SRI KRISHNA COLLEGE OF ENGINEERING AND TECHNOLOGY

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

FACIAL SKINCARE PRODUCT RECOMMENDATION USING DEEP LEARNING TECHNIQUES

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AGENDA

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ABSTRACT

An innovative skincare recommendation system integrates image processing and deep learning techniques like CNN and its architecture Efficient Net B0, accurately identifying diverse skin types (normal, oily, dry) and tones. Users upload facial images to receive personalized recommendations addressing concerns such as severity of the acne from low to high . The system provides comprehensive suggestions for cleansers, moisturizers, serums and more. With an overall accuracy of 92.34%, it revolutionizes personalized skincare solutions through a user-friendly web interface. This approach alleviates the challenge of buying skincare products online by offering precise guidance without the need for in-person trials.

INTRODUCTION

In personalized skincare, the integrated system uses Convolutional Neural Networks and EfficientNet B0 , accurately classifies facial images into Dry, Oily, Normal as well as identifying acne and pigmentation . Despite image quality challenges, the model achieves heightened accuracy. The system employs a region-based skin detection method in HSV and YCbCr color spaces, categorizing skin tones into six Fitzpatrick scale categories. Acne classification utilizes a CNN structure with transfer learning. Using a specialized dataset, the recommender system uses cosine similarity to offer tailored product suggestions aligned with diverse skin metrics. This innovative framework aims to revolutionize skincare by providing a curated selection designed to effectively address specific needs.

PROBLEM STATEMENT

The overwhelming skincare choices, the goal is to simplify product selection by understanding user needs. Existing systems fall short in analyzing individual concerns and preferences. The propose a novel deep learning approach for a personalized skincare experience, offering accurate recommendations beyond basic skin types.

LITERATURE SURVEY

TITLE	YEAR	ANALYSIS	AUTHOR
Facial Skin Type Classification Based on Microscopic Images Using Convolutional Neural Network (CNN)	2021	This paper introduces a CNN model for classifying facial skin types based on microscopic images, achieving a remarkable accuracy of 99.5% and a low loss value of 0.0216.	Sofia Saidah, Yunendah Nur Fuadah, Fenty Alia, Nur Ibrahim, Rita Magdalena, Syamsul Rizal
Skin Disease Classification and Detection by Deep Learning and Machine Learning Approaches	2023	This paper focuses on the automatic classification and detection of various skin diseases using deep learning and machine learning techniques. It employs a diverse dataset and applies different feature extraction and classification methods, demonstrating a comprehensive approach.	Summi Goindi Khushal Thakur Divneet Singh Kapoor
Human skin type classification using image processing and deep learning approaches	2023	This paper explores skin type classification employing various CNN architectures, including MobileNet-V2, EfficientNet-V2, InceptionV2, and ResNet-V1. It highlights the superior performance of the EfficientNet-V2 architecture with an accuracy of 89.70% .	Sirawit Saiwaeo a, Sujitra Arwatchananukul , Lapatrada Mungmai , Weeraya Preedalikit , Nattapol Aunsri

EXISTING SYSTEM

The system aimed to classify skin types (normal, oily and dry) using image processing and deep learning techniques. Researchers collected skin images dataset (normal, oily and dry) and enhanced their quality using CLAHE.The model was validated using 10-fold cross-validation, achieving 89.70% accuracy. Models used Various CNN architectures were evaluated

LIMITATIONS

- Data Scarcity and Bias: Large, diverse datasets are crucial for accurate training. Skin tone and type vary significantly across ethnicities, making it challenging to acquire representative data. Bias in data can lead to inaccurate classifications for specific groups.
- Environmental Factors: Lighting, makeup and temporary skin conditions can significantly affect image appearance, impacting classification accuracy.

OBJECTIVES

- An advanced skincare system seamlessly integrates image processing and EfficientNet B0 deep learning to accurately classify diverse skin types and address specific concerns.
- The system educates on effective skincare routines and ingredient benefits, empowering users for healthier, confident skin. With a commitment to open-source principles, the system becomes a trusted companion in achieving a tailored skincare routine, revolutionizing the beauty experience for a radiant complexion.

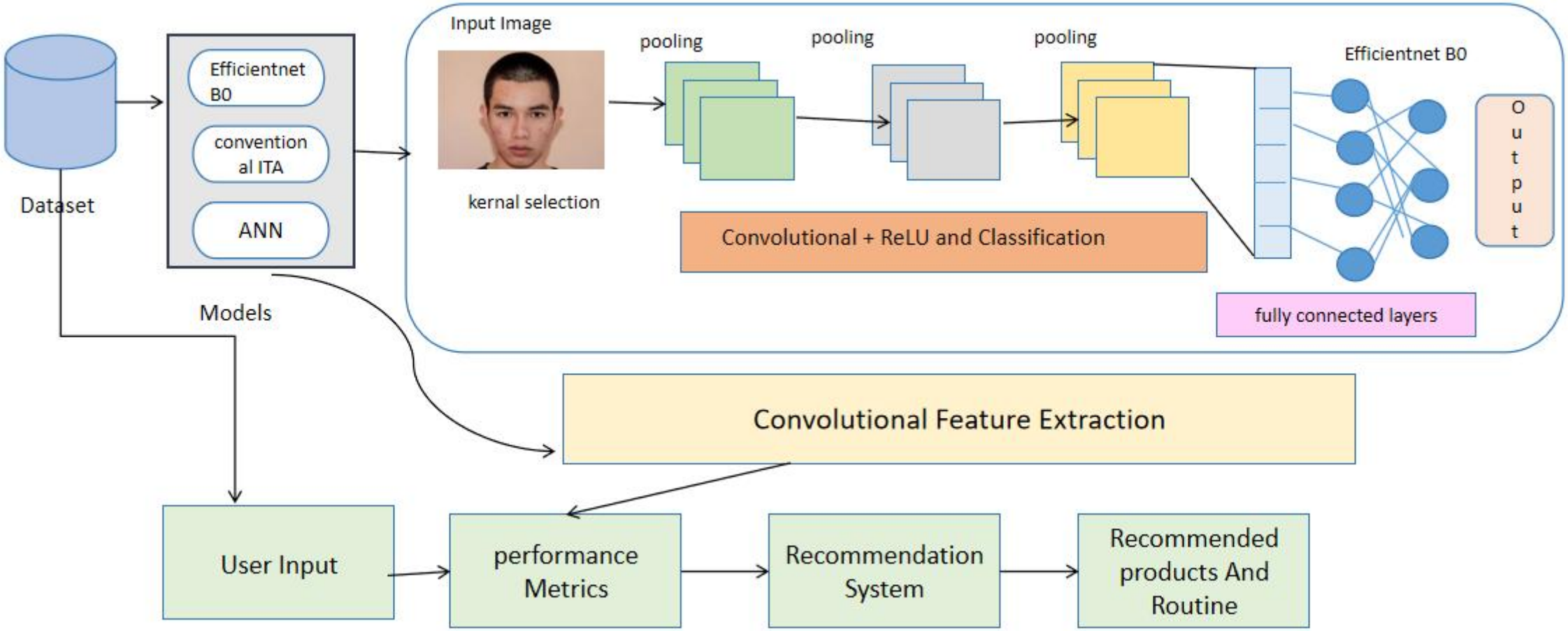
PROPOSED SYSTEM

The developed Facial Skincare Product Recommendation System using DL techniques like Convolutional Neural Networks (CNN) with EfficientNet B0 with 92.34% accurate skin type identification. Integrate image processing and deep learning to precisely assess diverse skin types, including normal, oily and dry skin. Implement a region-based skin detection method for accurate analysis of skin tones and address specific skincare concerns such as severity of acne from low to high and a recommender system that offers users a tailored selection aligned with their unique skincare needs.

ADVANTAGES

- Recommendations are tailored to your individual skin type, concerns, and goals, potentially leading to more effective results than generic advice.
- Offering personalized skincare recommendations can differentiate your brand and attract new customers.
- By recommending suitable products that address your specific needs, you might save money in the long run by avoiding ineffective or unnecessary purchases.

ARCHITECTURE



MODULES

DATASET COLLECTION AND DATA PREPROCESSING

FEATURE EXTRACTION

SKIN TYPE CLASSIFICATION

ACNE SEVERITY DETECTION

RECOMMENDATION SYSTEM

DATASET COLLECTION AND DATA PREPROCESSING

- Data Collection from various sources Eg: Kaggle
- Data cleaning and Data Augmentation.

FEATURE EXTRACTION

- Customer Demographics: Age, skin type, location and ethnicity can reveal underlying skincare needs and concerns.
- Product Features: Analyze ingredients, product type, brand and price point to understand their impact on customer choices.
- External Data: Incorporate personalize recommendations based on skin type.

SKIN TYPE CLASSIFICATION

- The skin type classification process employs a Convolutional Neural Network (CNN) with EfficientNet B0 architecture, utilizing color, texture and statistical features for precise categorization of oily, normal, dry skin types.

ACNE SEVERITY DETECTION

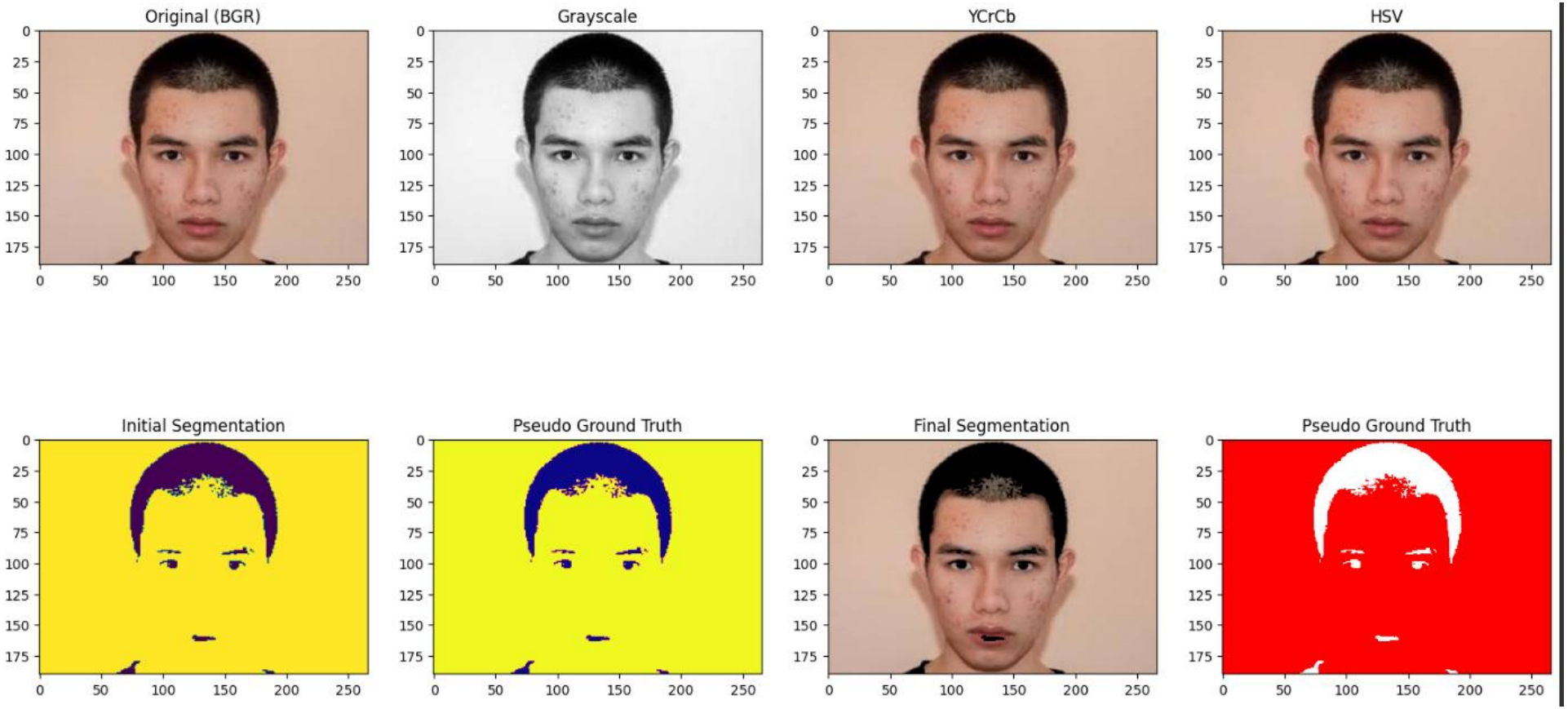
- Categorizes acne into three levels - low, moderate and high.

RECOMMENDATION SYSTEM

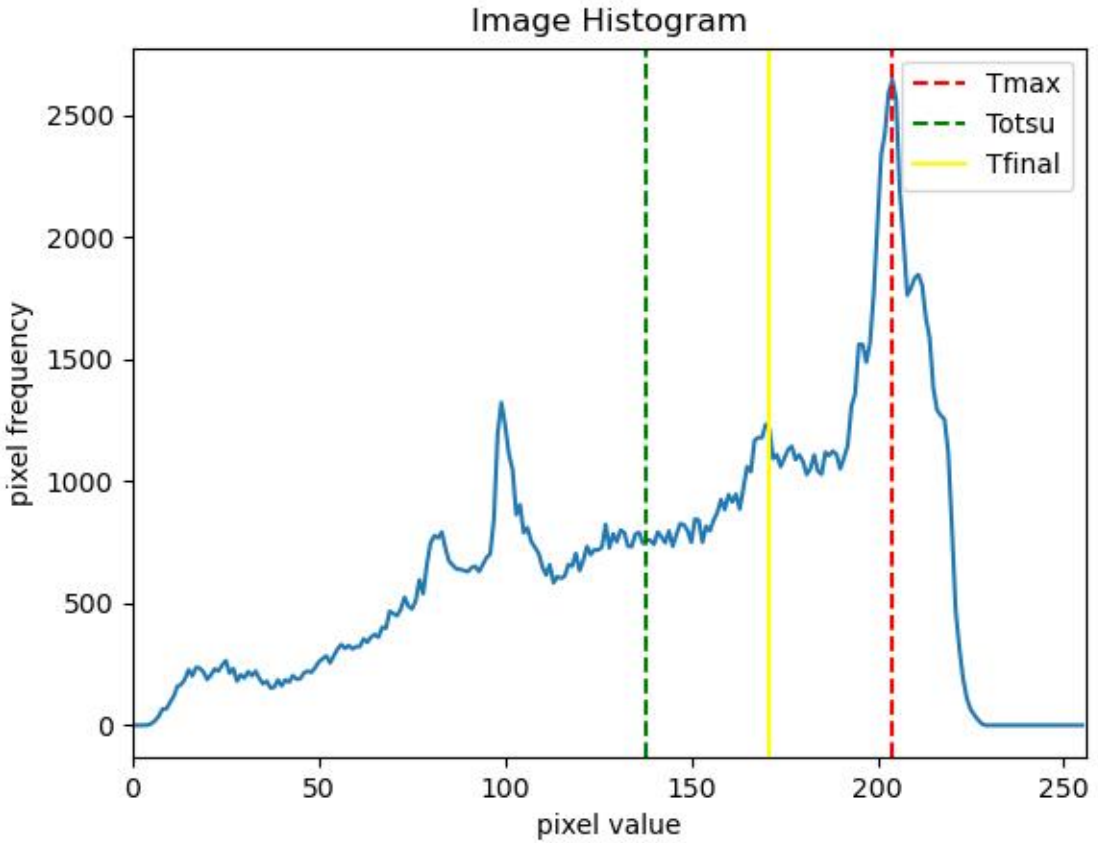
- Similarity scores are calculated between user and product vectors using cosine similarity, quantifying how well a product aligns with the user's needs.
- The system continuously learns from user interactions and feedback, refining its understanding of concern relationships and improving recommendation accuracy over time.

DATA SET / INPUT

FEATURE EXTRACTION



SKIN TYPE CLASSIFICATION



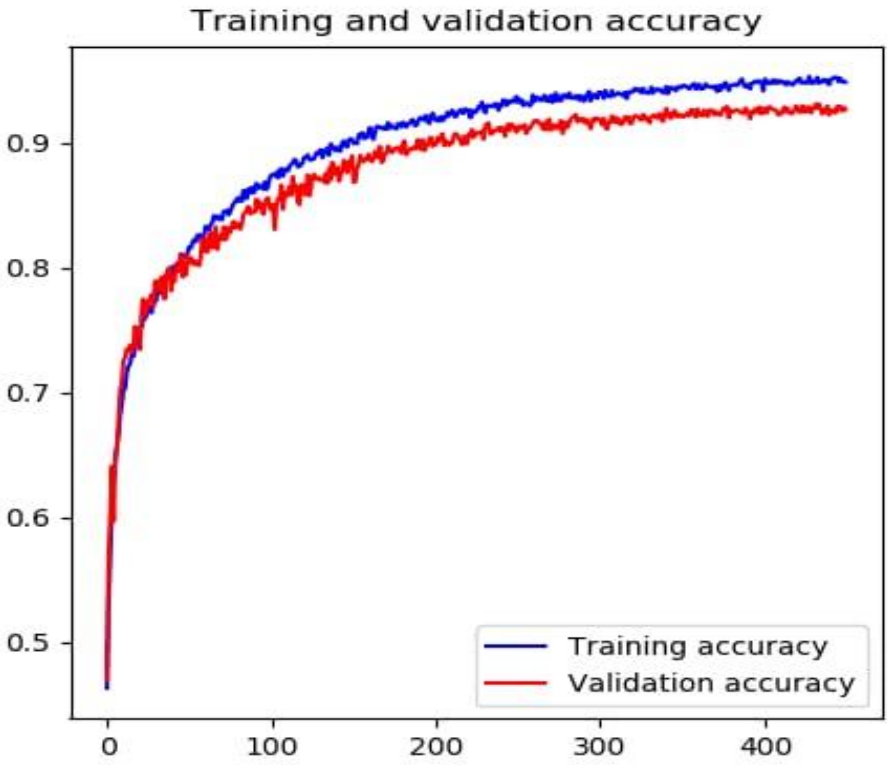
RECOMMENDATION SYSTEM

Recommending products similar to Avène Antirougeurs Jour Redness Relief Moisturizing Protecting Cream (40ml) :

	product_name	cos_sim
40	La Roche-Posay Nutritic Intense Rich 50ml	0.408956
87	Clinique Moisture Surge SPF25 Sheertint Hydrat...	0.408248
12	First Aid Beauty Ultra Repair Cream (56.7g)	0.379663
15	First Aid Beauty Ultra Repair Cream (170g)	0.379663
100	Alpha-H Daily Essential Moisturiser Spf50+ (50ml)	0.369800

3]:

PERFORMANCE ANALYSIS



ACCURACY:
92.34%

CONCLUSION

In summary, the system recommend skincare choices through a personalized platform addresses the challenges faced by consumers in navigating the vast array of products. Recognizing the limitations of existing systems, the innovative approach utilizes deep learning and image processing to offer accuracy 92.34% By going beyond conventional skin type analysis and considering individual concerns and preferences,the aim is to empower users with a tailored skincare experience.

REFERENCES

1. Goindi, S., Thakur, K., & Kapoor, D. S. (2023) "Skin Disease Classification and Detection by Deep Learning and Machine Learning Approaches." [Springer]

2.Saidah, S., Fuadah, Y. N, Alia, F., Ibrahim, N., Magdalena, R., & Rizal, S. (2023) "Facial Skin Type Classification Based on Microscopic Images Using Convolutional Neural Network (CNN)." [Springer]

3. Saiwaeo, S, Arwatchananukul, S., Mungmai, L., Preedalikit, W., & Aunsri, N. (2023). "Human Skin Type Classification Using Image Processing and Deep Learning Approaches."

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Dear Author,

We are thankful for your contribution to Research Community of IJSART.

We are pleased to inform you that your paper.

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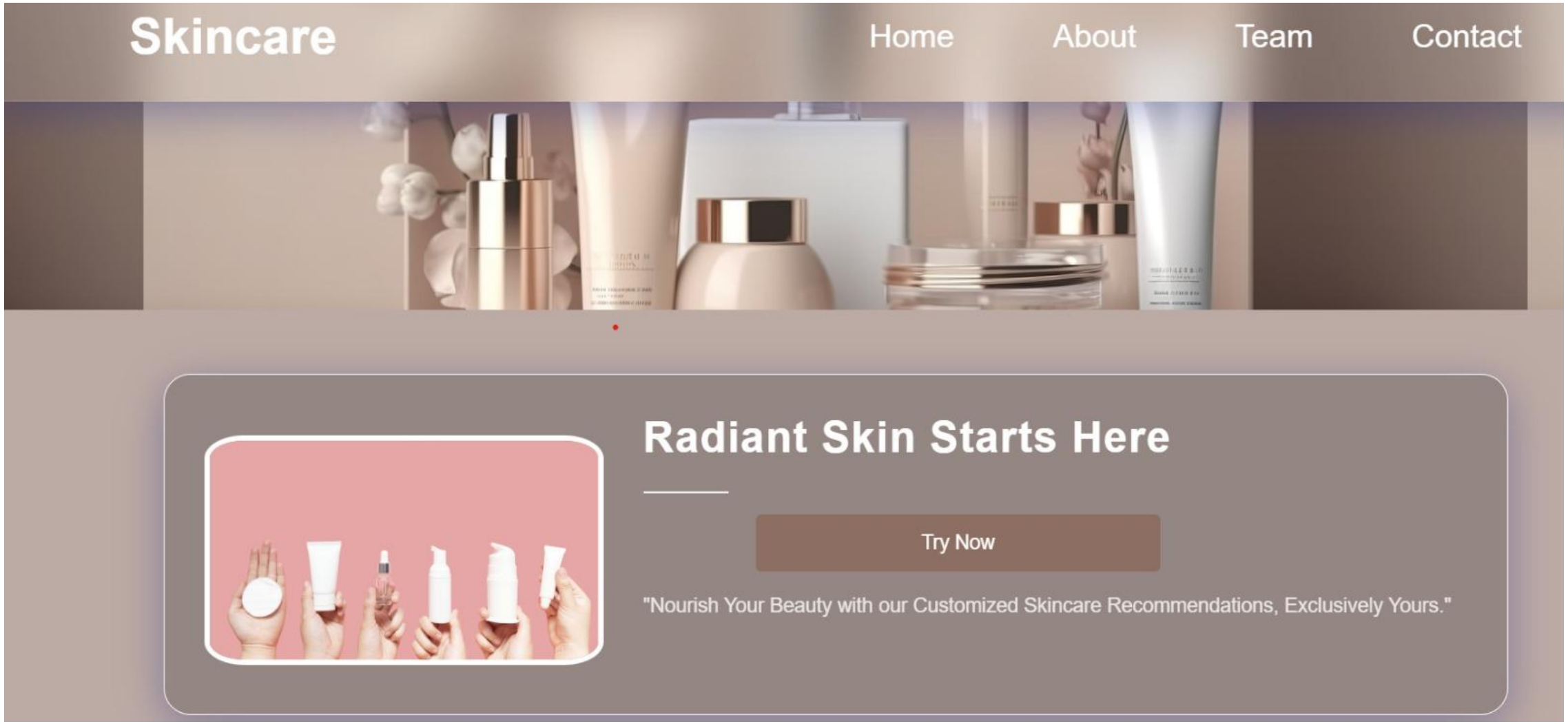
Author's Name: A1 : Sri Hema N A2 : Mr. Wasim Raja A A3 : Surya M R A4: Sanjay R

has been Accepted for publishing in IJSART, which will be published in **IJSART Volume 10,Issue 3, March 2024**

Congratulations!

THANK YOU

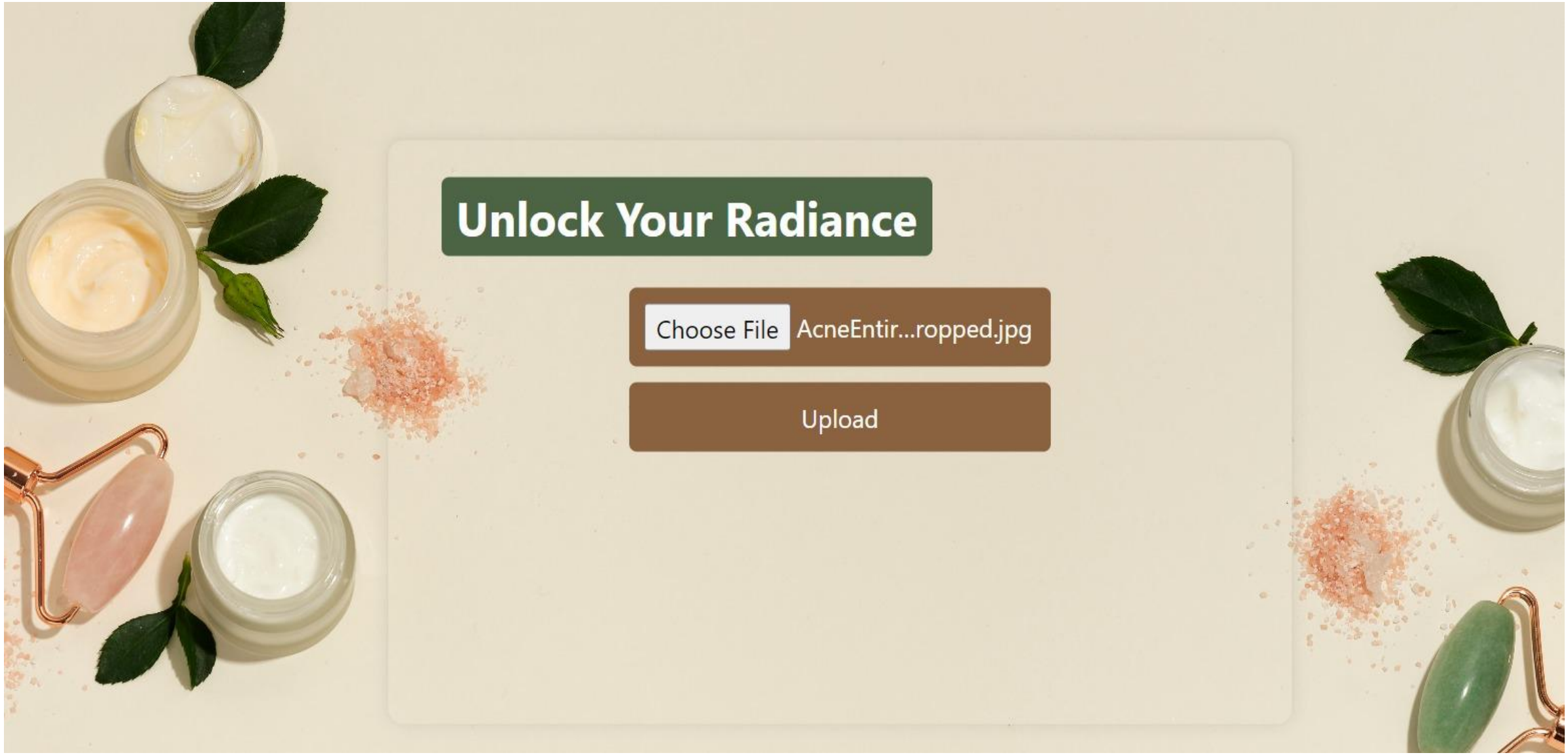
SCREENSHOTS



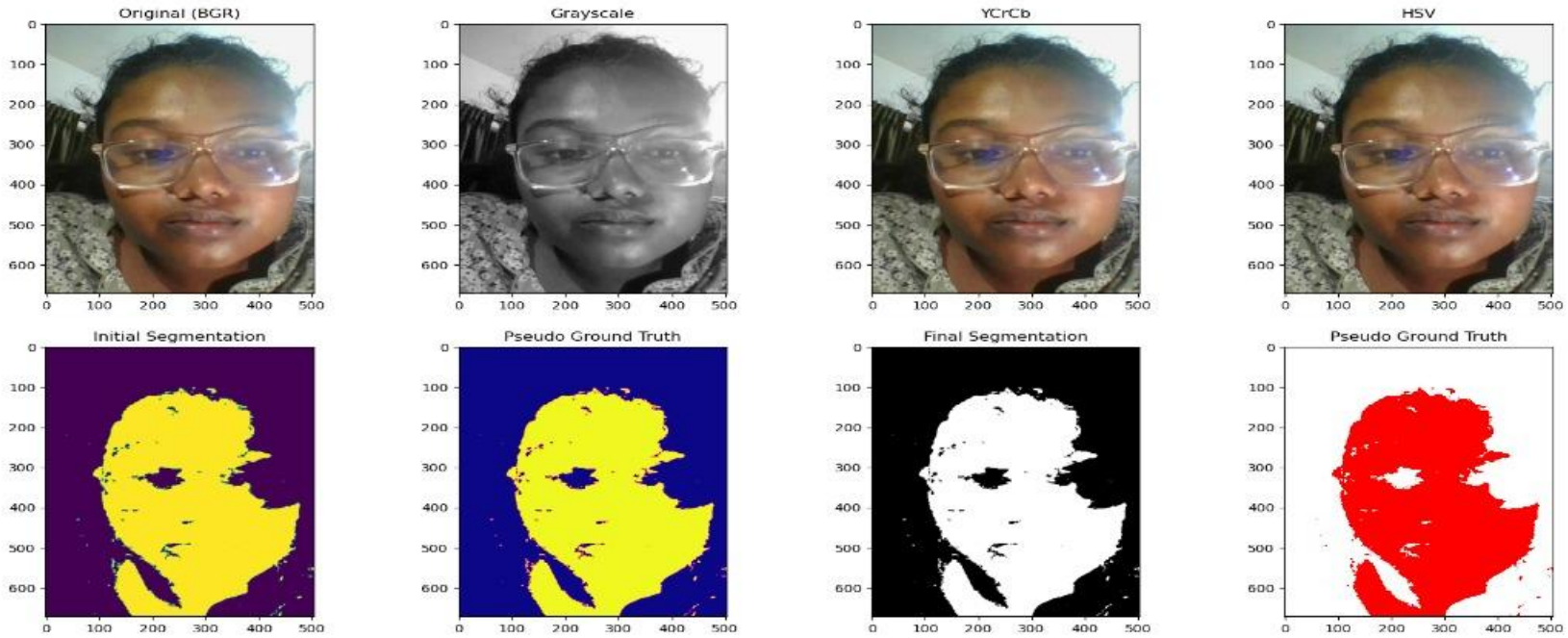
2. How does your skin feel at the end of the day?

- It feels dry and flakey, sometimes irritated
- It feels the same as in the morning, great!
- Dry cheeks, but nose & forehead are shiny
- My skin becomes shiny throughout the day

Continue


Unlock Your Radiance
Choose File
AcneEntir...ropped.jpg
Upload

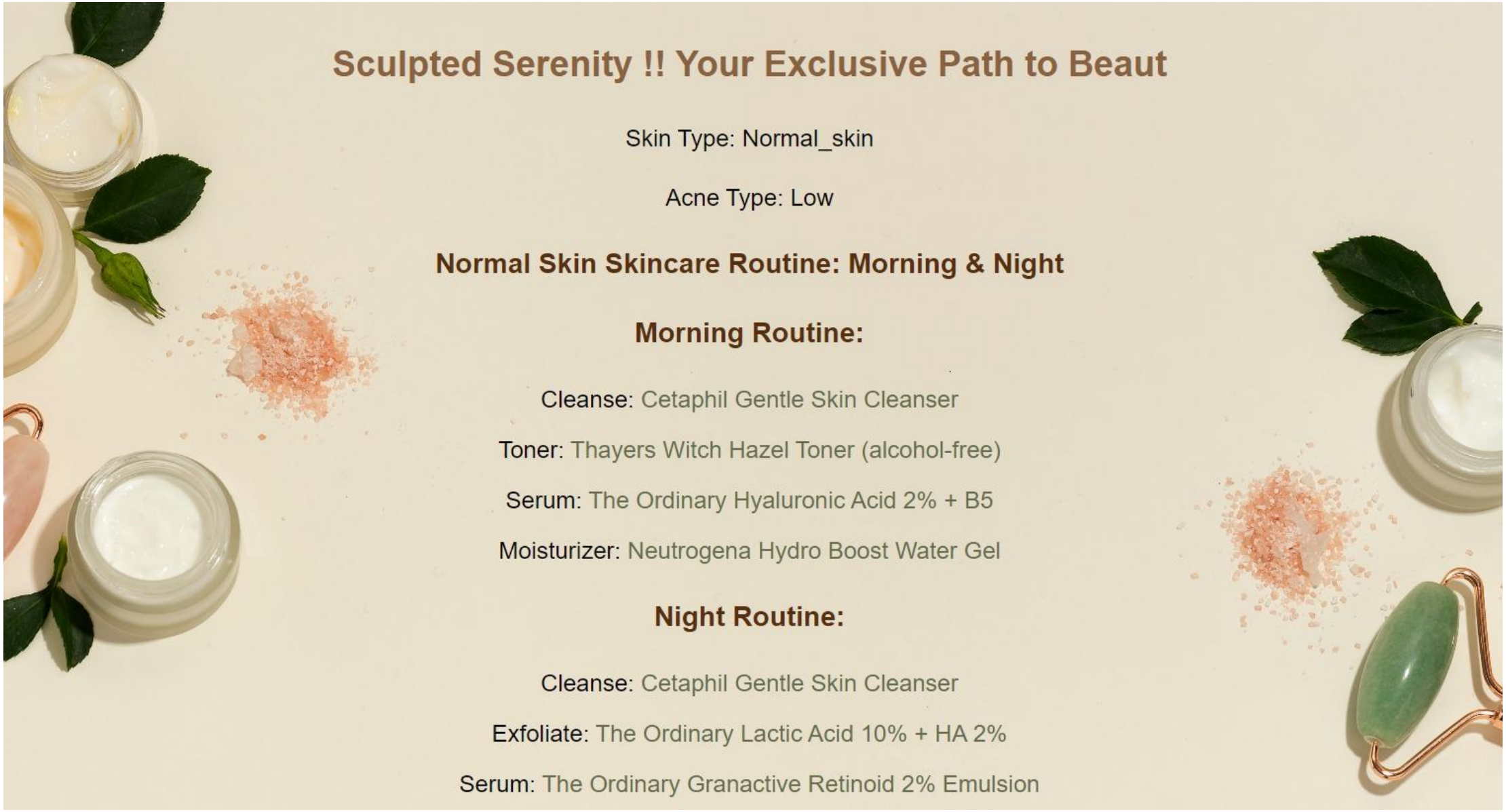
Prediction Results



Skin Type: Oil_skin

Acne Type: Low

Click here for recommended products for your skin type


Sculpted Serenity !! Your Exclusive Path to Beaut
Skin Type: Normal_skin
Acne Type: Low
Normal Skin Skincare Routine: Morning & Night
Morning Routine:
Cleanse: Cetaphil Gentle Skin Cleanser
Toner: Thayers Witch Hazel Toner (alcohol-free)
Serum: The Ordinary Hyaluronic Acid 2% + B5
Moisturizer: Neutrogena Hydro Boost Water Gel
Night Routine:
Cleanse: Cetaphil Gentle Skin Cleanser
Exfoliate: The Ordinary Lactic Acid 10% + HA 2%
Serum: The Ordinary Granactive Retinoid 2% Emulsion

Recommended Skincare Products

Oh K! Chok Chok Shimmer Face Scrub

Price: ££10.00

View Product

L:A BRUKET Marigold, Orange and Geranium Sea Salt Bath 450g

Price: ££23.00

View Product

Goldfaden MD Fresh A Peel Multi Acid Resurfacing Peel 50ml

Price: ££50.25

View Product

L:A BRUKET No. 069 Hand & Body Wash 450ml - Lemongrass

Price: ££27.50

View Product

L'Oréal Paris Extraordinary Oil Sleeping Oil Night Cream (50ml)

Price: ££14.99

View Product

L:A BRUKET No. 090 Sea Salt Bath Salt 300g

Price: ££6.00

View Product

L:A BRUKET No. 104 Hand & Body Wash 450ml - Bergamot/Patchouli

Price: ££27.50

View Product

First Aid Beauty Ultra Repair Face Moisturiser (50ml)

Price: ££20.00

View Product

First Aid Beauty Ultra Repair Instant Oatmeal Mask (56.7g)

Price: ££20.00

View Product

Sol de Janeiro Coco Cabana Shower Gel 90ml

Price: ££10.00

View Product

Back to Home

THANK YOU