AI-based tool for preliminary diagnosis of Dermatological manifestations

Project Overview

Problem Statement: Al-based tool for preliminary diagnosis of Dermatological manifestations

Problem Statement Number: **SIH1344**

Team Name: Sara Alpha

Team Mentor: B. Rethina Kumar M.E.

Team Leader: S. Syed Masood

Project Description

Dermatological Diseases can greatly affect a person's life, which is why an Accurate and Timely diagnosis is crucial for effective treatment. Our project aims to develop a comprehensive Healthcare System for Dermatological Disease Classification that combines the power of Deep Learning and Computer Vision to provide a holistic solution that will assist people dealing with Dermatological Conditions.

Project Objectives

1. **Accurate Disease Classification**: Develop Deep Learning models for classifying 7 Skin diseases, 3 Hair diseases and 4 Nail diseases from images with high accuracy.
2. **Personalized Healthcare Support**: Provide personalized Diet Recommendations, Do's and Don'ts and Skincare tips based on the predicted disease.
3. **Doctor Recommendations**: Recommend nearby dermatologists and specialists to users for expert consultation.
4. **Doctor Consultation Booking**: Simplify the process of booking consultations with Expert Dermatologists and healthcare providers.
5. **Community Engagement**: Establish a community forum where users can discuss their experiences, provide support and raise awareness.
6. **Skincare Diary**: Develop a digital diary platform that enables users to record and monitor the progression of their skin, hair, and nail conditions over time.

7. **Multilingual Support**: Ensure accessibility for users from diverse linguistic backgrounds.

8. **Cross-Platform Accessibility**: Develop both Mobile and Web applications to reach a wide user base.

Social Aim

In addition to the Project's Technical Objectives, our Social Aims are to:

Promote Health Awareness: By providing accurate disease classifications, healthcare recommendations and a supportive community forum, we aim to raise awareness about dermatological conditions, their management, and the importance of seeking professional medical advice.

Reduce Stigma: Dermatological conditions are often stigmatized, leading to isolation and reluctance to seek treatment. Our project's community forum feature aims to break down barriers and reduce the stigma associated with these conditions.

Enhance Accessibility: By recommending nearby Expert Doctors and Health Care Centres, particularly in underserved areas, we aim to improve healthcare accessibility for individuals with dermatological conditions.

Implementation Methodology

1. Data Collection and Preparation

- Collect a diverse dataset of Skin, Hair and Nail Dermatological disease Images, ensuring proper labelling.
- Preprocess the data, handle Missing values and perform Data Augmentation if necessary.

2. Model Development

- Build a Convolutional Neural Network (CNN) for the extraction of Image Features.
- Train separate models for Skin, Hair and Nail diseases.
- Develop a Dense Neural Network (DNN) for processing the Image Features extracted by the CNN and identify the Dermatological Disorder.

3. Healthcare Support Features

- Implement personalized Diet Recommendation Systems.
- Develop an Algorithm for generating Do's and Don'ts based on disease predictions.
- Create a Doctor Recommendation System using geolocation data.
- Implement the Doctor Consultation Booking feature.
- Build a Community Forum for user interactions.
- Develop Digital Skincare Diaries.
- Ensure Multilingual support for diverse users.

4. Mobile and Web Application Development

- Design and develop user-friendly Mobile and Web applications.
- Ensure Cross-platform compatibility and a Responsive design.

5. Testing and Validation

- Rigorously test and improve the Deep Learning models for accuracy and reliability.
- Conduct user testing to validate the usability and effectiveness of Healthcare Support features.
- Address and resolve any issues identified during testing.

6. Deployment

- Deploy the Mobile and Web Applications on relevant platforms.
- Monitor and maintain the Applications for scalability and reliability.

Project Team

1. **S. Syed Masood** (AI Engineer)
   - Led the project team from inception to completion.
   - Developed the Deep Learning models for disease Identification.
   - Worked on the backend development to integrate the models with the application.

2. **D. Suryaa** (Web Developer and Backend Developer)
   - Worked on the development of the Web Application.
   - Designed and implemented the User Interface for the Web App.
   - Built the Backend for the Web Application.

3. V V. Velvizhi (Web Developer)

- Worked on the development of the Web Application.
- Designed the User Interface and Functionality of the Web App.

4. M. GoppyKrishna (Mobile App Developer and Backend Developer)

- Worked on the development of the Mobile Application.
- Implemented User interface and Functionality for the Mobile App.
- Built the Backend for the Mobile Application.

5. N. Vishwa (UI/UX Engineer)

- Worked on the development of the Mobile Application.
- Designed the User Interface and Functionality for the Mobile App.

6. P. Saicharan (Data Analyst)

- Collected a diverse dataset of Skin, Hair, and Nail disease images.
- Pre-processed the data, by performing Data Wrangling.

Conclusion

Our project, the Dermatological Disease Identification and Healthcare System, aims to Revolutionize Dermatological Healthcare. We combine cutting-edge technology with comprehensive user support to develop Accurate Disease Classification models and provide a wide range of healthcare features. Our goal is to improve the lives of individuals struggling with Dermatological conditions.