SKINFLEX
BY PIXEL PERFECT

SECJ3553-02 ARTIFICIAL INTELLIGENCE

Group Member:

1. TERENCE LOORTHANATHAN (A20EC0165)
2. RISHMA FATHIMA BINTI BASHER (A20EC0137)
3. MADINA SURAYA BINTI ZHARIN (A20EC0203)
4. ADRINA ASYIQIN BINTI MD ADHA (A20C0174)
5. NAYLI NABIHAH BINTI JASNI (A20EC0105)

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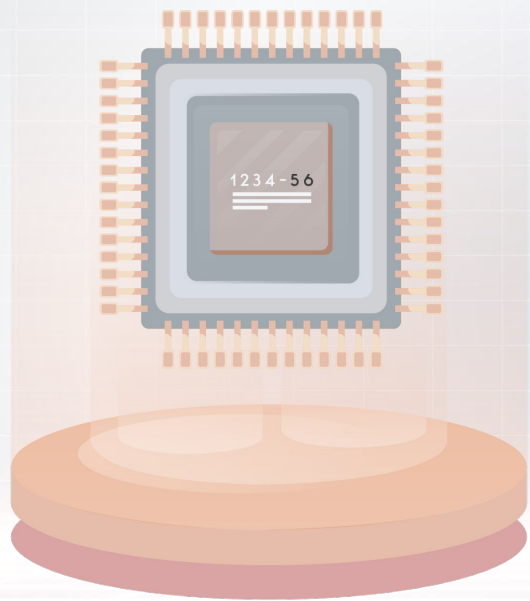
INTRODUCTION

INTRODUCTION

Nowadays, almost every device has been modernized according to the needs of the users. The presence of these modern technologies have proven that humans can adapt to life better and efficiently these days. Health is one of the aspects that has integrated artificial intelligence (AI) technology in its devices. These days, the concept of health and beauty is not only applied to women, however, we are now aware that everyone should pay attention to their skin without caring the gender at all because everyone should know their skin well. Most of the time, individuals always had trouble taking care of their skin since they are nescient about this. Lack of knowledge and understanding of our own body can be the reason why certain individuals have a hard time taking care of their own skin.

The main objective of this project is to provide help for the public, especially individuals that have no knowledge at all of their skin type to make sure that they are aware of how they should take care of their skin by recommending the best product based on their skin type. "Skinflex" is the title which reflects the functionality and the purpose of the technology itself. "Skinflex" is used to detect the skin type and make sure that the users get the best recommendation of skincares with affordable price and according to their preferences.

INTRODUCTION

Goal of Skinflex:

1. To detect skin concerns and describe it in detail with less jargon.

2. To recommend suitable ingredients that one needs upon buying skincare products.

3. To sort recommended products according to one's budgets.

4. To suggest the place that one can go to buy the products either online or offline.

5. To provide a chatbot where one can get advice directly from dermatologists.

6. To decrease the chances of buying less effective and unsuitable products.

7. To give exposure to the importance of taking care of the skin in an easy way.

8. To change the view that skincare does not require too much spending.

02 Knowledge Representation

Types of Skin

Normal Skin	Dry Skin	Oily Skin	Combination Skin	Sensitive Skin
Feels neither tight or oily	Feels Tight	Feels oily all over	Oily t-zone normal/dry cheeks	Red, irritated tight, patchy

Use machine learning algorithms to analyze images of skin. The algorithm looks for patterns in the images and then assigns a skin type to each image

Use sensors to measure things like skin temperature, moisture, and oiliness. The data from the sensors is then analyzed to determine the skin type.

KR

Face_detect, F	Normal_ skin, N	Sensitive_ skin, S	Dry_ skin, D	Oily_ skin, O	Combination_ skin, C
T	T	F	F	F	F
	F	T	F	F	F
	F	F	T	F	F
	F	F	F	T	F
	F	F	T	T	T
F	F	F	F	F	F

First-Order Logic (FOL)

KR1:

$\forall(F)(\ (\ Face\_detect(F) \land Normal\_skin(N)\ ) \rightarrow \neg(\ Sensitve\_skin(S) \lor Dry\_skin(D) \lor Oily\_skin(O) \lor Combination\_skin(C)\ )\ )$

KR2:

$\forall(F)(\ (\ Face\_detect(F) \land Sensitve\_skin(S)\ ) \rightarrow \neg(\ Normal\_skin(N) \lor Dry\_skin(D) \lor Oily\_skin(O) \lor Combination\_skin(C)\ )\ )$

KR3:

$\forall(F)(\ (\ Face\_detect(F) \land Dry\_skin(D)\ ) \rightarrow \neg(\ Normal\_skin(N) \lor Sensitve\_skin(S) \lor Oily\_skin(O) \lor Combination\_skin(C)\ )\ )$

KR4:

$\forall(F)(\ (\ Face\_detect(F) \land Oily\_skin(O)\ ) \rightarrow \neg(\ Normal\_skin(N) \lor Sensitve\_skin(S) \lor Dry\_skin(D) \lor Combination\_skin(C)\ )\ )$

KR5:

$\forall(F)(\ (\ Face\_detect(F) \land Oily\_skin(O) \land Dry\_skin(D) \land Combination\_skin(C)) \rightarrow \neg(\ Normal\_skin(N) \lor Sensitve\_skin(S)\ )\ )$

KR6:

$\forall(F)(\ \neg(\ Face\_detect(F)\ ) \rightarrow \neg(\ Normal\_skin(N) \lor Sensitve\_skin(S) \lor Oily\_skin(O) \lor Dry\_skin(D) \lor Combination\_skin(C))\ )$

03

## State space search

STATE SPACE SEARCH

1st State: The face detector is activated to detect whether it can recognise a face or not. If face is recognised, it will remain still to perform the next state.

2nd State: After detecting the face, the skin type scanner will be activated to detect the skin type of the recognised face. In this state, there are **five** possible outcomes.

     i) Normal skin,

     ii) Dry skin,

     iii) Oily skin,

     iv) Sensitive skin,

     v) Combination skin

3rd State: After the skin type is identified, regardless of the skin type of the face, a notification will be sent to the device according to the result identified earlier.
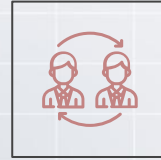
STATE SPACE SEARCH
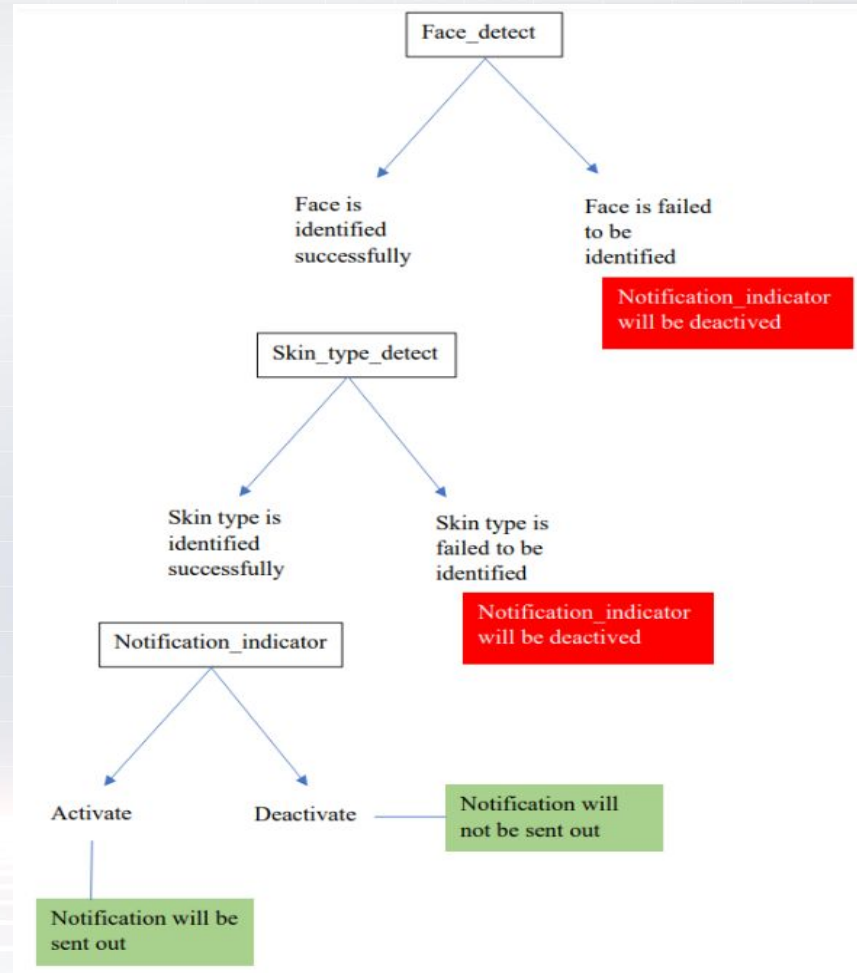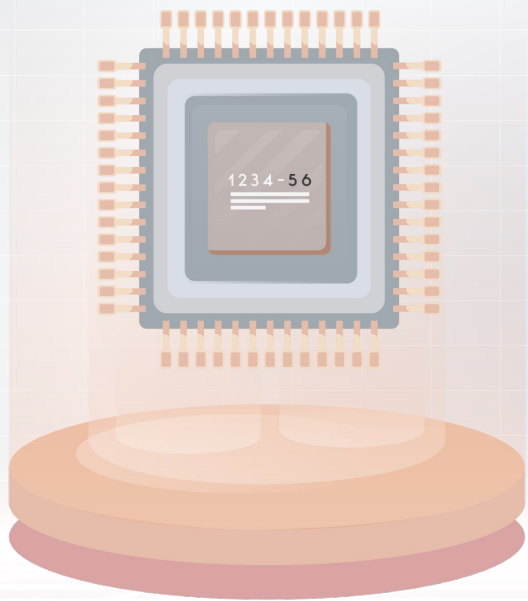
04

PEAS MODEL

Agent:
SKINFLEX SKIN TYPE SCANNER

PEAS MODEL

PERFORMANCE MEASURE
Detecting face, determine skin type, skin and product preferences.

ENVIRONMENT
People, device with camera, makeup store, skincare store, home or dermatologist clinic.

ACTUATORS
Light (green-complete & red-fails), sound (beeping sound when fail)
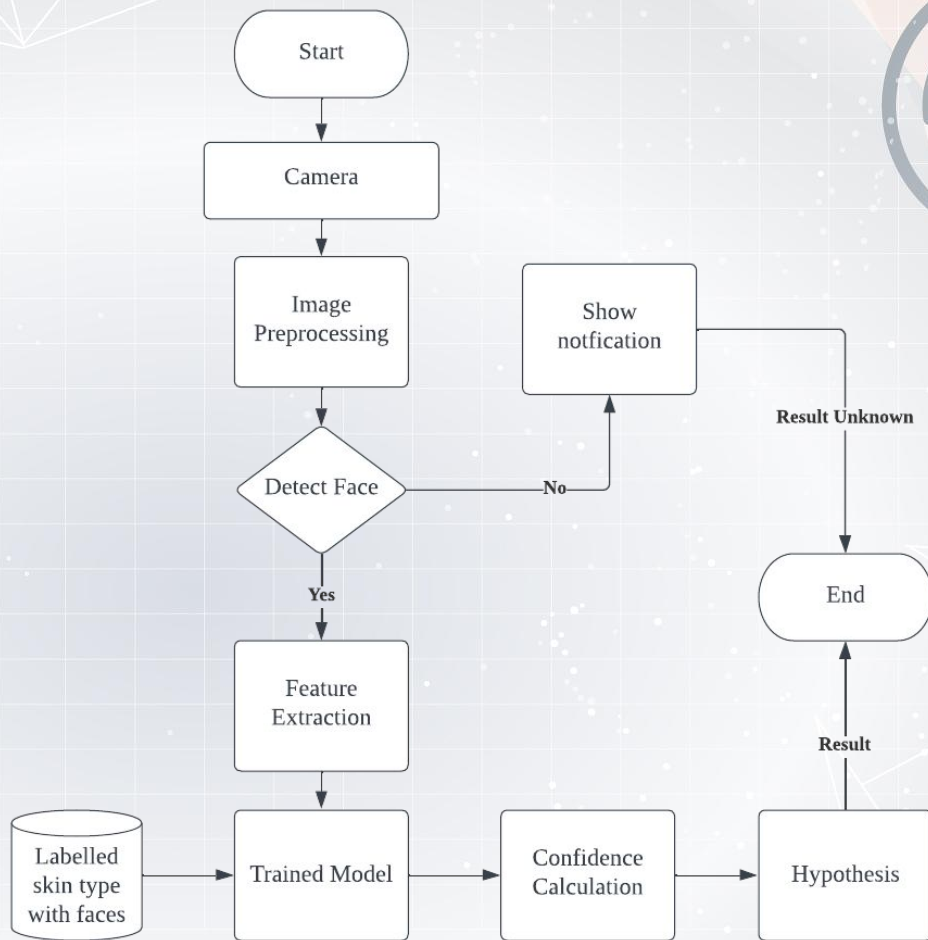
SENSORS
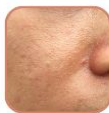Camera

05 PROOF OF CONCEPT

SkinFlex Architecture

MOBILE APP

SkinFlex - Proof of Concept

Face Detection

Model will be trained to determine the type of skin of the user, if face is detected.

Screen 1: Types of Skin

Types of Skin

Dry Skin
Dry skin, also known as xerosis or xeroderma, makes the skin look and feel rough, itchy, flaky or scaly.

Oily Skin
Oily skin types produce excess sebum, leaving skin looking and feeling greasy, shiny, and blemish.

Combination Skin
Combination skin is oily in the traditional T-zone (forehead, nose, and chin) whilst being normal or even dry on the cheeks.

Your Skin Type is   Dry Skin

Click the review button below to review your skin condition.

Review

Screen 2: Dry Skin

⟨ Log Out

Dry Skin

Treatment & Remedies
We recommend using a cream or ointment throughout the day to relieve dry skin. Cream and ointments tend to be more effective than lotions.

Ingredients to look for:
jojoba oil, dimethicone, glycerin, hyaluronic acid, lactic acid, lanolin, mineral oil, petrolatum & shea butter.

Preventions:
Washing in warm water, use only gentle and fragrance-free products, patting but not rubbing, applying plenty of moisturizer immediately after drying the skin, avoiding sitting or standing close to heat sources, such as fireplaces and drinking plenty of water.
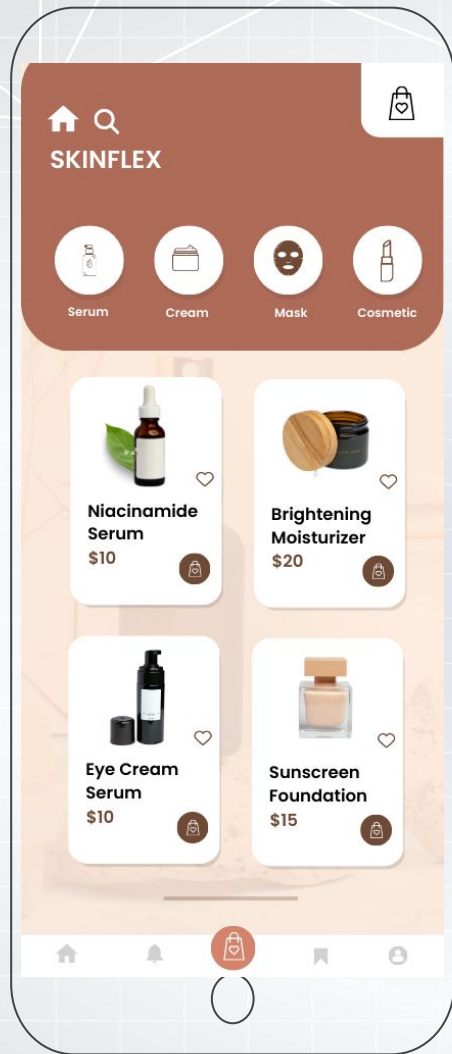
Your Skin Type is   Dry Skin

Click button below to view and purchase recommended product.
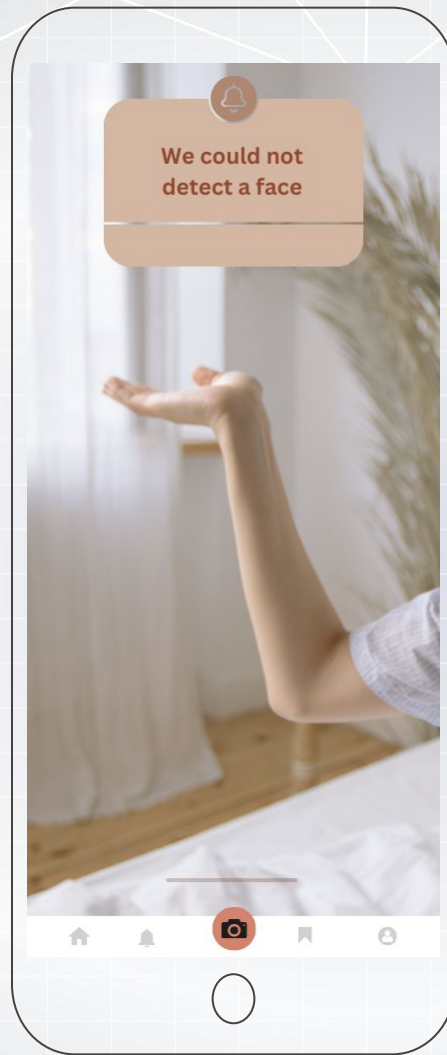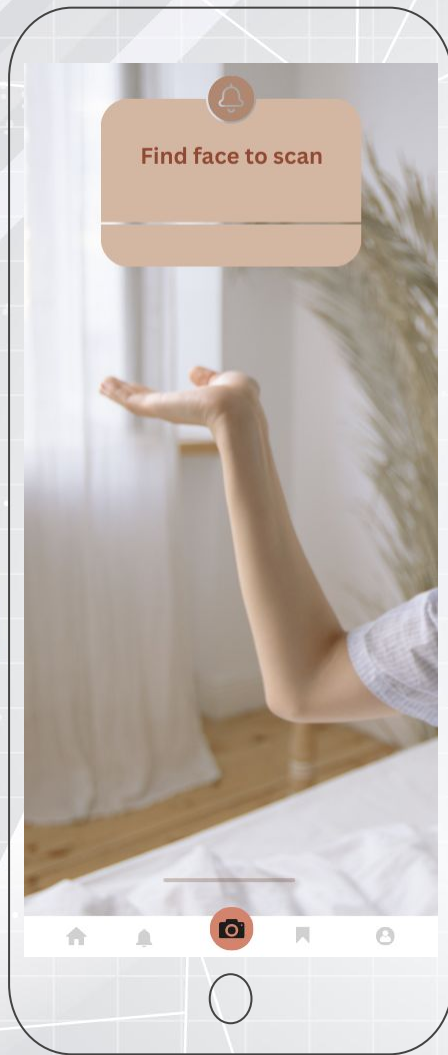
View Product

Evaluation & Information

After determining the type of skin, SkinFlex will brief user on their skin type.

Skin care products

SkinFlex if skin type is determined, then SkinFlex will suggest skin care products based on users skin type.

No face detected

If the model determined there is no face in the images, then user will be notified that there is no face in the camera's POV.

Find face to scan

We could not detect a face

CONCLUSION

Lately, there has been a rise of skincare usage among the youths. The newer generation has been exposed to the importance of skin protection through all social media platforms. This cost the skincare market to grow at such a breakneck rate. A rise in market growth also means the rise in technology usage in skincare. There had been a ton of products that had been created to further help detect skin problems. Currently, the latest technology to determine skin problems may only be used by certified skincare professionals. This results in a high price point for customers as they need to consult with a dermatologist. Alternatively, there are scanners in drugstores used by the salesperson to detect the skin type of customer. These types of scanners are usually inaccurate and give little information of what the user's skin condition requires. In the current market, there are many competitors who are striving to manufacture better and more compatible products. The technology and AI had been much more advanced than the previous.

Hence, by creating a skin care scanner built in an app where users can easily download it through their phones. Users can use the app to scan their faces through the phone's camera. A diagnosis will be made to determine whether the skin is normal, dry, oily, combination, or sensitive. After ruling out the skin type, the app will then list out the cause of the skin problems and give out skin care product recommendations.

THANK YOU