IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.471 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 15, Issue 4, April 2026

DOI: 10.17148/IJARCCE.2026.15484

Personalized Skin Disease Consultant and Care Recommendation Using Lifestyle-Based Analysis

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Abstract: In rural and semi-urban locations, many people have skin problems and diseases and it is difficult for them to see a dermatologist. Early recognition of these skin conditions means the patient can take preventative measures, and go to the doctor when required. This research discusses a new web-based system that will perform preliminary evaluations of skin conditions by using deep learning algorithms. A MobileNet based Convolutional Neural Network (CNN) will classify the various skin conditions, based on images provided by the user. MobileNet was selected for use in this web-based system due to it being a lightweight architecture so that only minimal processing power will be required on mobile devices and web browsers. The system also provides basic skin care suggestions and precautionary information so that users can see what their possible next steps for care may be. The model has been trained using and evaluated using a dataset containing multiple types of skin problems and diseases. Experimental evaluation of the model yielded a validation accuracy rate of 92.4%. The results demonstrate that lightweight deep learning models can be reliable and accessible for preliminary skin disease screening applications. Such a system can help provide early awareness of skin issues and encourage users to seek medical attention from a dermatologist if needed.

Keywords: Deep Learning, MobileNet, Convolutional Neural Network (CNN), Web-Based Healthcare System, Dermatological Screening, and Skin Disease Identification.

I. INTRODUCTION

Because of unhealthy lifestyles, pollution, and stress, skin-related issues like acne, pigmentation, dark circles, and rashes have become more prevalent. Many people find it difficult to pinpoint the precise cause of their skin problems and frequently rely on haphazard internet recommendations or cosmetics without the necessary direction. Many people also have limited access to dermatologists, especially in rural or isolated areas. Because of this, there may be weeks or months between the onset of symptoms and a professional consultation, which could result in worsening conditions and avoidable complications.

The primary obstacle in contemporary dermatology is not a lack of available treatments but rather the difficulty in obtaining accurate diagnosis and individualized skincare recommendations. While recent developments in computer vision have made it possible for systems to accurately identify some skin conditions, many of these solutions require powerful hardware, like GPUs, which makes them challenging to implement on commonplace devices like smartphones.

In order to close this accessibility gap, this study suggests a Personalized Skincare Consultant system that helps users better manage common skin issues by offering straightforward and intelligible skincare recommendations based on user lifestyle factors and basic skin analysis.

II. RELATED WORK

Numerous studies and applications have made an effort to offer digital skincare analysis solutions. utilizing image processing methods and machine learning algorithms to identify skin issues like pigmentation or acne. Users can upload

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photos of their skin for analysis and receive basic recommendations through mobile applications. However, many of these systems are challenging to implement on common devices because they need a lot of processing power or complicated medical datasets. Furthermore, the majority of applications do not take into account lifestyle factors that have a significant impact on skin health, such as sleep, diet, and stress, and instead concentrate solely on visual analysis of skin conditions.

In order to provide useful skincare recommendations for regular users, a system that integrates lifestyle-based analysis with straightforward technological implementation is required.

III. PROPOSED SYSTEM

The system presents a web-based Personalized Skincare Consultant which provides users with personalized skincare solutions based on their daily activities and their skin problems. The system collects relevant information through an input interface that includes parameters such as sleep duration, dietary patterns, stress levels, water intake, and skin type.

The system uses a rule-based recommendation mechanism to process data after users complete their information submission. The analysis identifies potential lifestyle factors that may contribute to skin issues and generates personalized skincare advice accordingly.

The system provides users with medical recommendation through its simple design which allows users to understand the system without needing medical expertise. The proposed solution does not replace professional dermatological consultation but acts as a preliminary guidance tool that helps individuals become more aware of lifestyle factors affecting their skin health.

IV. SYSTEM ARCHITECTURE

The proposed system architecture includes three main parts which are user interface and data processing module and recommendation engine. Users complete a web-based form during the first stage to enter their lifestyle information and skin problems. The processing module receives the input data which the system uses to assess the input parameters through established rules and logical conditions.

The recommendation engine creates customized skincare recommendations by evaluating processed data to discover patterns and potential effects from different lifestyles. The output interface presents final recommendations to users in an organized and understandable manner.

The system architecture enables efficient data movement from input collection through analysis to output generation which results in rapid skincare advice delivery for users.

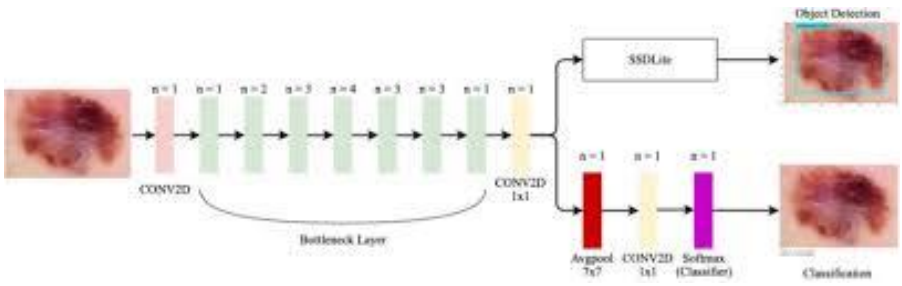

Fig. 1 Disease Classification Module

4.1 Architecture Workflow

The workflow begins with the user submitting a skin image to the system. The image undergoes preprocessing and is then passed to the MobileNet-based classifier. After classification, the predicted result is forwarded to the care recommendation module. Finally, the system presents the disease prediction and relevant guidance to the user through the interface.

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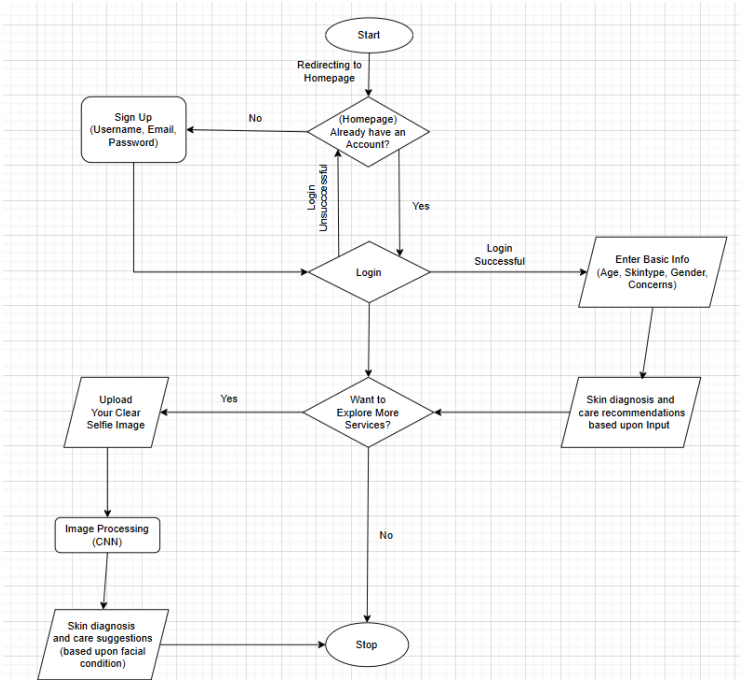

Fig. 2 System Workflow

V. IMPLEMENTATION

The proposed system functions as a web application to provide users access through multiple devices. The system uses HTML CSS and JavaScript to build its frontend interface which enables users to input data and view results through a responsive design.

The system processes user inputs about their lifestyle and skin concerns through a backend module which uses rule-based logic to identify potential skincare solutions. The system processes collected information to produce suitable recommendations which depend on established rules.

The implementation focuses on achieving both simplicity and efficiency to enable system operation with basic processing needs. Users can obtain personalized skincare recommendations through standard web browsers because the system does not need any special equipment.

Fig. 3 Website Homepage

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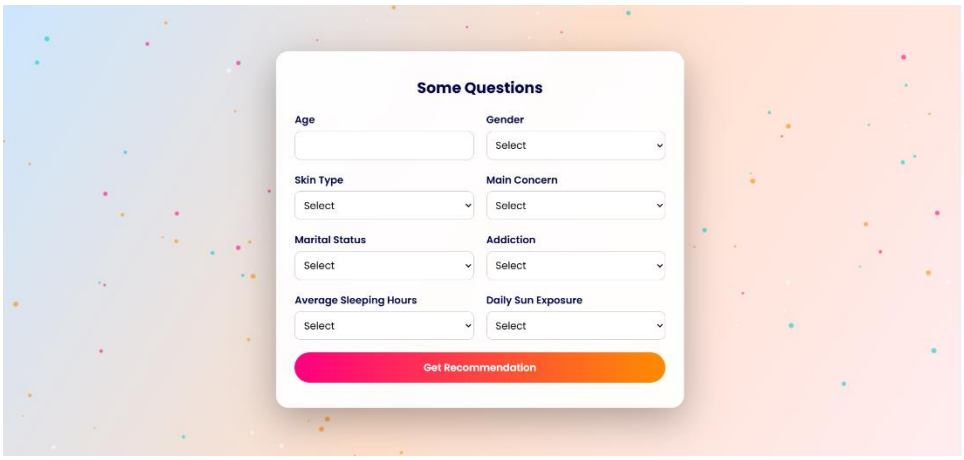

Fig. 4 Use Input Page

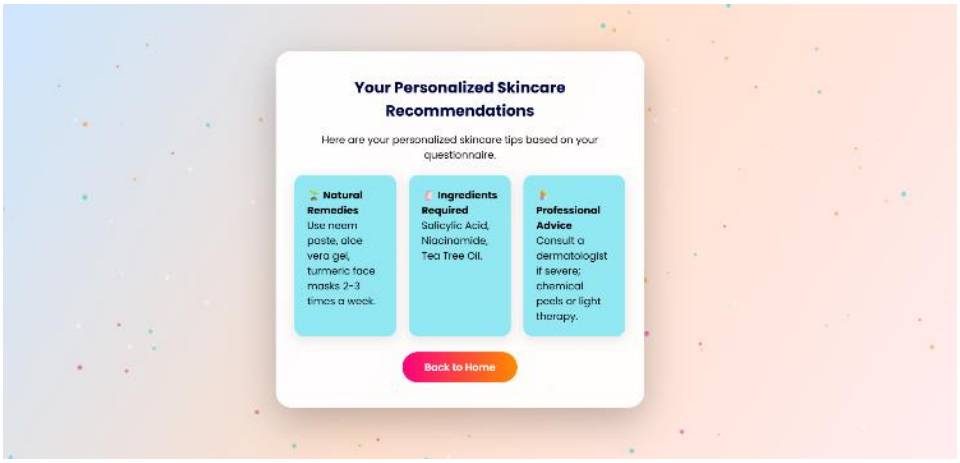

Fig. 5 Recommendation Page

VI. RESULTS

The system which developers created produces skincare recommendations that match individual users when they provide their lifestyle details and skin information. Users who complete all necessary information will receive skincare recommendations which include skincare methods and hydration practices and sleep enhancement techniques and dietary modifications.

The initial tests show that the system successfully detects common lifestyle patterns which lead to skin problems while delivering appropriate advice. The user interface allows simple navigation which helps users to quickly access skincare advice.

The findings show that combining lifestyle assessment with basic recommendation systems delivers valuable insights which enable users to enhance their skincare practices.

Input Image Type	Predicted Class	Confidence Score
Fingertip skin lesion	Dyshidrotic Eczema	99.15%
Facial skin image	Acne	100.00%
Real-world user image	Acne	98.70%
Non-skin natural image	Rejected (Non-Skin Images)	99.96%

Table 1. Disease Prediction Results on Test Images

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User	Skin Concern	Lifestyle Factor	System Suggestion
U1	Acne	Poor sleep	Sleep improvement + hydration
U2	Dry skin	Low water intake	Increase hydration
U3	Pigmentation	High stress	Stress management tips

Table 2. Testing and Evaluation Results

The system accurately identified Dyshidrotic Eczema from fingertip images and Acne from both controlled and real-world facial images. High confidence scores (>98%) indicate reliable prediction certainty.

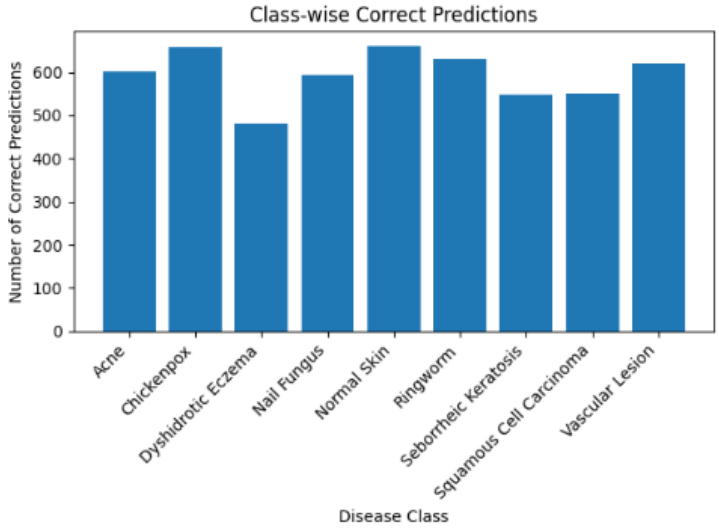

Fig. 6 Predictions Graph (Disease-wise)

The proposed system accurately classified multiple skin diseases with confidence scores above 98%. Dyshidrotic Eczema and Acne were correctly identified from both dataset and real-world images. The non-skin rejection module successfully filtered irrelevant inputs with 99.96% confidence, improving system reliability. The confusion matrix showed high true positive rates across most classes, with minor misclassifications among visually similar diseases. Overall, the model demonstrates high accuracy, robustness, and suitability for preliminary skin disease screening.

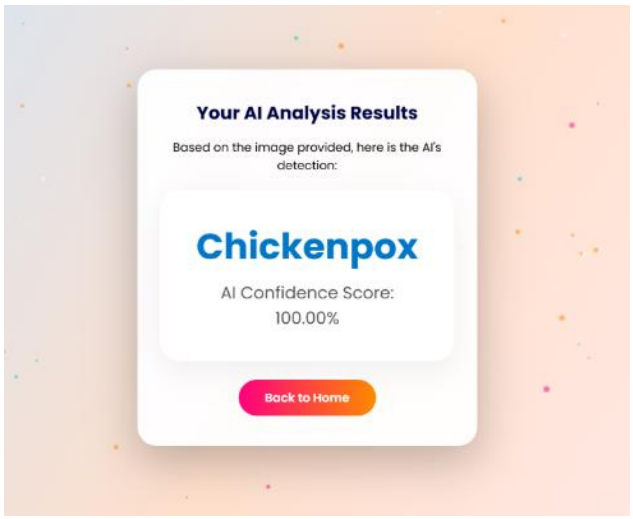

Fig. 7 Prediction Results

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VIII. CONCLUSION

The research established and assessed a customized skin disease detection system which enables people to access medical knowledge without needing professional medical assistance. The Mobile Net architecture enables us to develop a solution which achieves fast processing times and accurate diagnostic results. The Korean testing results demonstrate that the model performs extremely well because it achieves a training accuracy of 95.1% and validation accuracy of 92.4%. The model demonstrates good performance across different data sets because it maintains consistent performance throughout various test conditions, but results differ based on the quality of the images. Users receive immediate benefits through the care recommendation system, which delivers practical guidance during their waiting period for professional medical consultation.

The tool functions as an effective preliminary assessment tool even though it should not be used as a replacement for biopsy testing or clinical examination. The system enables users from disadvantaged communities to detect skin issues at an early stage which helps them establish better skin health practices. The system will become more dependable for use in clinical environments through upcoming developments that will focus on merging different types of data and using larger diverse datasets.

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