iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 14 **Issue:** IV **Month of publication:** April 2026

DOI: https://doi.org/10.22214/ijraset.2026.79511

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 14 Issue IV Apr 2026- Available at www.ijraset.com

AI-Based Personalised Facial Skincare Recommendation System

Mrs. Saba Noor Ayesha Khanum[1], M. Prathik[2], K. Smiley[3], G. Layasai[4]
[1]*Assistant Professor, Department of CSE(AI&ML), Methodist College of Engineering and Technology, Abids, Hyderabad, Telangana, 500001, India*
[2, 3, 4]*Students, Department of CSE, Methodist College of Engineering and Technology, Abids, Hyderabad, Telangana, 500001, India*

Abstract: ***The influence of intelligence in skincare and dermatology is growing. This project introduces a system that uses intelligence to analyze facial images and provide personalized skincare recommendations. The system uses computer vision and deep learning to identify skin characteristics such as acne, pigmentation, wrinkles and more. It determines the users skin type. Connects detected issues with suitable skincare ingredients and products. The goal is to provide affordable skincare guidance.***
Keywords: Artificial Intelligence, Personalized Skincare, Deep Learning, Skin Type Classification, Facial Analysis, Machine Learning, Computer Vision, Skin Condition Detection.

I. INTRODUCTION

Skincare has now become a significant factor in personal care as people are more aware of the effects of environmental conditions and lifestyle on personal health and skin. Traditionally, personalized advice on skincare can only be obtained directly from dermatologists and beauty experts, which can be costly and sometimes impossible for people to access. Moreover, these methods are always different and sometimes do not yield consistent results. However, with the rapid evolution of technology and the advent of Artificial Intelligence (AI) in various aspects of life, AI has now proven to be a revolutionary tool which can change the face of traditional methods of skin analysis and assessment. Modern AI systems are now capable of analyzing facial images and detecting various skin patterns and characteristics which are not visible to the naked eye. AI systems can automatically detect common skin problems such as acne, pigmentation, enlarged pores, wrinkles, and texture issues on the face of the person being analyzed. Unlike traditional methods of skin analysis and assessment, AI systems can perform these functions automatically without the need to consult a dermatologist or a beauty expert physically. Besides the analysis of facial characteristics and common skin problems, AI systems can now perform more personalized functions by combining the analysis of facial characteristics with the knowledge of various skincare products and environmental conditions.
This enables the formulation of a skincare routine which is personalized according to the weather conditions prevailing on a given day. This is important because weather conditions are known to This is important because weather conditions are known to affect the skin considerably. Therefore, the AI system of skincare recommendation acts as a link between professional advice and personal care and provides the public with a platform which is personalized and cost-effective and can be relied upon to give accurate and reliable advice on various aspects of personal care and skincare.

II. LITERATURE SURVEY

Recent studies have shown that AI and computer vision are effective tools for analyzing skin conditions using facial images. CNN is used to detect skin problems. Existing systems are mostly focused on providing generalized recommendations or consulting with an expert.

A. Existing System & Disadvantages

1) Consulting with an expert dermatologist
2) Consumes time and is costly
3) Provides generalized recommendations
4) Lacks real-time analysis

B. Proposed System & Advantages

1) AI-based automated skin analysis
2) Provides real-time analysis
3) Provides personalized recommendations
4) Provides a user-friendly app

©IJRASET: All Rights are Reserved

III. SYSTEM ARCHITECTURE

The proposed system will be designed in a layered structure, including user interface, image processing, AI analysis, and recommendation.

The user will be prompted to give input through a mobile application developed using the Flutter framework. The facial image will be captured, and preprocessing will be done using face detection techniques.

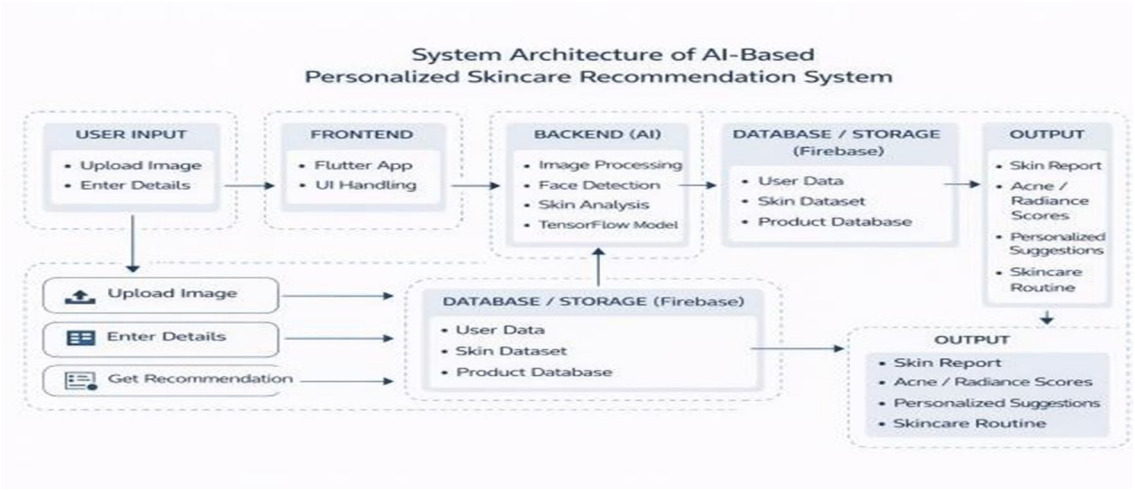


Fig-1: Architecture of AI-Based Skincare System.

Analysis of the processed image is performed using AI models to recognize skin problems like acne, pigmentation, oiliness, and dark circles. These are sent to a rule-based recommendation system, which creates customized skin regimens.

IV. IMPLEMENTATION

The system can be developed using Flutter for the front end and image processing techniques for the back end.

1) Image Acquisition: The user can acquire images using the camera.
2) Preprocessing: The face is detected using ML Kit, and the background is removed.
3) Skin Analysis: AI techniques can be used to determine the percentage of various parameters.
4) Recommendation System: A rule-based system can be developed for skincare products.

V. METHODOLOGY

The Personalized Skincare Recommendation System, as proposed, utilizes an AI-based system that follows a particular methodology to convert a facial image into meaningful skincare insights and recommendations. The methodology includes a number of steps that are followed to ensure the desired output is obtained.

A. Image Acquisition

The Personalized Skincare Recommendation System starts with the acquisition of the facial image, where the image is captured through a camera installed on a mobile device. The application also offers real-time image acquisition to ensure that the image is captured and analyzed accurately.

B. Face Detection and Preprocessing

Once the image is captured, face detection is performed through Google ML Kit, where the facial area is separated from the rest of the image.

The image is then subjected to a number of preprocessing techniques, such as:

1) Cropping the facial area
2) Resizing the image to a particular size
3) Noise reduction to eliminate any unwanted distortions
4) Normalization to ensure that the image quality is maintained.

The image is then subjected to a number of feature extraction techniques, such as:

C. Feature Extraction

The image is then analyzed to extract the relevant features, such as:

1) A presence of Acne
2) Oiliness
3) Pigmentation
4) Dark Circles
5) Moisture
6) Radiance

The image is analyzed to detect these features, and the analysis is performed through image processing and AI-based technologies that help detect the relevant features through the textures and color changes on the skin surface.

D. Skin Condition Analysis

The extracted features are quantified in numerical form, i.e., percentage-based scoring.

Each feature is classified under various categories, such as:

1) Healthy
2) Moderate
3) Needs Care

This classification will help in understanding the severity of all the skin conditions.

E. Recommendation Generation

A rule-based technique is used to provide recommendations after identifying skin conditions.

Recommendations can be created after analysis for:

1) Skincare products
2) Daily routine suggestions
3) Generic skin care advice

F. Output Display

The extracted data is presented in an easily understandable way.

Presentation is made for the following information:

1) Percentage of skin condition
2) Issues highlighted
3) Skincare products
4) Daily routine suggestions
5) Generic skin care advice

VI. RESULTS AND DISCUSSION

Performance Evaluation of the Proposed AI-based Personalized Skincare Recommendation System shows the ability of the system to accurately analyze a facial image and provide customized skincare recommendations.

The system performance has been evaluated in terms of skin condition detection accuracy, recommendation effectiveness, and usability.

A. Skin Condition Detection Accuracy

The proposed AI-based system has effectively identified different skin conditions such as acne, oiliness, pigmentation, dark circles, moisture, and radiance. Percentage values for each parameter have been given to better understand the state of one's skin.

Upon testing with different facial images, the system has effectively been able to detect the mentioned skin features. Various skin conditions, like acne or pigmentation, have been detected based on texture and color variations, and the levels of oiliness and moisture have been calculated using skin reflectance and brightness levels. Face detection and noise reduction as preprocessing steps have contributed to accurate skin feature extraction.

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

B. Recommendation Effectiveness

The proposed rule-based recommendation system has effectively mapped skin conditions to skincare recommendations. Based on the analysis results, the system has provided recommendations such as:

- Skincare products such as cleanser, serum, moisturizer, and sunscreen, etc.
- Personalized skincare routines such as morning and night routines.
- Generic skincare tips for maintaining healthy skin

The recommendations are highly personalized based on individual user needs. For instance, if a user indicates high levels of acne or oiliness, recommendations for oil-controlling and anti-acne products will be made.

Here is one instance that shows how this system can provide relevant and personalized advice regarding skincare.

C. User Interface and Usability

The application has an effective user interface that allows for easy navigation between various functions such as scanning, analysis, recommendations, and routines.

The visualization of parameters based on percentage and color helps users understand their skin conditions.

D. Real-Time Performance

One of the advantages of this system is its real-time performance. The application can quickly process images of the face and produce analysis results within a short period. The incorporation of mobile-based image processing and the use of lightweight AI techniques enable smooth performance without high computational needs.

E. Output Analysis

The system's output includes:

- Skin parameters such as acne, pigmentation, moisture, etc.
- Highlighted problem areas.
- Skincare product recommendations.
- Skincare routines.
- Skincare tips.

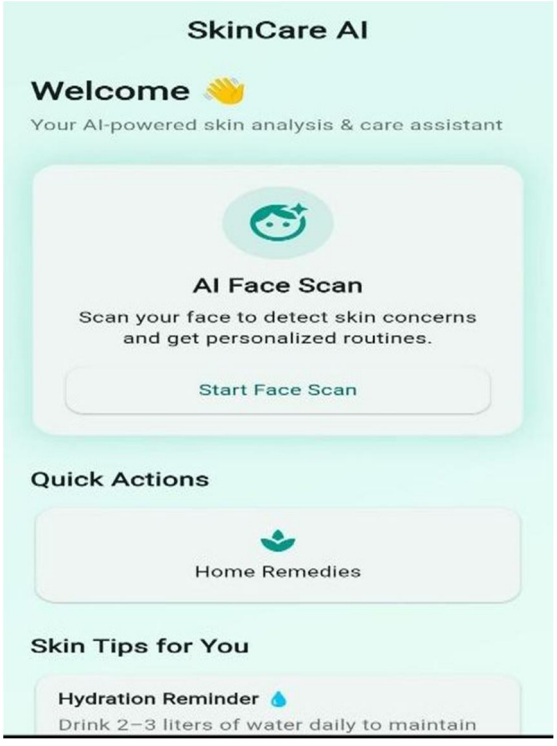


Fig-2: Home Screen of Application

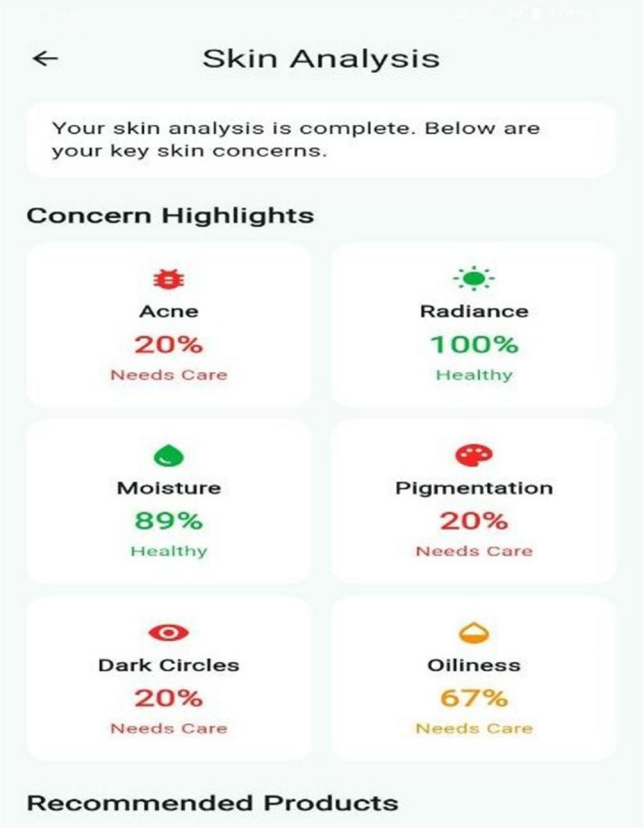


Fig-3: Skin Analysis Results



Fig-4: Recommended Products

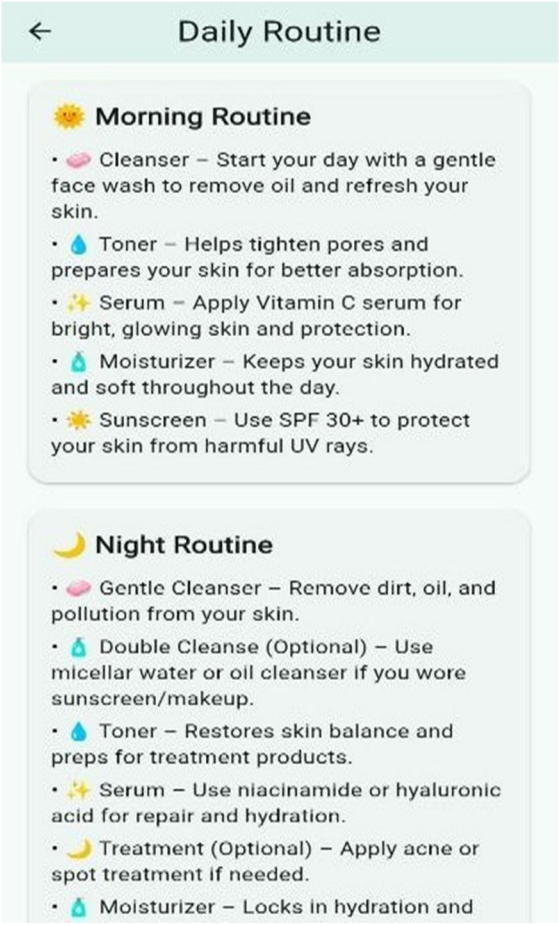
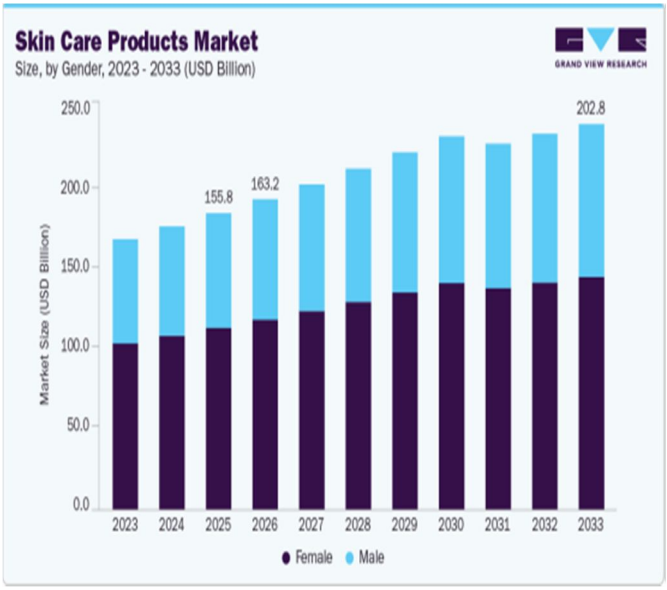
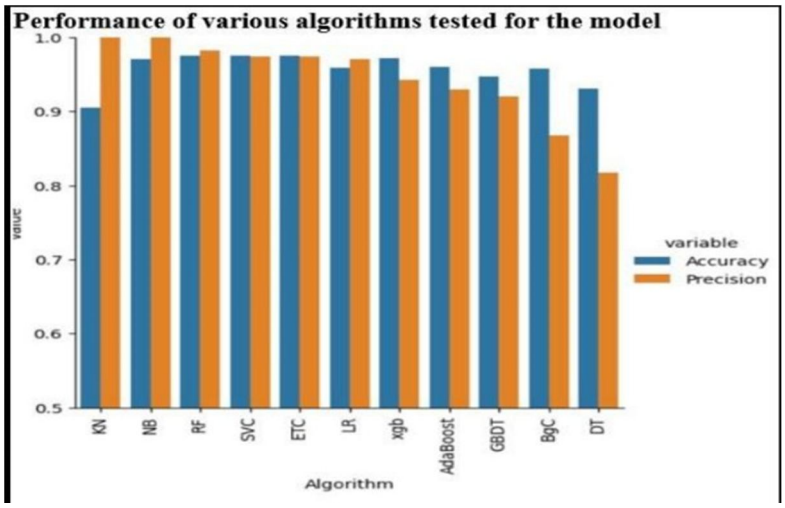
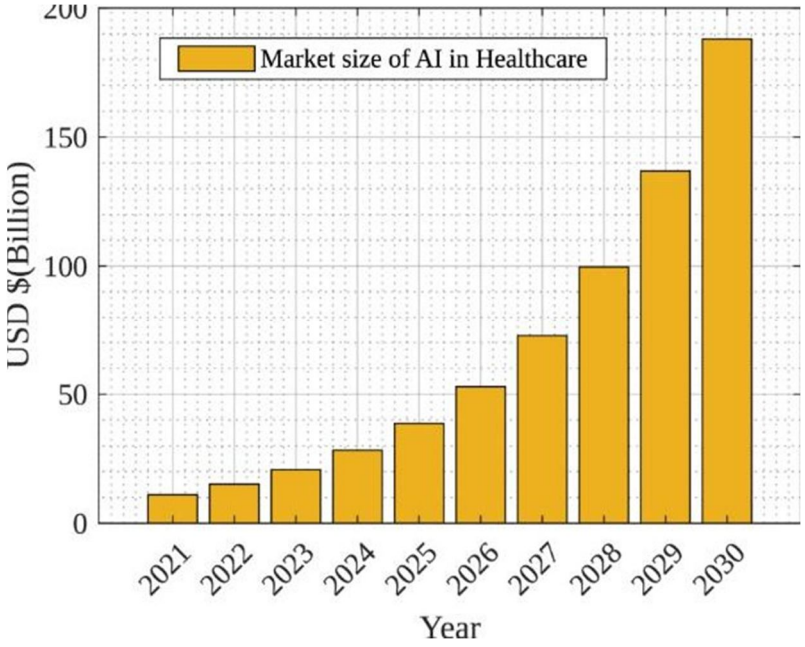


Fig-5: Daily Skincare Routine

The system shows skin conditions such as acne, moisture, pigmentation, and oiliness in percentage values. On the basis of these results, personal product recommendations and daily skincare routines are made.The application also offers useful tips such as hydration, sun protection, and skincare routines.







VII. CONCLUSION

The Personalized Skincare Recommendation System, developed through the application of AI and computer vision, is a clear example of the application of Artificial Intelligence and computer vision technology to a particular domain, namely, skincare analysis. The system effectively performs image analysis, identifying important skin characteristics such as acne, pigmentation, oiliness, moisture, and dark circles, and offers personalized recommendations to the end users.

The system, through the application of image analysis, image feature extraction, and rule-based recommendation, offers a comprehensive and easy-to-use system for skincare analysis and recommendations. The application of mobile technology is also an important contribution, as the system offers a convenient platform for users to analyze their skin without the need for any additional equipment or consultation.

The system, apart from improving decision-making for choosing the right skincare products, also promotes awareness among individuals regarding skincare through personalized skincare routines and advice. The system, compared to traditional methods, is efficient, cost-effective, and convenient.The experimental results indicate that the system is functioning well under normal circumstances and is offering meaningful results that can be used to maintain healthy skin.

In conclusion, the system bridges the gap between manual skincare analysis and intelligent technology, and offers a practical and innovative approach to skincare analysis and recommendations. The system, with further enhancements, is capable of becoming a comprehensive dermatology system for individuals and professionals alike.

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

VIII. FUTURE SCOPE

An AI-based Personalized Skincare Recommendation System is a powerful solution for skin analysis in real time; nevertheless, some modifications can be done in order to improve the system in the future.

A. Application of Advanced Deep Learning Methods

One possible modification can include the application of advanced deep learning methods such as Convolutional Neural Networks and Vision Transformers in order to enhance the precision of skin condition recognition.

B. Recognition of Additional Skin Disorders

In addition to that, the proposed system can be adjusted to recognize such skin disorders as wrinkles, fine lines, redness, sensitivity, and skin diseases as well.

C. Real-Time Cloud Computing Services

Another modification involves integration of the services based on cloud computing technologies in order to ensure real-time storage of information about skin analysis and its subsequent improvement.

D. Development of Personalized AI Models

Finally, one can introduce personalized AI models into the system in order to meet the needs and preferences of specific users in terms of skincare.

E. Integration of Professional Dermatologists' Assistance

The proposed system can be upgraded through the integration of assistance from professional dermatologists. It can provide users with an opportunity to consult professional dermatologists when necessary in order to develop features that will make the use of a hybrid AI and human expertise possible.

F. Multiple Platforms

The proposed system is currently being designed and developed in such a way that it can only operate mobile applications.However, future improvements can allow the development of an app that supports other platforms apart from mobile phones.

G. Multiple Languages

The integration of several languages in the app will make its use simpler since many people will be able to use it.

H. Improvement in Product Recommendation

Future improvements in the proposed system can include allowing the purchase of products in the system, as well as the provision of more accurate product recommendation suggestions.

I. Real-Time Monitoring of Skin Health

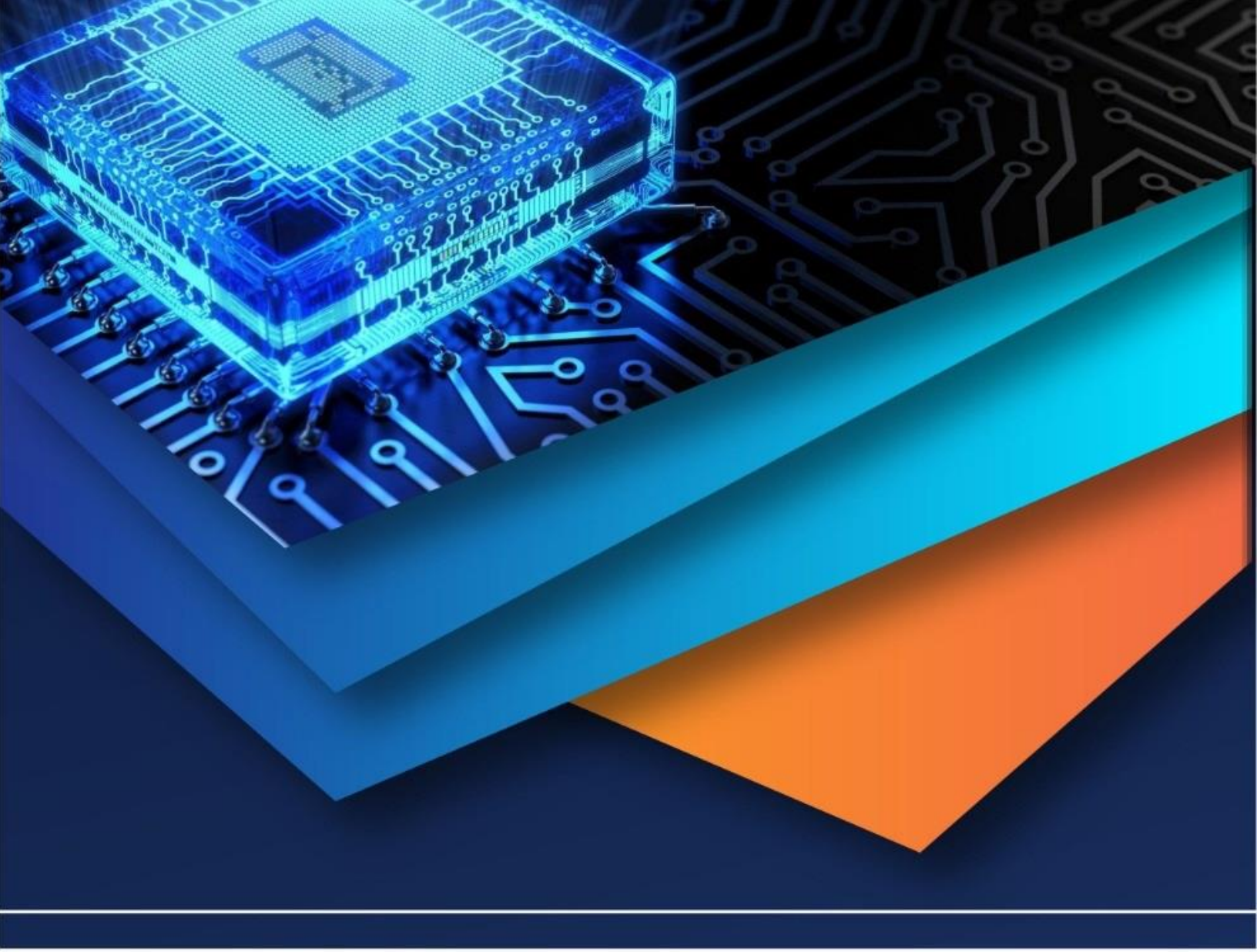
Another improvement to the proposed system can include features such as the monitoring of the skin and provision of tips for maintenance of skin health.

REFERENCES

[1] S. Sylvagno and T. H. Rochadiani, “Skincare Recommendation System Based on Facial Skin Type with Real- Time Weather Integration,” 2025.
[2] Yadav and K. Singh, “Smart Dermatology: CNN-Based Detection and Product Recommendation,” International Research Journal of Engineering and Technology (IRJET), 2025.
[3] Yadav, R. E. H. Khan, and K.Singh, “YOLO-Based Detection of Skin Anomalies with AI Recommendation Engine,” International Research Journal of Computer Science (IRJCS), 2025.
[4] R. E. H. Khan and K. Singh, “AI-Driven Personalized Skincare: Enhancing Skin Analysis and Product Recommendation Systems,” 2025.
[5] M. Rajegowda et al., “AI-Assisted Skincare Routine Recommendation System in XR,” Journal of Emerging Technologies and Innovative Research, 2025.
[6] S. Supe, V. A. Agaskar, R. R. Mestry, and K. B. Rokade, “DermaTech: Skincare Product Recommendation System Using Machine Learning and Deep Learning,” 2025.
[7] A. Jannatin and C. I. Ratnasari, “Personalized Skincare Recommendation System Based on Ontology and User Preferences,” 2025.
[8] K. Vishwanth et al., “Smart Mirror Skin Care Recommendation Using Machine Learning,” International Journal of Innovative Research in Science, Engineering and Technology (IJIRSET), 2025.

©IJRASET: All Rights are Reserved

[9] P. Krishnamoorthy, “Personalized Skincare Recommendations Using Deep Learning,” Master’s Thesis, 2024.
[10] Fajrizal et al., “Web-Based Expert System Application in Determining Facial Care,” IOP Conference Series, 2020
[11] S. H. Kassani, P. H. Kassani, R. Khazaeinezhad, M. J. Wesolowski, and K. A. Schneider, “A Comparative Study of Deep Learning Architectures for Skin Disease Classification,” IEEE Access, vol. 7, pp. 150530–150543, 2019.
[12] Esteva et al., “Dermatologist-Level Classification of Skin Cancer with Deep Neural Networks,” Nature, vol. 542, pp. 115–118, 2017.
[13] T. Yu and Y. Zhao, “Deep Learning- Based Skin Lesion Analysis for MobileHealthcare Applications,” IEEE Transactions on Biomedical Engineering, vol. 67, no. 5, pp. 1300–1310, 2020.
[14] M. Codella et al., “Skin Lesion Analysis Toward Melanoma Detection Using Deep Learning,” IEEE Journal of Biomedical and Health Informatics, vol. 23, no. 2, pp. 501–512, 2019.
[15] N. Codella, D. Gutman, M. Celebi, et al., “Deep Learning Ensembles for Melanoma Recognition,” IEEE ISBI Conference, 2018.
[16] Y. LeCun, Y. Bengio, and G. Hinton, “Deep Learning,” Nature, vol. 521, pp. 436–444, 2015.
[17] K. Simonyan and A. Zisserman, “Very Deep Convolutional Networks for Large-Scale Image Recognition,” arXiv, 2014.
[18] O. Ronneberger, P. Fischer, and T. Brox, “U-Net: Convolutional Networks for Biomedical Image Segmentation,” MICCAI, 2015.
[19] Google, “ML Kit for Mobile Developers,” Available: https://developers.google.com/ml-kit



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)