Acne Severity Detection & Personalized Chat Assitant

Acne is a common skin condition that affects millions of individuals worldwide, often leading to physical discomfort and emotional distress. While timely and accurate diagnosis is essential, access to dermatologists is limited for many, and manual assessment of acne severity is subjective and inconsistent. There is a growing need for a fast, objective, and intelligent solution that can assist users in identifying the severity of acne and guiding them toward suitable treatment options. This project addresses that need by leveraging deep learning and conversational AI to automate acne assessment and provide personalized skincare guidance.

In this project, I developed an AI-powered web application that detects acne severity from facial images and provides personalized skincare advice through a chatbot interface. The solution integrates MobileNetV2, a lightweight deep learning model, with OpenAI's GPT-3.5 for contextual user interaction. The user uploads a photo, and the system predicts the severity level—Clear, Mild, Moderate, or Severe—along with confidence score and tailored skincare tips.

I selected MobileNetV2 because it offers an excellent trade-off between model accuracy and computational efficiency. It's particularly well-suited for real-time inference and edge deployment. Streamlit was chosen for its simplicity and rapid prototyping capabilities, making it perfect for building interactive machine learning apps. The OpenAI GPT-3.5 chatbot adds conversational intelligence and improves user engagement by answering personalized skincare questions based on the AI's prediction.

The benefits of this technology include fast deployment, ease of use, and the potential to support remote skin health screening. However, the project faced several challenges: handling class imbalance in the dataset, ensuring generalization across diverse skin tones and lighting conditions, and maintaining inference speed while achieving high accuracy. Additionally, integrating GPT-based dynamic conversations into a real-time system required careful prompt engineering.

The working demo shows how the user uploads a skin image, receives an acne severity prediction with a confidence score, and gets appropriate skincare advice. The user can then ask follow-up questions such as, "What should I use for moderate acne?" and receive tailored responses. This system blends deep learning and NLP to simulate a dermatology assistant experience accessible from anywhere.