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Ayurvedic Diagnosis: A Machine Learning Based Medication System

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Abstract:

The widespread adoption of digital health technology has made available preliminarily health information in new ways. This study describes a web-based health application that applies machine learning techniques to identify diseases which emerge from symptoms provided by users in addition to Ayurvedic medicine. The proposed system employs Support Vector Machine (SVM) and ID3 Decision Tree algorithms for classifying diseases in relation to reported symptoms. The application has been programmed utilizing Python and Flask along with HTML and CSS being used for making an interface on SQLite/MySQL systems. The application retains a browser history for the users and makes use of a module system which can be enlarged with additional algorithms and databases. The aim of the system is to achieve preliminary diagnostic assessment and not be a replacement for real diagnosis or treatment procedures. The proposed framework allows the researcher to use modern methodologies along with traditional medicine. Further research on the use of larger and more varied datasets is planned along with the assessment of the safety and reliability of Ayurvedic medicine recommendations.

Keywords: Machine Learning, Disease Prediction, Ayurvedic Medicine, Support Vector Machine (SVM), ID3 Decision Tree, Healthcare Decision Support Systems, Symptom Analysis, Flask, Personalized Healthcare and Web Application

1. Introduction

Artificial Intelligence (AI) and Machine Learning (ML) have found numerous applications in the healthcare sector in the areas like disease prediction, clinical decision-making, and medical information dissemination. AI model has the capacity to examine patients' records and discover correlations between various diseases and medical conditions which can assist in creating solutions to provide advice. This technology can be beneficial in the situations when there is no opportunity to consult a doctor.

To access healthcare services in rural areas and isolated regions remains a challenge for patients due to lack of availability of medical practitioners, clinics, and medical technologies. Internet technologies provide patients with an opportunity to obtain knowledge about their health. Along with technology, Ayurveda can offer an ancient healthcare philosophy based on the evaluation of symptoms, illnesses, and remedies. The only problem is that knowledge of Ayurveda is required in order to select Ayurvedic treatments. The integration of Ayurveda together with technology can provide similar solutions.

Supervised machine learning techniques can classify illnesses by using the available data about symptoms and diseases. Support Vector Machine (SVM) methods are among the most popular classification techniques, while the ID3 Decision Tree provides a tree-based resolution technique, which is implemented through performing a sequence of decisions based on features. Both SVM and ID3 can be used by the system in order to analyze the symptoms that users enter and classify them into illness classes and categories. The comparison of the two techniques is of importance for the development of the predicted functioning of the device.

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The present paper discusses the web application "Ayurvedic Diagnosis: A Machine Learning-Based Medicine System." The application allows users to enter their symptoms after which the prediction module identifies a probable category of illness and provides the relevant information about Ayurvedic medicine. The system should preserve users' history of predictions for future consultations. The system has been developed in Python and Flask and uses HTML and CSS for interface design and SQLite/MySQL for data storage. Its modular structure includes user authentication, inputting symptoms, predicting diseases, recommending medicines and system administration.

Additionally, this technology offers the opportunity to utilize both machine learning-based disease classification and classical Ayurvedic information in one web application. However, it is important to note that the accuracy of predictions depends on the quality and representativity of the information included in the training set. In the same way, Ayurvedic medicine recommendations also need to be validated but are not to be treated as individual medical prescriptions. Therefore, this solution has been developed as an assistant and information tool rather than a substitute for a competent doctor.

The purposes of the study are as follows:

1. develop a disease prediction system by means of SVM and ID3 Decision Trees.
2. classify the diseases that might occur based on the input symptoms.
3. include Ayurvedic medicine recommendations.
4. store the information about users and predictions.
5. provide preliminary health information using web-based platform.
6. create a modular system for further extension with more industries and datasets.

2. Literature Review

Artificial Intelligence (AI) and machine learning (ML) have been significant breakthroughs in the healthcare sector especially for prediction of diseases as well as for clinical decision support services and personalized healthcare. Various supervised learning techniques such as Support Vector Machine (SVM), Decision Tree, Random Forest, Logistic Regression and deep learning have been subjected to exmination by researchers in order to determine the patterns in medical data. Recently, the application of these methods has expanded to some traditional medicines including Ayurveda. However research can still be hindered by the existing limitations such as data quality, model interpretability, clinical qualification and lack of adequate data.

Kumar and Gupta (2023) studied SVM, Decision Tree, Random Forest and Logistic Regression techniques for determining the classifier in the field of healthcare. The authors of the study reached the conclusion about having different effectiveness of various algorithms under specific dataset and type of disease. In this study, it was demonstrated that SVM algorithm was effective for structured data, while Decision Tree was more interpretable. The importance of choosing the appropriate algorithms based on the features of the data provided and the needs of the application has been shown.

Online healthcare systems have gained a lot of interest because of the fact that users can access the services through a web browser without having to install special software. Most of the existing applications have been functioning to identify the disease based on the symptoms given by the user. However, many applications only deal with the prediction of the disease and do not help relate the predicted problem to treatment. This is the way for integrated systems to combine the classification of the disease with the required medicine or treatment.

The recent research has shown that machine learning was used for Ayurvedic health care. For instance, Patra et al. (2026) proposed the framework that incorporates machine learning and Ayurvedic principles to determine an individual's Tridhosa constitution. The research achieved establishment of the possibilities of applying computation for creating personalized Ayurvedic health care. Nevertheless, the research did not cover the issue of prediction of disease based on symptoms and the provision of treatment procedures as it was focused primarily on constitutions.

Srivastava, Garg, and Pandey (2026) have introduced the VedCure model, which employs SVM and Decision Tree approaches for disease prediction and treatment recommendation based on the characteristics of the patient. Their contribution has shown that machine learning includes not only disease detection but also recommending treatment.

Nevertheless, the effectiveness and scope of these systems will depend on the quality and amount of information on diseases and respective symptoms they are based on.

Afsar et al. (2025) explored the application of AI techniques to conventional and alternative medicine and the use of methods like SVM, Decision Tree, and Random Forest in such issues as disease prediction and herbal medicine. The research declared that there are many challenges, including the lack of clinical evidence, insufficient datasets, differences in traditional diagnostics, and the absence of common evaluation mechanisms that need to be processed for successful development of AI-based traditional medicine systems.

Likewise, Upasani (2025) made a study on AI applications in conventional and Ayurvedic medicine and emphasized the significance of having proper data and understandable models. Nonetheless, variations among datasets, lack of model transparency, and the challenges of adapting research models for practical application in healthcare still pose significant challenges. When it comes to applying artificial intelligence in conventional medicine, machine learning has been used not only for disease prognosis but also for identifying medicinal plants, assessing plant attributes, analyzing chemical substances involved, and designing herbal technology. This reinforces an understanding that computational methods have great potential for traditional medicine. However, it is necessary to have appropriate data, systematic verification of results, and data that takes safety issues into account before turning computational findings into valid treatment advice.

Another potential development lies in creating systems that combine disease prediction with recommendation systems. In this case, the systems not only predict possible diseases but also give information about the treatment. While the systems provide useful features going beyond classification systems, they still depend on the accuracy of information in their databases. Moreover, symptoms-based recommendations may not take into account characteristics of the patients, such as age, gender, medical history, allergies, and treatment in the past.

Overall, recent studies prove the efficiency of SVM, Decision Tree, and other techniques of machine learning in terms of the healthcare industry prediction and decision support. Moreover, the research highlights the growing tendency of combining principles of AI with different aspects of Ayurvedic medicine. However, concern about the integration of such issues as symptom-based disease prediction, Ayurvedic medicine knowledge, web accessibility, and patient record management into one system still exists. Also, matters concerning dataset quality, explainability, validation, scalability, and reliability of recommendations are also needed further investigations.

Thus, the current study aims to fill this gap with the help of the web application that combines the methods of SVM and ID3 Decision Tree for the symptom-based disease prediction with help of Ayurvedic medicine information. The developed platform not only provides prediction history management and user interaction within the same web application but also aims to implement the principles of machine learning, web technology, and Ayurvedic knowledge.

3. Research Methodology

The approach taken in Ayurvedic Diagnosis: A Machine Learning-Based System is systematic, focusing on the prediction of diseases using user-provided symptoms and the provision of information regarding medicines available in Ayurveda. The process is carried out in four stages: collection of data, preprocessing of data, disease classification, and the development of a web-based system.

3.1 Data Collection

The first stage involves the preparation of data required for the purpose of general classification and recommendation of medicines. The dataset contains information about diseases along with their symptoms and Ayurvedic medicines pertaining to each condition. When it comes to the machine learning process, symptom–disease connections will be utilized for the training of models, while the medicine-related information will be provided by the app after the prediction of a disease.

Apart from this, the app will also store the users' data, including information about their registration, symptoms provided by them, and results obtained from previous predictions. The organization of data is done in such a way that all of the information is separated in the database and can be easily retrieved and updated afterwards when the system is in use.

3.2 Data Preprocessing

Before being input into the machine learning models, the gathered data must be arranged first. The preprocessing process is comprised of the effort of identifying any repeated records, addressing missing or incomplete data, and standardizing symptoms so that each symptom will be represented in identical manner. When it comes to the dataset of prediction, the symptoms are used as the input variables and disease types - as the output value being predicted.

3.3 Disease Prediction Using SVM and ID3

Before being input into the machine learning models, the gathered data must be arranged first. The preprocessing process is comprised of the effort of identifying any repeated records, addressing missing or incomplete data, and standardizing symptoms so that each symptom will be represented in identical manner. When it comes to the dataset of prediction, the symptoms are used as the input variables and disease types - as the output value being predicted.

After preprocessing the data, it is divided into two separate data sample. The training data set is utilized for the process of building classification models, and the testing dataset is used for testing classification models' results based on the newly obtained data. The symptoms provided by the users should also go through the same preprocessing and formatting operations as the input data.

The ID3 method creates a decision tree using information gain to assess features. Each decision point in the decision tree represents a symptom-based decision and every branch depicts a corresponding feature value of any possible disease. This leads to an efficient classification process.

The user enters symptoms and thus transforms them into the desired form for the models. The proper model processes the information, categorizing it into the relevant disease category. The results are saved for future reference along with user information, whereas Ayurveda remedy data is retrieved from the database after the diagnosis has been made.

3.4 System Architecture and Workflow

The application follows a design made up of three layers namely Presentation, Application, and Data Layers. The Presentation Layer is responsible for the user interface using HTML and CSS. The users will be able to log in, register, enter the symptoms of the ailments, and see the prediction result.

The Application Layer is built on Python and Flask and holds the main logic. The logic of the Application Layer handles application requests, validates the symptoms, interfaces with the machine learning model to make predictions about the disease.

The Data Layer is designed to have an SQLite/MySQL database holding all the records regarding the application which include users' information and diseases' descriptions.

The process starts when the user logs in to the application and enters the symptoms that he/she has; following this, the system checks and prepares the data for the machine learning model which is then used to come up with a prediction. When the disease that was predicted is found, it will search for the information regarding Ayurveda in its medicines database and show the outcome to the user that was produced. The prediction and the related information will then be stored in the database, which means all the previous outcomes are accessible if needed.

The system's goal is to provide initial support concerning treatment decisions and health information; however, it is not a substitution for the diagnostic procedure or treatment by a healthcare professional. The degree of predictions' reliability greatly relies on the quality of the data and its comprehensiveness, which was used to train the models.

4. Implementation and Experimentation

The aforementioned project, named Ayurvedic Diagnosis: A Machine Learning-Based Medication System was created as a web application that combines the module of disease-oriented classification based on symptoms and the Ayurvedic medicines information database. The system consists of a number of functional modules including the user log-in, symptom reporting, disease prediction and user interface management module. The programming tools to create this system were Python and Flask for coding and HTML and CSS for front-end development.

4.1 Software Environment

The development of the entire system has been achieved through the use of existing software technologies. The programming language Python has been chosen for putting the logic of the application and machine-learning functions into practice. Flask acts as a connection between the web interface, prediction machine-learning models, and the database. Both HTML and CSS were used for building the front-end application interface. The technologies SQLite/MySQL were applied for the storing of information about users, diseases, their symptoms, Ayurvedic medicine, and predictions made by the developed system.

Classification Models	SVM, ID3 Decision Tree
Database	SQLite/MySQL
Development Environment	Visual Studio Code
Operating System	Windows

Software Component	Technology Used
Programming Language	Python
Web Framework	Flask
Frontend	HTML, CSS

4.2 Dataset Preparation

The importance of the quality of the data set used lies in the process of building a reliable disease classification model. The data set utilized for the purpose of the application contains data concerning the disease, its symptoms, and Ayurvedic medicine. The data present in the system were analyzed to identify existing duplicate records and to check whether the symptom is presented in a consistent way before the model is trained.

For supervised learning, symptoms were treated as input features and diseases were used as target classes. The prepared records were converted into a format suitable for the selected machine learning algorithms and divided into training and testing subsets. The training data were used to build the classification models, while the testing data were reserved for evaluating their predictions. Separate database information was maintained for diseases, symptoms, medicines, users, and prediction history.

The main categories of data used by the application are:

- **Symptom data:** information describing symptoms associated with different conditions.
- **Disease data:** disease categories corresponding to combinations of symptoms.
- **Medicine data:** Ayurvedic medicine information associated with the relevant disease categories.

4.3 Model Training

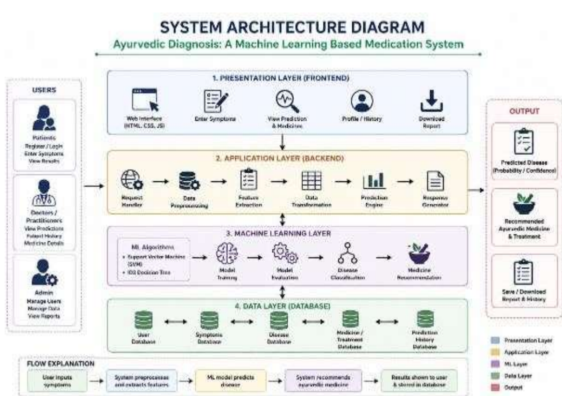
Two supervised classification methods, SVM and ID3 Decision Tree, were used in the disease-prediction module. Both models were trained using the prepared symptom and disease data.

The SVM model learns a classification boundary from the training examples and uses the resulting model to assign new symptom patterns to disease categories. The ID3 algorithm uses information gain to select relevant symptoms and constructs a decision tree for classification. The two models

therefore provide different approaches for mapping symptom information to disease classes.

After training, the models were connected to the Flask application. When a user submits symptoms through the web interface, the application converts the input into the required format and sends it to the prediction component. The resulting disease classification is then presented through the application. Following the prediction, the system retrieves related Ayurvedic medicine information from the database.

The application also stores the prediction details in the user's history. This allows previously generated results to be reviewed and provides a record of interactions with the prediction system.



4.4 Experimental Procedure

Testing was performed to examine both the functionality of the application and the behavior of the disease-classification component. The process begins with user registration and login. After authentication, the user enters the symptoms through the symptom-input interface. The application validates the submitted information and prepares it for processing by the selected machine learning model.

The SVM and ID3 models then classify the submitted symptom pattern. The resulting disease category is displayed to the user, after which the application retrieves the corresponding Ayurvedic medicine information from the database. The prediction and related information are subsequently stored in the prediction-history section.

Different combinations of symptoms were used during testing to examine the classification process across multiple disease categories. Where labeled test data were available, the predicted disease was compared with the corresponding expected class to evaluate model performance. Functional testing was also carried out for the major application components, including user registration, authentication, symptom submission, disease prediction, medicine-information retrieval, prediction-history management, and administrative operations.

The testing process was intended to verify that information could move correctly between the user interface, application logic, machine learning models, and database. It also helped identify problems associated with invalid input, missing records, or incorrect communication between system components.

Figure 4.1: User Login Page

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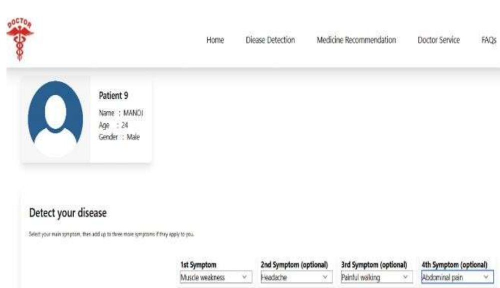

Figure 4.2: Symptom Input Page

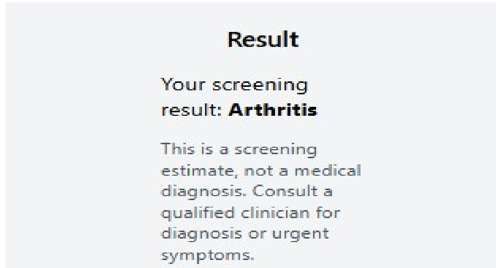

Figure 4.3: Disease Prediction Result

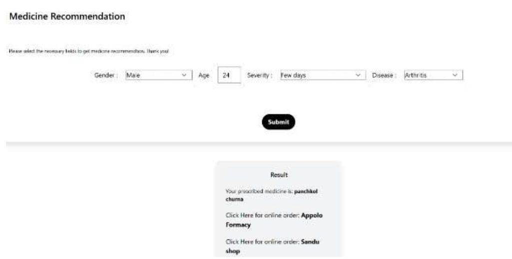

Figure 4.4: Ayurvedic Medicine Recommendation

5. Results and Analysis

The developed Ayurvedic Diagnosis system was evaluated using the test dataset prepared for the disease-classification models. The performance of Support Vector Machine (SVM) and ID3 Decision Tree was examined using classification measures, including accuracy, recall, and F1-score. Additional tests were conducted by entering different combinations of symptoms through the web interface to examine the complete process from symptom input to disease prediction and retrieval of related Ayurvedic medicine information.

5.1 Accuracy

Accuracy indicates the proportion of test cases that were classified correctly out of the total number of test cases. The results obtained for the two machine learning models are presented in Table 5.1.

Table 5.1. Prediction Accuracy

Algorithm	Accuracy (%)
SVM	96.4
ID3	94.8

The SVM model achieved an accuracy of 96.4%, whereas the ID3 model obtained 94.8%. Thus, SVM performed better on the test dataset used in this study. The difference may be related to how the two algorithms handle the symptom features and disease classes in the dataset. This result represents the performance observed under the present experimental conditions and does not imply that SVM will outperform ID3 for every healthcare dataset.

5.2 Recall

Recall measures the proportion of relevant disease cases that are correctly identified by a classification model. A higher recall indicates that fewer relevant cases are missed by the model.

Table 5.2. Recall Performance

Algorithm	Recall (%)
SVM	96.1
ID3	94.2

Joint Pain, Swelling	Arthritis	Yogaraja Guggulu
Indigestion, Stomach Pain	Gastritis	Avipattikar Churna

The SVM model recorded a recall of 96.1%, while ID3 achieved 94.2%. The results show that SVM identified a slightly larger proportion of the relevant cases in the test dataset.

5.3 F1-Score

The F1-score combines precision and recall into a single performance measure. It is useful when both types of classification errors need to be considered.

Table 5.3. F1-Score Comparison

Algorithm	F1-Score (%)
SVM	95.9
ID3	94.0

SVM produced an F1-score of 95.9%, compared with 94.0% for ID3. The higher F1-score indicates that SVM provided a better balance between precision and recall for the tested dataset. Together with the accuracy and recall results, these findings show that SVM achieved the stronger overall classification performance in the experiment.

5.4 Disease Prediction Examples

Functional testing was performed by submitting different symptom combinations through the web application. The examples below illustrate the type of result generated by the system.

Table 5.4. Sample Disease Prediction Results

Symptoms Entered	Predicted Disease	Ayurvedic Medicine Information
Fever, Headache, Fatigue	Viral Fever	Sudarshan Churna
Frequent Urination, Excessive Thirst	Diabetes	Nishamalaki Churna

Cough, Sore Throat, Mild Fever	Common Cold	Sitopaladi Churna

The test cases demonstrate that the application can process user-provided symptoms, generate a disease classification, and retrieve corresponding Ayurvedic medicine information from the database. Prediction records are also maintained in the history module so that users can review previous results.

Overall, the experimental results show that both SVM and ID3 were able to classify disease categories using the available test data. SVM produced higher accuracy, recall, and F1-score than ID3 in the reported experiments. The web application also successfully connected the symptom-input interface, prediction module, and medicine database. These findings demonstrate the feasibility of using machine learning as a component of a preliminary healthcare decision-support application.

The results should be interpreted within the limitations of the dataset and experimental setup. High classification performance on the current test data does not by itself establish clinical accuracy or prove that the system can independently diagnose disease. Similarly, the Ayurvedic medicine information presented by the application should not be regarded as an individualized medical prescription. Further testing with larger and more diverse datasets would be required to assess the generalizability and practical reliability of the system.

6. Discussion

The experimental results show that both SVM and ID3 can be used for symptom-based disease classification in the proposed web application. SVM achieved higher accuracy, recall, and F1-score than ID3 on the tested dataset, indicating better performance under the conditions of this study. ID3 remains useful because its tree-based structure provides a relatively simple representation of classification decisions.

The system also connects disease prediction with Ayurvedic medicine information. After classification, related information is retrieved from the database and displayed through the web interface. User authentication and prediction-history management further support the practical operation of the application.

Several limitations should be considered. Model performance depends on the quality, size, and diversity of the dataset, while incomplete or incorrect user input may affect predictions. The current system primarily uses reported symptoms and does not include laboratory results, detailed medical history, allergies, or current medications. Therefore, its output should be treated as preliminary information rather than a clinical diagnosis or individualized prescription.

Future work can focus on expanding the dataset, evaluating additional machine learning algorithms, improving model explainability, and conducting validation with independent datasets. Mobile and multilingual versions, as well as carefully designed integration with clinical systems, may also be investigated.

Overall, the study demonstrates the feasibility of combining machine learning, web technologies, and Ayurvedic medicine information within a single decision-support platform. Further technical and clinical evaluation is required before considering broader healthcare deployment.

7. Conclusion and Future Work

7.1 Conclusion

This study developed a web-based healthcare application that combines machine learning-based disease classification with Ayurvedic medicine information. The system uses user-reported symptoms as input and applies SVM and ID3 Decision Tree algorithms to identify a possible disease category. Related Ayurvedic medicine information is then retrieved from the database and presented through the web interface.

The application was implemented using Python, Flask, HTML, CSS, and SQLite/MySQL, with modules for authentication, symptom submission, prediction, medicine information, and prediction history. In the reported experiments, SVM achieved higher accuracy, recall, and F1-score than ID3 on the available test dataset.

The proposed application is intended for preliminary health information and decision support rather than professional diagnosis or individualized treatment. The results are also dependent on the quality and characteristics of the dataset. Further validation is therefore necessary before considering wider healthcare application.

7.2 Future Work

Future development can focus on expanding the disease and symptom dataset and evaluating additional algorithms such as Random Forest, Gradient Boosting, and neural networks. Explainable AI could also be introduced to make model predictions easier to understand.

Other possible improvements include mobile and multilingual support, secure cloud deployment, integration with suitable electronic health records, and the use of additional patient information where appropriate. The Ayurvedic medicine database can also be expanded and carefully validated.

Future studies should focus on improving prediction performance while addressing data quality, privacy, security, explainability, and clinical validation. These improvements can strengthen the proposed framework as a foundation for responsible AI-assisted healthcare applications.

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In IEEE format of citations, the references should consist of the recent ones published in a range from 2021–2025 that fit the topic of the research in the area of Machine Learning, Disease Prediction, SVM, Decision Trees, Ayurvedic Medicine, and Healthcare Decision Support.

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