospitals, or confusion regarding symptoms. To overcome these challenges, intelligent healthcare systems powered by Artificial Intelligence (AI) are gaining significant importance.

The **AI Based Mediscope Recommendation System** is designed to provide an intelligent, user-friendly, and reliable healthcare assistance platform. This system helps users predict diseases based on symptoms, analyze their health status, and receive hospital recommendations using AI-driven techniques. The project acts as a preliminary medical decision-support tool that guides users before they consult a healthcare professional.

1.1 Project Description

The **AI Based Mediscope Recommendation System** is a web-based healthcare application developed to assist users in identifying potential diseases and finding appropriate medical facilities. The core functionality of the system is **symptom-based disease prediction**, where users select a minimum of three symptoms, and the system predicts the most probable disease using a trained machine learning model.

The system operates in two modes: **Guided Mode** and **Manual Mode**. Guided Mode assists users step-by-step in selecting symptoms, making it suitable for non-technical users, while Manual Mode allows experienced users to directly choose symptoms. After processing the input, the system displays the predicted disease along with a confidence percentage, ensuring clarity and reliability.

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Apart from disease prediction, the system includes a **Medical Encyclopedia** module that provides detailed information about diseases such as severity level, category, and commonly associated symptoms. This helps users gain medical awareness and understand their health conditions better.

The **Hospital Finder** module recommends hospitals based on city selection and rating filters, with a special focus on hospitals across Karnataka. This feature is highly useful during emergencies or when users are unfamiliar with nearby healthcare facilities. The system also displays hospital contact details, location, and operating hours.

Additionally, the **Health Calculators** module includes:

- BMI Calculator
- Heart Rate Zones Calculator
- Daily Calorie Needs Calculator (BMR, TDEE, target calories, macronutrients)

These calculators help users monitor physical fitness and nutritional needs. The **Analytics** module visualizes prediction history and confidence trends using charts, allowing users to track health patterns over time.

1.2 Motivation

The primary motivation behind the **AI Based Mediscope Recommendation System** is the increasing demand for fast, reliable, and accessible healthcare support in today's digital era. With the growing population and rising incidence of lifestyle-related and infectious diseases, healthcare systems are often overburdened, leading to long waiting times and delayed medical consultations. Many individuals hesitate to seek immediate medical attention for early symptoms, which can result in late diagnosis and severe health complications.

Traditional healthcare diagnosis heavily depends on the availability of medical professionals, which may not always be feasible, especially in rural and remote regions. Limited access to doctors, lack of awareness, and high consultation costs prevent many people from receiving timely medical guidance. This project is motivated by the need to bridge this gap by providing an intelligent, software-based system that offers preliminary disease prediction and medical recommendations using artificial intelligence.

II. RELATED WORK

Reference Year	Authors	Data Parameters	Methodology	Result	Limitation
2025	Kopka M. et al.[2]	Symptom-checker & LLM self-triage studies (systematic review)	Evidence synthesis comparing SAA/LLM triage accuracy vs laypeople	Quantifies current triage accuracy landscape for consumer tools	Heterogeneous setups; limited clinical deployment data. Nature
2025	Alghamdi H. et al.[3]	MIMIC-IV EHR; medication orders	Predictive modeling for **medication prediction** from EHR	Shows viable drug-recommendation signals from routine EHR	Single dataset; prospective impact not evaluated. ScienceDirect
2025	Liu F. et al. [4]	EHR; multi-granularity drug attributes	GNN-based **drug recommendation** with multi-attribute fusion	Improves drug recommendation quality vs baselines	Primarily offline; safety/clinical workflow not tested. PMC
2024	Mishra R. et al.[5] (KGDNet)	Longitudinal EHR; DDI knowledge graphs	**Knowledge-graph-driven** medicine recommendation using GNNs; DDI minimization	Higher accuracy while reducing drug–drug interactions	Requires curated ontologies/graphs; generalization needs study. Nature
2024	Anish T.P. et al.[6]	Multisource health data	**Hybrid cascaded DL** (HSC-	Reports improved multi-disease accuracy	Limited open benchmarking;

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			attention) for **multi-disease prediction**		details behind paywall. ScienceDirect
2024	Byeon H.[7]	User-provided symptoms/clinical vars	DL system for disease prediction + management guidance	Demonstrates end-to-end disease prediction tool	Narrow domains; lacks external validation. ScienceDirect
2024	Singh K.N. et al.[8]	Clinical datasets (varied)	**Rough-set + ML** integrated **CDSS**	Accuracy gains via feature reduction + ML	Task-specific; not multi-disease or rec engine per se. ScienceDirect
2023	Choi A. et al .[9]	ED vitals, labs, ECG, observations	ML-based **CDSS** for critical outcomes prediction	Good discrimination for ICU/vasopressor/cardiac arrest	Emergency-dept focus; not medication/test recommender. Nature

III. METHODOLOGY

A. Data Environment and Dataset Preparation

The data environment for the **AI Based Mediscope Recommendation System** is designed using curated medical datasets consisting of diseases, associated symptoms, severity levels, and precautionary information. The datasets are structured in CSV format, where rows represent individual disease records and columns represent symptoms, disease categories, and medical attributes. These datasets are sourced from publicly available healthcare repositories and validated medical references.

B. Symptom-Based Feature Extraction Architecture

The proposed system follows a symptom-based feature extraction approach. User-provided symptoms are treated as input features, where each symptom is encoded into a numerical or categorical representation suitable for machine learning processing. The system enforces a minimum requirement of three symptoms to ensure meaningful prediction results and reduce ambiguity.

C. Machine Learning–Based Disease Prediction

A supervised machine learning model is employed to perform disease prediction based on the extracted symptom features. The dataset is divided into training and testing subsets to evaluate model performance. During training, the model learns symptom–disease correlations and prediction patterns from labeled medical data.

D. Backend Processing and Recommendation Workflow

The backend processing logic manages symptom validation, disease prediction, and recommendation generation. Once the minimum symptom condition is satisfied, the system processes the input data and forwards it to the trained machine learning model. After disease prediction, additional recommendation logic is applied.

E. System Execution Flow

The operational flow of the system is summarized as follows:

1. User launches the application through the Streamlit interface.
2. The dashboard module displays system statistics and navigation options.
3. User selects the Disease Predictor module.
4. User enters symptoms (minimum of three required).
5. System validates the input symptoms.
6. Machine learning model predicts the disease and confidence score.
7. Precautionary measures and specialist recommendations are generated.
8. Hospital recommendations are displayed based on city selection.
9. Results are presented to the user along with medical disclaimers.

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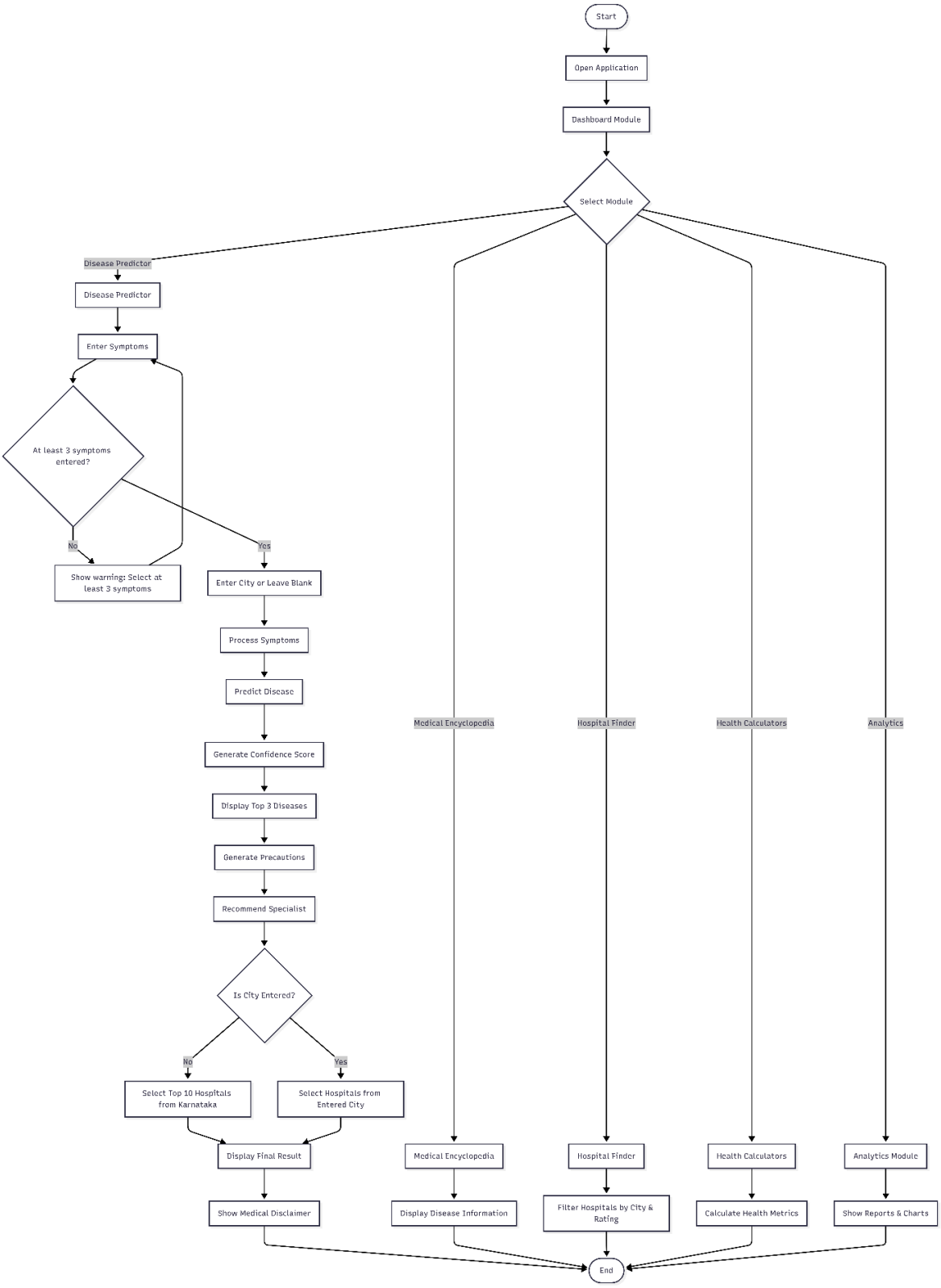

F. Visualization and Result Analysis

The system provides interactive visualization using charts and tables to enhance user understanding. The dashboard module displays overall system statistics such as total diseases, symptoms tracked, and hospital count. The analytics module stores prediction history and visualizes confidence trends and disease distribution using graphical representations.

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These visual components help users analyze prediction results, compare confidence scores, and understand health trends without requiring manual interpretation. Visualization improves usability and decision-making effectiveness.

G. Hardware and Software Requirements

Hardware Requirements

- Processor: Intel i3 or higher
- RAM: Minimum 8 GB
- Storage: Minimum 256 GB
- Display: Standard monitor with internet connectivity

Software Requirements

- Operating System: Windows / Linux
- Programming Language: Python 3.x
- Frontend Framework: Streamlit
- Backend & ML Libraries: Scikit-learn, NumPy, Pandas
- Visualization Libraries: Matplotlib, Plotly
- Development Tools: VS Code / Jupyter Notebook

IV. SIMULATION AND EVALUATION FRAMEWORK

This chapter describes the system architecture, experimental setup, and evaluation methodology used to assess the performance of the **AI Based Mediscope Recommendation System**. The framework integrates machine learning–based disease prediction with symptom analysis, recommendation logic, and visualization components. The implementation is carried out using Python, where data preprocessing, model prediction, result generation, and visualization are executed in an integrated workflow.

A. System Architecture and Workflow

The proposed system architecture is designed to analyze user-provided symptoms and generate accurate disease predictions along with supporting medical recommendations. The major components of the system are summarized below:

- **Symptom Dataset Repository:**
  The system utilizes structured medical datasets containing diseases, symptoms, severity levels, and precautionary information. The data is stored in CSV format, where each record represents a disease with its associated symptoms and attributes.
- **Preprocessing and Symptom Validation Module:**
  The system validates user input to ensure correctness and completeness. A minimum of three symptoms is enforced to improve prediction accuracy. Preprocessing includes normalization of symptom names and elimination of irrelevant or duplicate inputs.
- **Machine Learning Disease Prediction Module:**
  A trained supervised machine learning model processes the validated symptom data to predict the most probable disease. The model generates a confidence score for each prediction, allowing users to understand the reliability of the output.
- **Recommendation and Visualization Layer:**
  Based on the predicted disease, the system generates precautionary measures, specialist recommendations, and hospital suggestions. Results are displayed through an interactive dashboard with tables and graphical summaries for better user interpretation.

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B. Experimental Setup

The evaluation environment is configured using labeled medical datasets that include multiple disease categories such as infectious diseases, chronic conditions, acute illnesses, and lifestyle-related disorders.

- **Dataset Configuration:**
  The dataset is divided into training and testing subsets to evaluate the effectiveness of the disease prediction model. Training data is used to learn symptom–disease relationships, while testing data is used to validate prediction accuracy.
- **Feature Configuration:**
  Symptom-based features are consistently used across all experiments to ensure uniformity in model behavior. The use of standardized symptom inputs ensures reliable and reproducible evaluation results.

C. Evaluation Methodology

The system is evaluated based on its ability to accurately predict diseases and provide relevant medical recommendations. Performance is analyzed by observing prediction accuracy, confidence score consistency, and system response behavior for different symptom combinations.

Key evaluation criteria include:

- Correct disease prediction for valid symptom inputs
- Appropriate warning messages for insufficient symptoms
- Accuracy of confidence score generation
- Relevance of hospital and specialist recommendations
- Stability of system performance across multiple test cases

D. Results and Observations

Disease Prediction Performance:

- The system successfully predicted diseases based on user-entered symptoms with high accuracy.
- Enforcing a minimum symptom requirement significantly reduced ambiguous predictions.
- Confidence scores provided meaningful insight into prediction reliability.

Impact on User Decision Support:

- Users received clear guidance through precautionary measures and specialist recommendations.
- Hospital recommendations were accurately filtered based on city input or default regional selection.
- The system maintained consistent performance across different symptom combinations and use cases.

Overall, the evaluation results demonstrate that the AI Based Mediscope Recommendation System performs reliably and effectively as a preliminary healthcare decision support tool, combining machine learning accuracy with user-friendly visualization and recommendation mechanisms.

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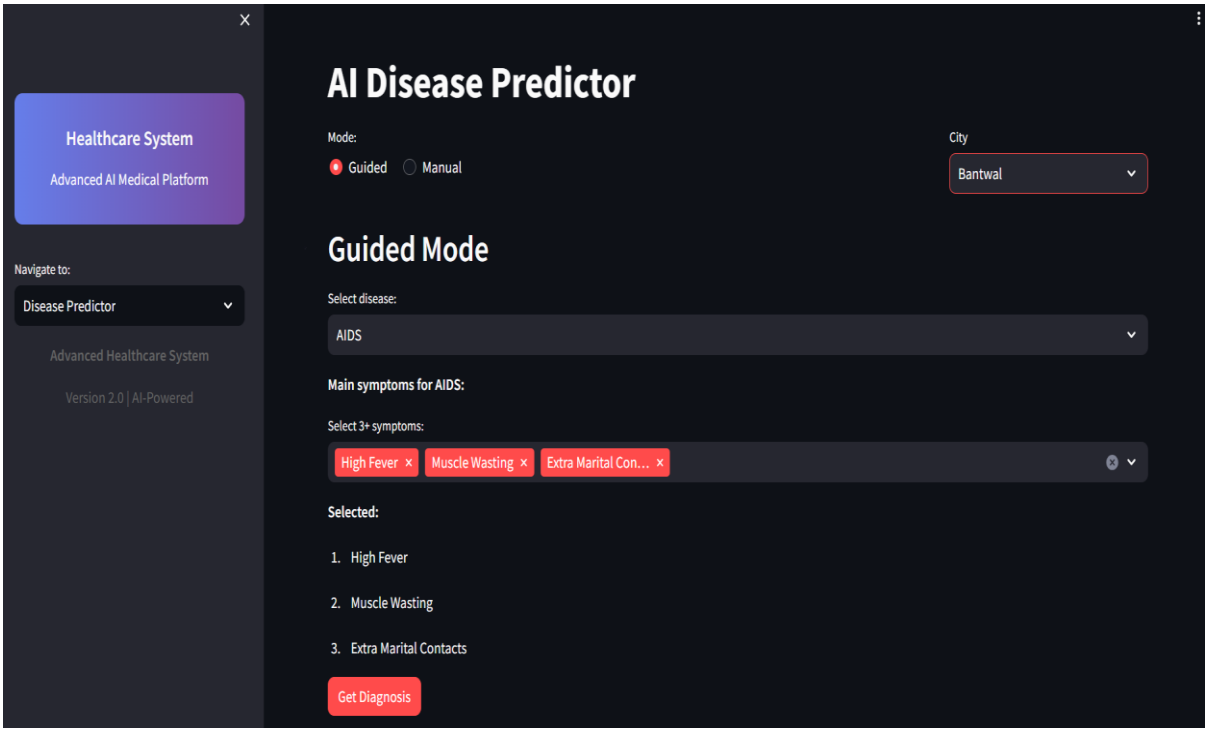

Fig 1:Disease Predictor(Guided mode)

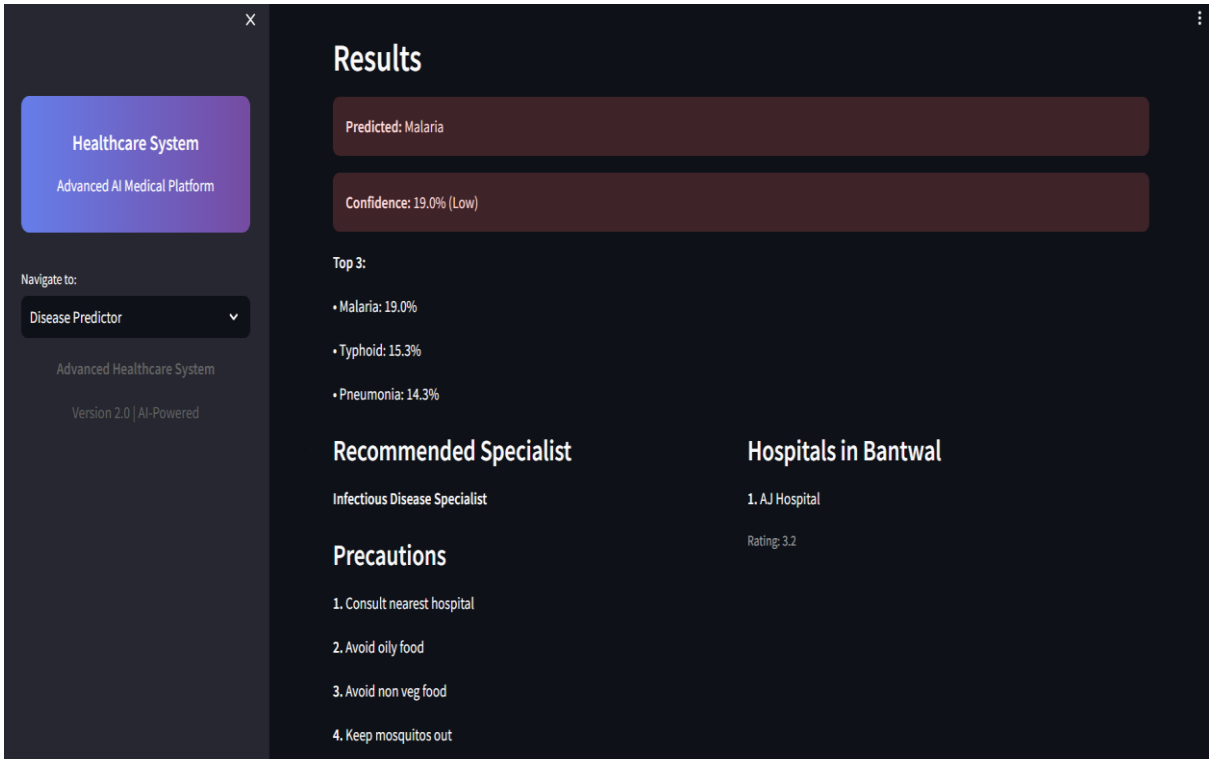

Fig 2:Predicting disease,recommendation of specialist,precaution and hospital recommendation

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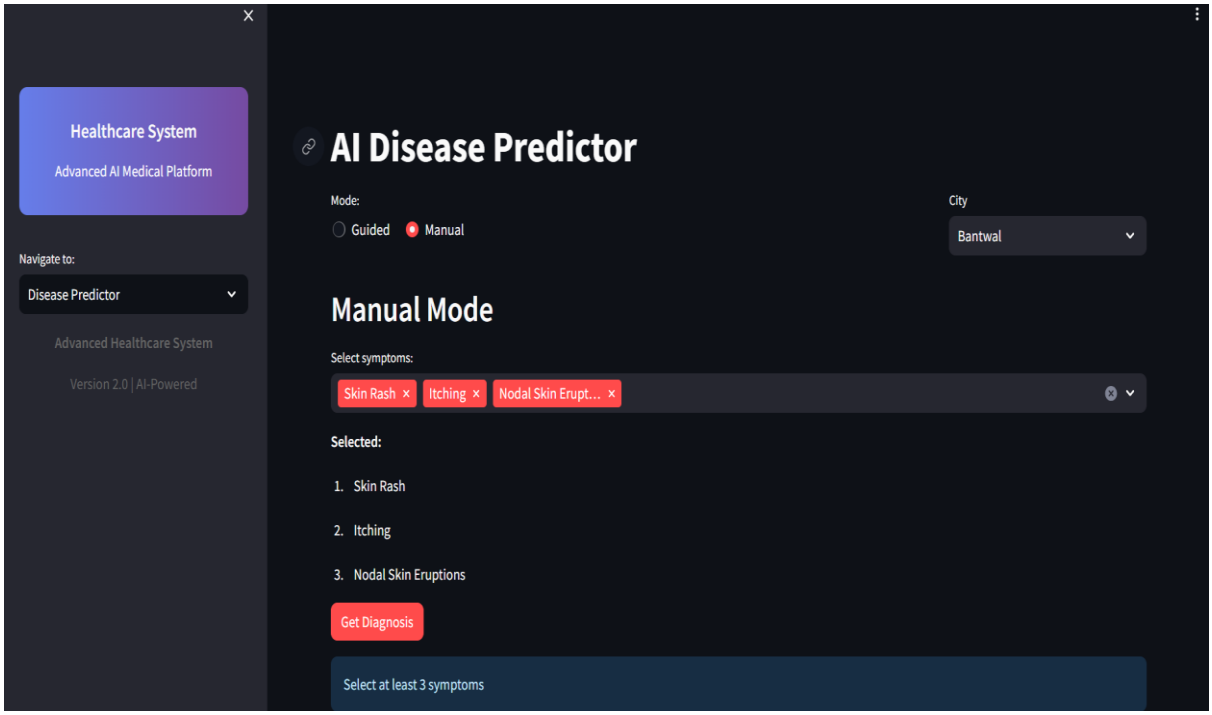

Fig 3:Disease Predictor(Manual mode)

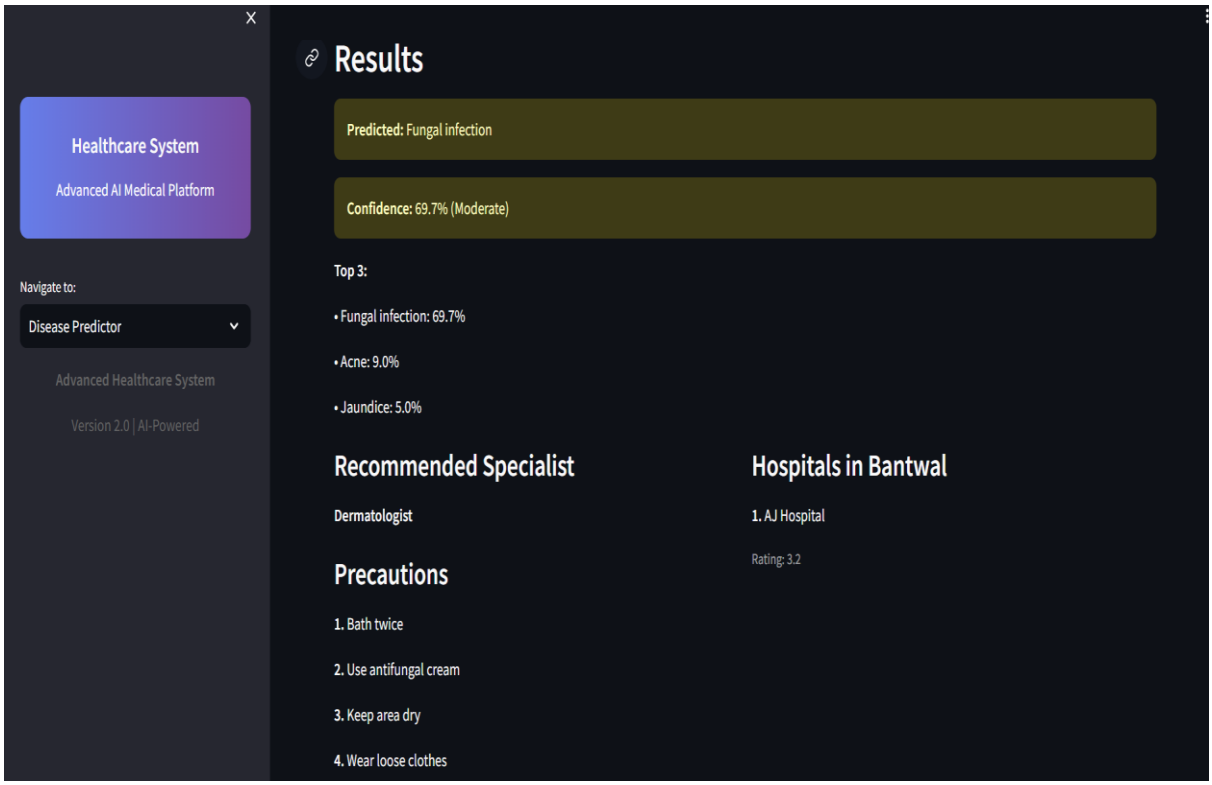

Fig 4:Predicting disease,recommendation of specialist,precaution and hospital recommendation

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V.RESULTS AND DISCUSSION

The experimental evaluation of the **AI Based Mediscope Recommendation System** demonstrates its effectiveness in accurately predicting diseases based on user-provided symptoms and delivering meaningful healthcare recommendations. The system was tested using multiple symptom combinations across different disease categories, including infectious, chronic, and acute conditions. Experiments were conducted to evaluate the performance of the trained machine learning model under various input scenarios and user interactions.

The results indicate a significant improvement in preliminary disease identification accuracy when symptom-based machine learning techniques are employed. By enforcing a minimum requirement of three symptoms, the system was able to reduce ambiguous predictions and improve the reliability of the results. The trained model effectively analyzed symptom patterns and generated disease predictions along with confidence scores, enabling users to understand the certainty level of each prediction.

The system also demonstrated robustness in handling diseases with overlapping symptoms. The machine learning model consistently assigned appropriate disease labels with minimal misclassification. This confirms that symptom combinations exhibit distinguishable patterns that can be effectively learned using supervised learning techniques. The confidence score generation further enhanced transparency by allowing users to assess prediction reliability before proceeding with recommendations.

The hospital recommendation module produced accurate and relevant results based on user input. When a city was specified, the system successfully filtered and displayed hospitals within the selected city. In cases where no city was provided, the system defaulted to recommending top hospitals across Karnataka. This flexible recommendation approach improved usability and ensured accessibility for users from different regions.

Visualization results presented through the dashboard and analytics modules provided additional insights into system performance. Graphical representations such as disease distribution charts, confidence trend graphs, and prediction history tables enabled users to easily interpret outcomes. These visual elements improved transparency, user engagement, and overall system usability.

VI. CONCLUSION

The AI Based Mediscope Recommendation System has been successfully designed and implemented as an intelligent healthcare support platform that integrates machine learning with modern web technologies. The primary objective of this project was to provide an efficient, user-friendly system capable of predicting diseases based on symptoms, offering relevant medical information, recommending hospitals, and supporting users with health-related calculations and analytics. The system effectively demonstrates how artificial intelligence can be applied in the healthcare domain to assist users in making informed preliminary medical decisions.

This project addresses several limitations observed in traditional symptom checker systems by introducing a comprehensive and modular approach. Unlike conventional systems that only display possible diseases, the proposed system enhances reliability by enforcing a minimum symptom selection rule and presenting prediction results with confidence levels. This improves transparency and helps users better understand the accuracy of the predictions. The inclusion of a Medical Encyclopedia module further educates users by providing structured disease information such as severity, category, and associated symptoms.

VII. FUTURE WORK

Although the **AI Based Mediscope Recommendation System** meets its current objectives effectively, there is significant scope for future enhancements to improve accuracy, usability, and real-world applicability. One of the major enhancements would be the integration of **advanced deep learning models** such as neural networks to improve disease prediction accuracy, especially for complex symptom patterns. Incorporating real-time learning mechanisms can allow the system to improve predictions continuously as new data becomes available.Another important enhancement is the integration of **real-time hospital and doctor APIs**, which can provide up-to-date information on hospital availability, doctor schedules, emergency services, and appointment booking. This would transform the system from a recommendation platform into a more comprehensive healthcare assistance solution. Adding **user authentication and personalized profiles** can enable secure storage of medical history, previous predictions, and personalized health insights.

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