SECJ 3553 (02) – ARTIFICIAL INTELLIGENCE

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PROOF OF CONCEPT

TITLE: SKINFLEX

GROUP: PIXEL PERFECT

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1.0 Introduction

In recent years, there has been a growing interest in personalizing skincare routines based on one's unique skin type. To assist with this, a mobile application has been developed that utilizes the front camera of a smartphone to detect and classify different skin types. This report will provide an overview of the development and testing of this innovative application, as well as its potential uses and benefits for users.

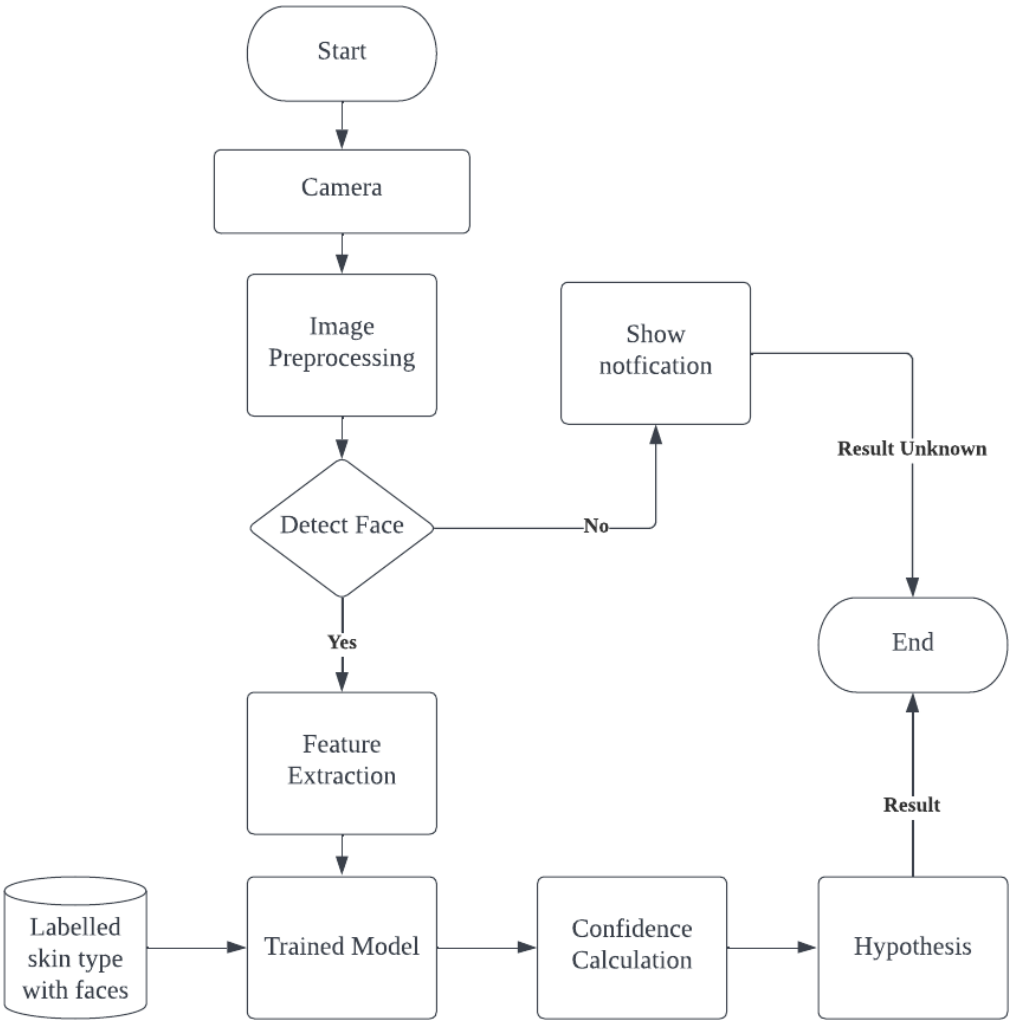
Canva is a graphic design tool that allows users to create professional-looking designs without the need for advanced design skills. One of its features is the ability to create prototypes, which are interactive mockups of a design that can be used to test its functionality and usability before finalizing it.

To use Canva's prototyping feature, users start by creating a design in the platform, this can be a website, landing page, mobile application, or any other digital product. In our case, we are using Canva to prototype a mobile application (SkinFlex).

2.0 Target User & Requirements

Target User	Requirements
People that are concerned about their skin type	- The system should be able to instantly recognise if a face is present in the FOV of the phone's camera. - Determine the type of skin of the user instantly. - Fault tolerance of the system should not be more than 5 times.

3.0 Architecture of SkinFlex



a) Preprocessing and Feature Extraction Processes

Image preprocessing and feature extraction are important because they help to improve the performance of the decision-making algorithm by reducing the dimensionality of the data, removing noise and irrelevant information, and highlighting relevant features. By preprocessing the image and extracting relevant features, the algorithm is able to focus on the most important information, which can lead to better classification or detection performance. Additionally, preprocessing and feature extraction can also make the algorithm more robust to changes in lighting, scale, and other variations in the image.
In the case of SkinFlex, we have to make sure that images are preprocessed so the algorithm can decide whether there is a face. If there is one we have to make sure to keep the important features for decision making later.

b) Database

The database should be able to store images which is a type of unstructured data, and it should perform decently because an algorithm has to be trained using it. In terms of SkinFlex, Object storage is the best kind of database. This type of storage is optimized for storing unstructured data, such as images and videos. They are highly scalable and can handle large amounts of data. Examples include Amazon S3 and Google Cloud Storage.

c) Evaluation

To train the algorithm, we opted for a supervised learning algorithm because they can be trained on labeled data and can then make predictions about new, unseen data. Which means that this type of algorithm can achieve high accuracy. Supervised learning algorithms can achieve high accuracy on a wide range of tasks, especially when trained on large amounts of labeled data. Not to mention, it is very good for generalization. Supervised learning algorithms can generalize well to new, unseen data, which makes them useful for making predictions about future data.

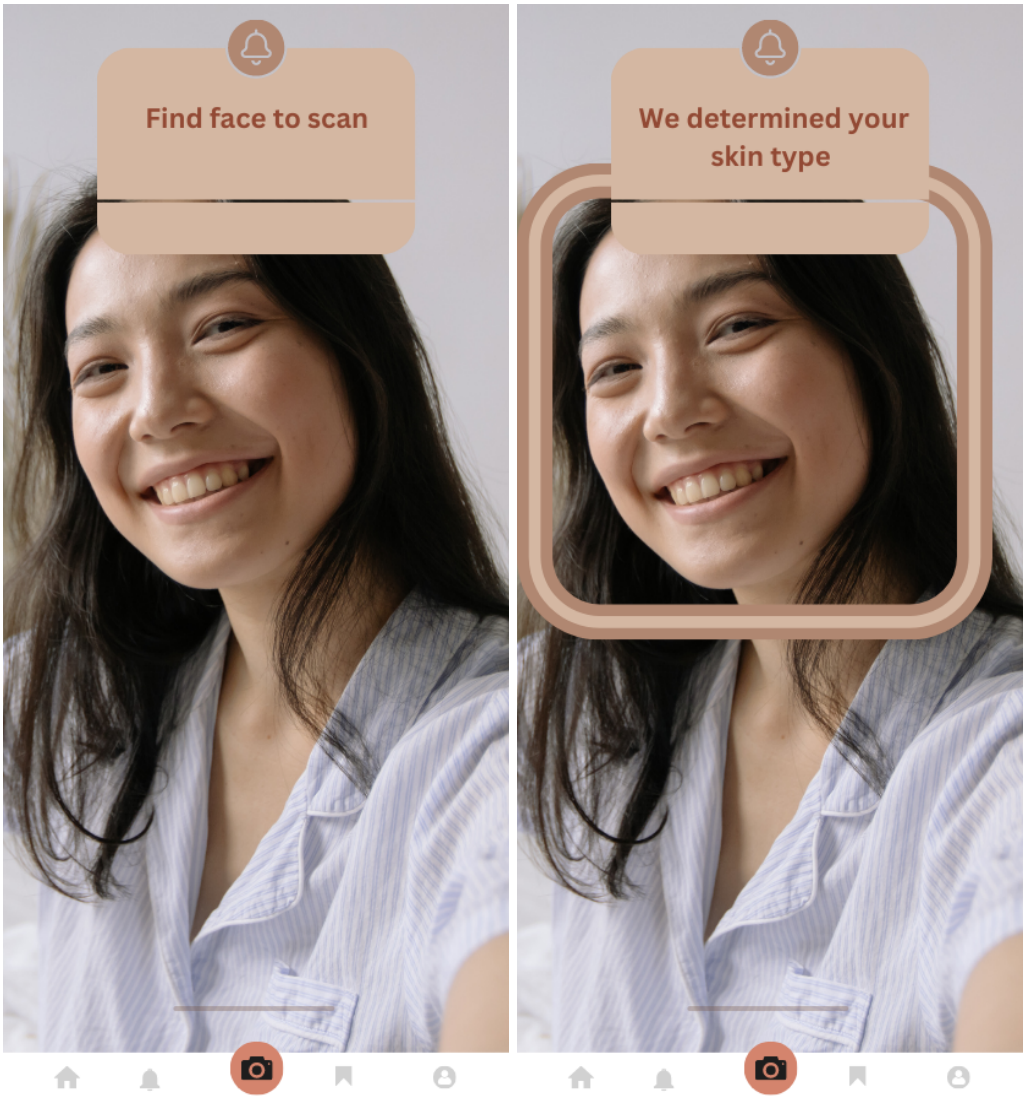
We also have to make sure that confidence calculation is done on every result from the algorithm. This is because the system can then identify uncertain predictions. This can be useful in applications where the cost of making an incorrect prediction is high. In terms of SkinFlex, the cost of an incorrect prediction is very high as users will commit to the results produced and spend money on specifically tailored skin products. Not to mention, it also helps in improving performance of the model. For example, by collecting more data to train the model for uncertain predictions, the model can improve its predictions for those cases.

4.0 Design Concept

Home page of the mobile application with a list of types of skin for the user to read and get to know. There is also a scan option for the user to scan their face to retrieve their skin type.

{Figure 1: Home Page}

The mobile application finds the face of the user for scanning purposes and detects the skin type when the face of the user is present.



{Figure 2: Detecting Skin Type with Face Present}

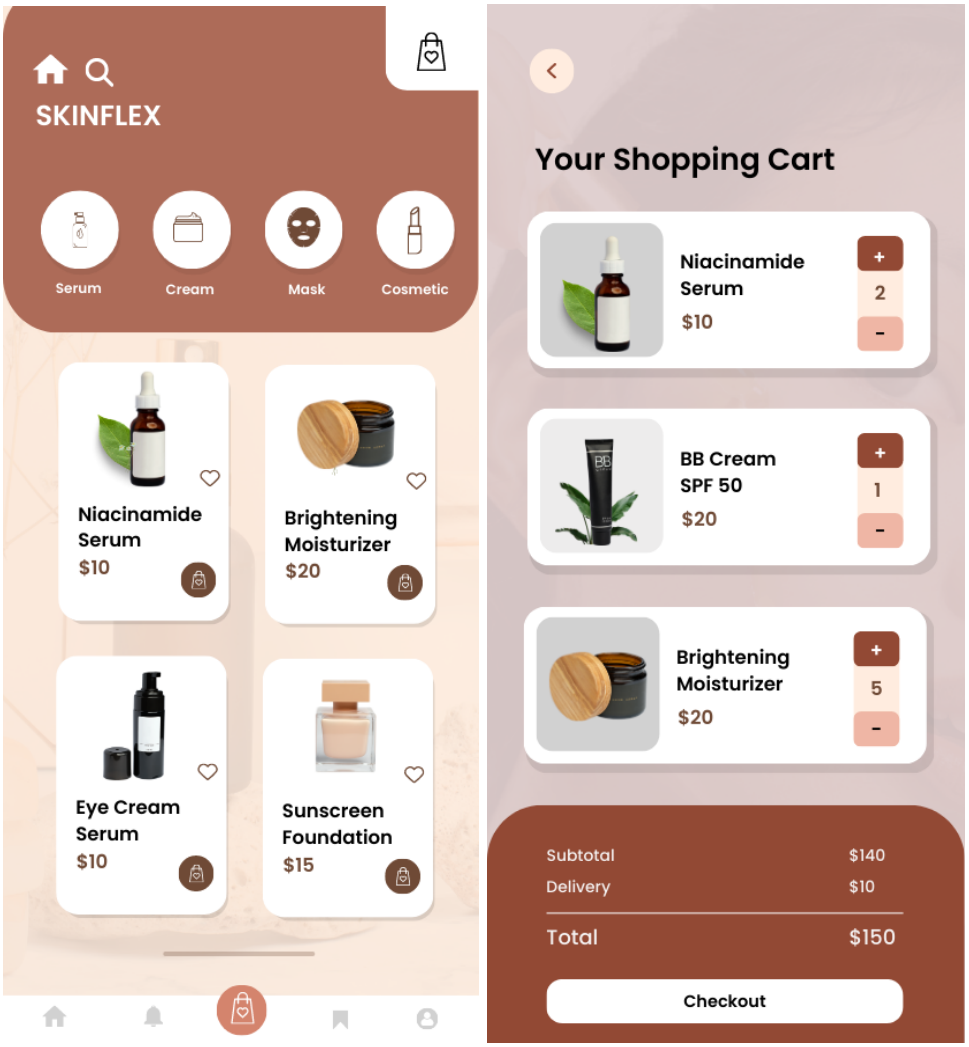
After successfully detecting the skin type, user can click review button to get more information about their skin condition.

{Figure 3: Home Page after successfully detected skin type}

Information about treatment & remedies, ingredients to look for and some recommended prevention will be displayed. Users can see some recommended products that are suitable for them by clicking the ‘View Product’ button.

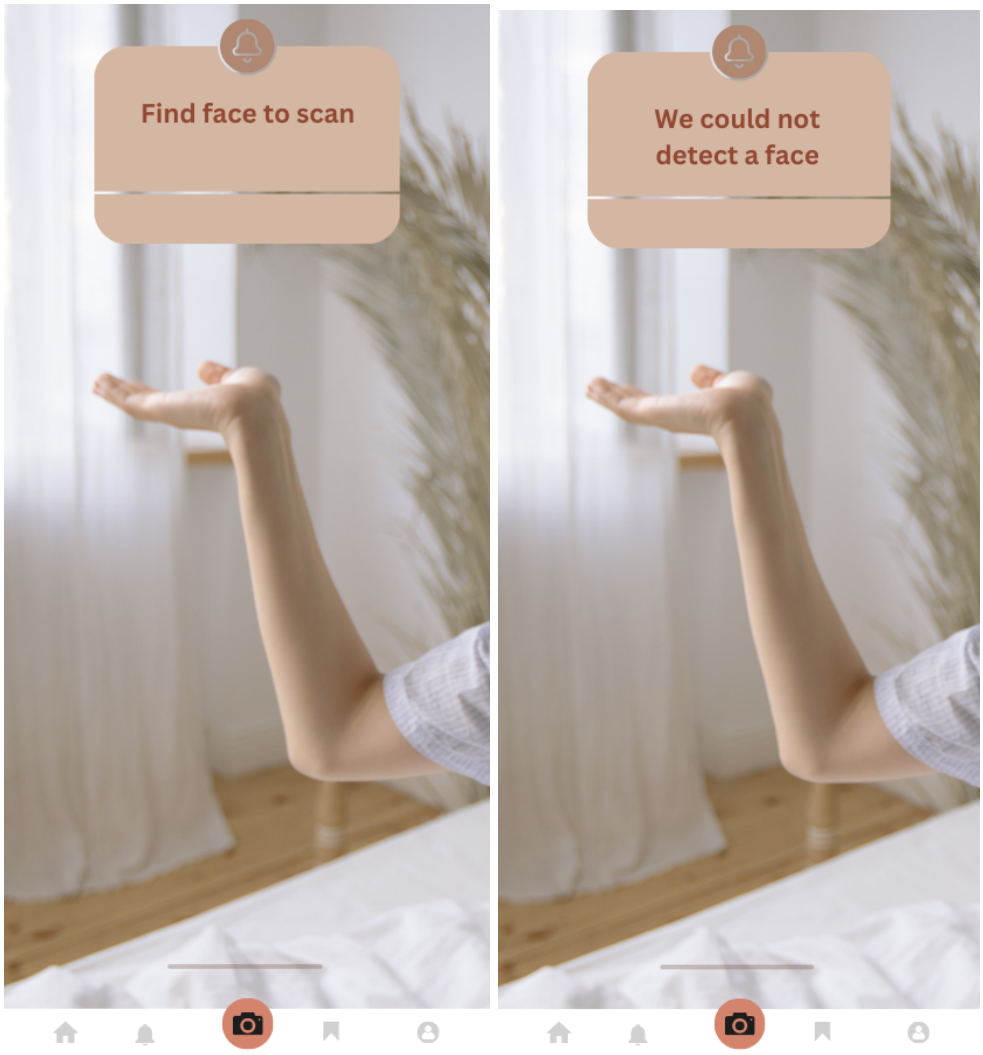
{Figure 4: Information about skin condition}

Upon viewing, users can also purchase it. However, it is optional.



{Figure 5: View recommended product and purchase}

If the face could not be detected, an alert will be displayed.



{Figure 6: Detecting Skin Type without Face Present}