IDENTIFICATION OF DIFFERENT MEDICAL PLANTS/RAW MATERIALS THROUGH IMAGE POCESSING USING MACHINE LEARNING ALGORITHM

[1]Mr. N. Lakshmi Narayana,[2]N. Pavani,[3]N. Anil Kumar,[4]L. Sowmya

[1]Assistant Professor, Dept of Computer Science and Engineering, St. Ann's College of Engineering and Technology, Chirala-523187, India.

[2,3,4]U. G Student, Dept of Computer Science and Engineering, St. Ann's College of Engineering and Technology, Chirala-523187, India.

ABSTARCT - ***Medical plants widely used in traditional and modern medicine for treating various diseases. Accurate identification of medicinal plants and raw materials is essential for ensuring their correct usage and preventing harmful substitutions. This project presents an image processing and Machine learning-based system for identifying different medicinal plants and herbal raw materials leaf or plant images. The proposed system utilizes image processing, feature extraction, and a Convolution Neural Network(CNN) model to classify plant species accurately. Users can upload an image through a web application, and the train model predicts the plant name along with its scientific name, medicinal users, and confidence score. The developed system improves identification accuracy, reduces manual effort, and provides a fast and reliable solution for researchers, students, farmers, and health care professionals.***

KEYWORDS: ***Medicinal plants, Image Processing, Machine Learning, Deep Learning, Convolutional Neural Network(CNN), Medicinal Plant Identification, Herbal-Medicine plant, Computer Vision.***

INTRODUCTION

Medicinal plants have been used for centuries in traditional healthcare system due to their therapeutic properties. Correct identification of these plants is essential because many medicinal plants have similar appearances, making manual identification is the difficult. Incorrect identification may lead to improve treatment and health risks. Advancements in image Processing and

Machine Learning provide automated methods for identifying medicinal plants accurately. By analyzing leaf shape, texture, color, and other visual characteristics, Machine learning algorithms can classify the medicinal plants with high accuracy. This project develops a web-based application that allows users to upload plant images and receive instant identification along with medicinal information.

LITERATURE SURVEY

Several researchers have proposed Machine Learning and Deep Learning techniques for medicinal plant identification. Traditional image processing methods rely on handcrafted features such as shape, texture, and color histograms, while modern approaches use Convolution Neural Networks (CNN) for automatic feature extraction. Recent studies show that CNN models achieve high classification accuracy for medicinal plants.

Transfer learning techniques using models such as Mobile Net, Res Net, and Efficient Net further improve performance while reducing training time. These systems support agriculture, herbal medicine, biodiversity conservation, and pharmaceutical research.

RELATED WORK

Previous research demonstrates that image processing combined with Deep Learning provides an efficient solution for medicinal plant classification. CNN-based models automatically extract complex image features without manual intervention. Several mobile and web applications have been developed for plant identification; however, many focus only on general plants rather than medicinal species. This project specifically identifies medicinal plants and raw materials while also providing scientific names, medicinal uses, and confidence scores, making it more useful for healthcare and educational purposes.

EXISTING SYSTEM

The existing system mainly depends on manual identification by botanists, herbal experts, or traditional practitioners. Identification is based on visual observation of leaf shape, flower structure, stem characteristics, and plant morphology. Manual identification is time-consuming, requires expert knowledge, and may produce incorrect results when plants have similar appearances. Existing mobile

applications also provide limited medicinal information and lower accuracy for certain species.

PROPOSED SYSTEM

The proposed system uses image Processing and Machine Learning techniques to automatically identify medicinal plants and herbal raw materials from uploaded images. The uploaded image undergoes data cleaning, including resize, noise removal, and normalization. A CNN model extracts image features and classifies the plant species. The system displays:

- ❖ Plant Name
- ❖ Scientific Name
- ❖ Plant Family
- ❖ Medicinal Uses
- ❖ Prediction Confidence

The proposed system provides fast, accurate, and user-friendly medicinal plant identification.

SYSTEM ARCHITECTURE

The proposed system consists of the following modules:

- ❖ User Registration and login
- ❖ Image Upload Module
- ❖ Image Pre-process
- ❖ Feature Extraction
- ❖ CNN Based Classification Model
- ❖ Plant Database
- ❖ Prediction Result Display

The upload image is preconditioning before being passed to the trained CNN model. The predicted class is matches with the medicinal plant database, and the corresponding plant information is displayed to the users.

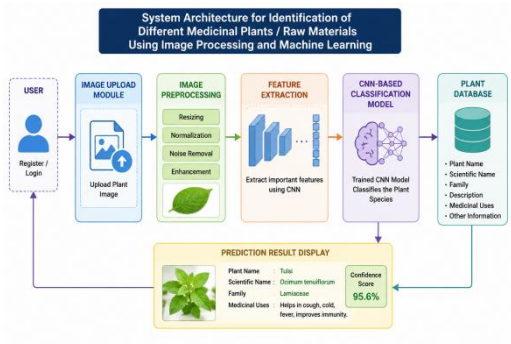

Fig1: System Architecture

METHODLOGY DESCRIPTION

The methodology begins with collecting medicinal plant images from publicly available data set and custom image collection. Images are precondition using resize, normalization, and noise reduction techniques. The CNN model is trained using labeled plant images. During prediction, the uploaded image undergoes precondition before feature extraction is performed automatically by

the CNN. Finally, the system retrieves medicinal information from the data set and displays the result to the user.

RESULTS AND DISCUSSION

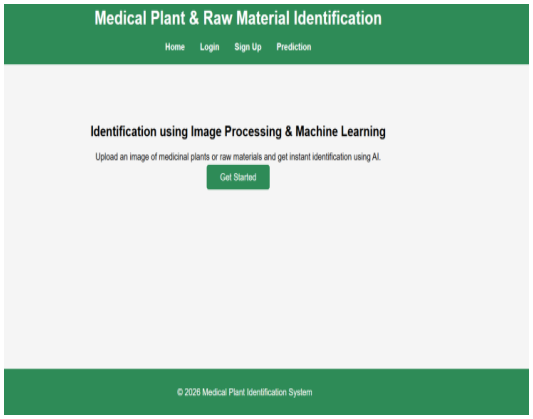

Fig 2: home page

The home page provide users with an overview of the medicinal plant identification system and allow navigation to sign up, login, and image upload pages.

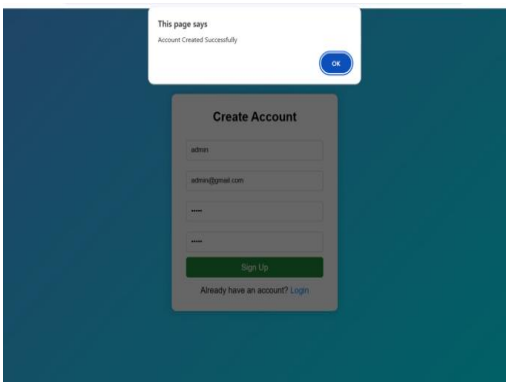

Fig 3: signup page

Users can create account and securely log into the application before accessing plant identification features.

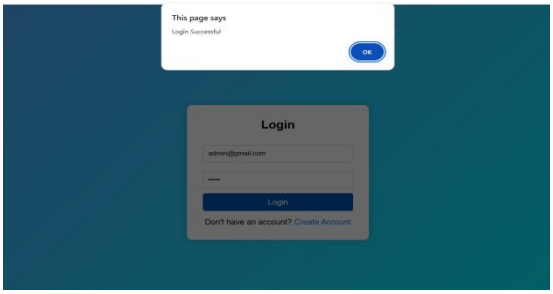

Fig 4: Login page

User can login with previous account creating mails and passwords. Here user can login only after account creating.

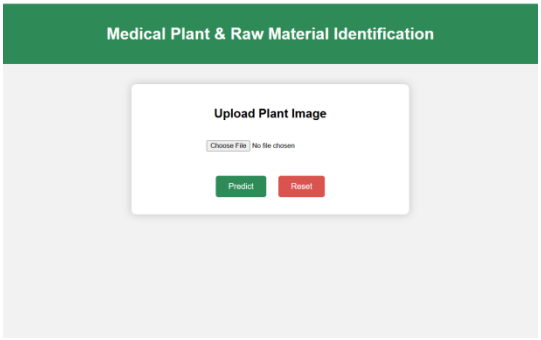

Fig 5: Image upload page

Users upload medicinal plant images. The CNN model processes the image and predict the plant species with a confidence score.

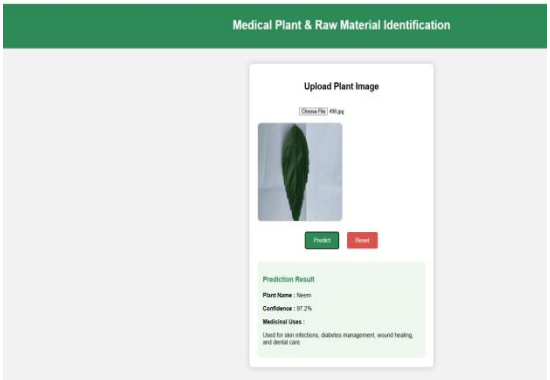

Fig 6: Prediction page

The prediction page refers the plant name, confidence, medicinal uses of the plant and the system demonstrates the high classification accuracy for different medicinal plant species.

CONCLUSION

The proposed image Processing and Machine Learning based medicinal plant identification system provides an efficient solution for automatically recognizing medicinal plants and herbal raw materials. The CNN model accurately classifies plant images and provides useful medicinal information to users. The system reduces dependency on manual identification, saves time, and minimize errors. It offers valuable support for students, research, farmers and health care professional. Overall, the project demonstrates how AI can simplify medicinal plant identification and contribute to modern health care and agricultural applications.

FUTURE SCOPE

Future work aims to improve the system by integrating larger medicinal plant identification data set covering 1000 of species. Advanced Deep Learning models such as vision Transformers and efficient net can further enhance classification accuracy. Mobile application support will enable real time plants identification using smartphone cameras. The system can also be expanded to identify plant diseases, recommend cultivation methods, and support multilingual interfaces for wider accessibility and improve scalability and usability in agriculture and health care application

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