



Colour Harmony: AI for Skin Tone Detection and Palette Prediction

AIML Project

Under the guidance of Mr. Neeraj Baghel SCSET

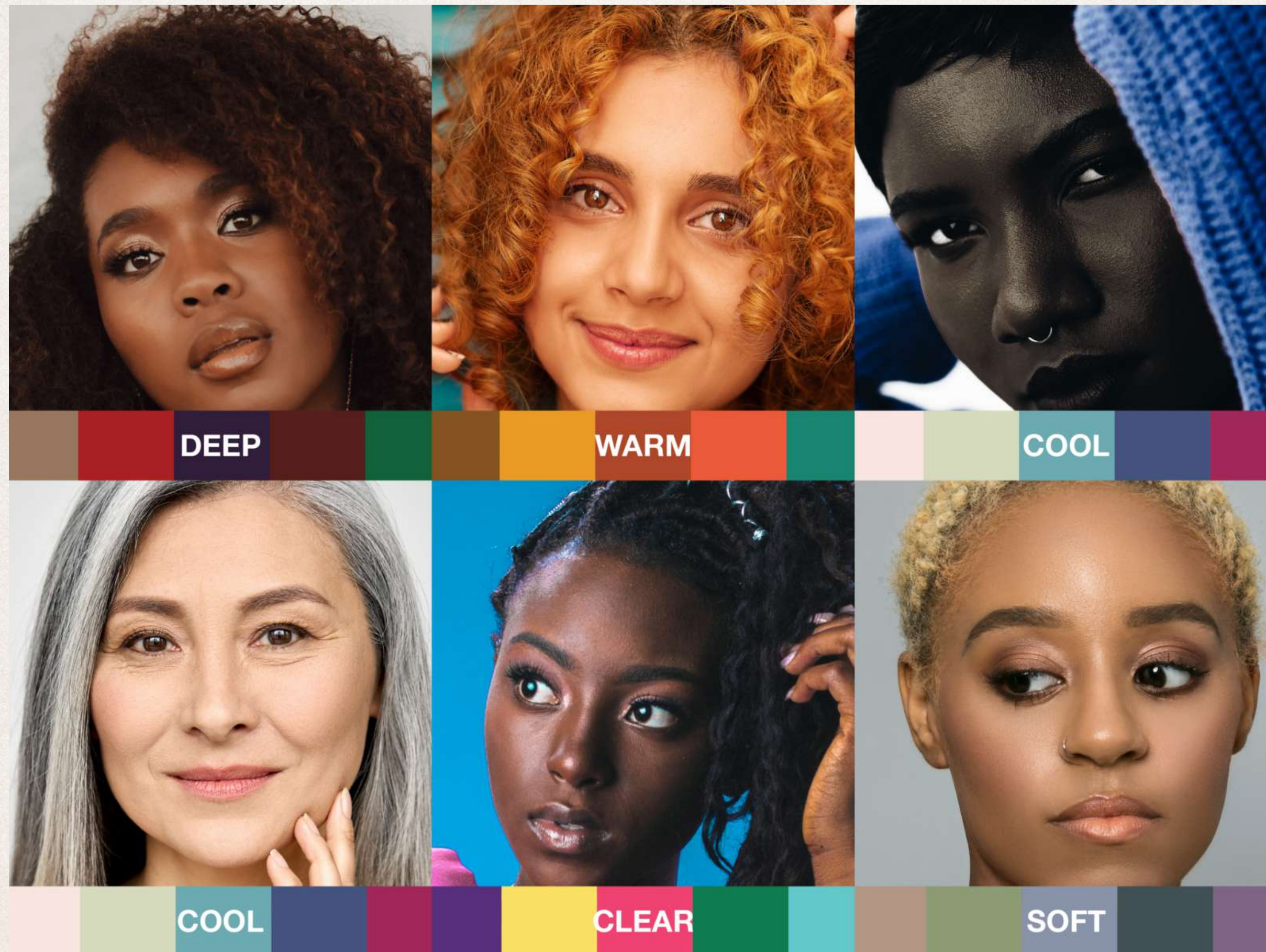
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Problem Statement



Choosing the right colours that match a person's natural skin tone can be confusing.

Traditional colour analysis methods are manual, time-consuming, and subjective.

There is a need for an **automated, accurate, and easy-to-use** solution that helps users discover their ideal colour palettes based on their skin tone.

Goal

Develop an AI-based application that predicts a user's skin undertone and seasonal color type using an uploaded image.

Provide a personalized color palette recommendation based on the predicted season.

Make colour analysis simple, fast, and interactive without needing manual testing or physical swatches.

Help users make better choices in fashion, makeup, and accessories based on their natural colouring.



Proposed Solution

- ❖ Build a Streamlit web app where users can upload their image.
- ❖ Users can click on the uploaded image to select a skin tone pixel.
- ❖ Predict the seasonal colour type based on the RGB value and selected skin tone (warm, cool, neutral).
- ❖ Show a recommended colour palette suited for the user's undertone.

Colour Harmony 🎨 Find your recommended palette as per your Skin Tone!

🔍 **Instruction:** Click on your skin area to pick the color!

Upload an image



Drag and drop file here

Limit 200MB per file • JPG, JPEG, PNG

Browse files

Select your skin tone:

warm



How it recommends:



You clicked at: (566, 1029)

Selected RGB Color: [188, 156, 126]

Predicted Season: **Soft Summer**

Recommended Colors:



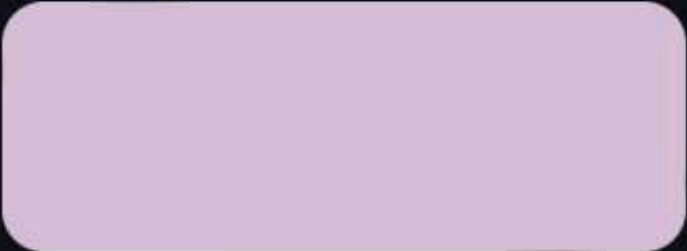
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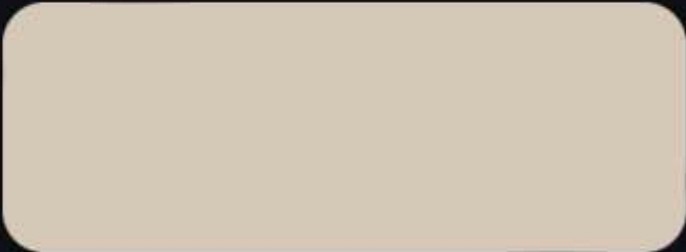
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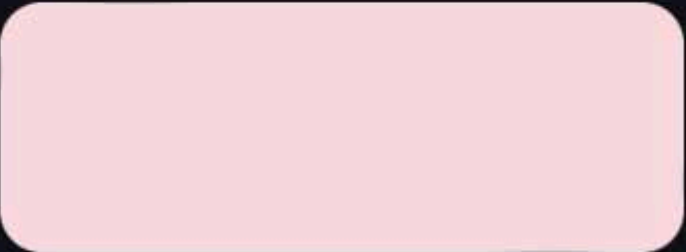
#9DC183



#D8BFD8



#D8CAB8



#FADADD



#7393B3



#66A5AD



Work Done

We applied **unsupervised learning** techniques to extract information from skin images.

KMeans Clustering algorithm was used to find the **dominant colour** in each image without any labeled training data.

Computer Vision techniques were used to **read and process images**.

We used the **OpenCV** library to load images and convert colour formats (BGR to RGB).

Image pixels were reshaped into a **2D array** for processing.

Dominant RGB values were extracted as important features representing each image.

Work Done

Rule-Based Logic (Post-ML Processing)

- After detecting dominant colour, we used a **simple mathematical formula** (brightness calculation) to decide whether the tone is **light or deep**.
- Based on **skin tone type** (warm/cool/neutral) and **brightness**, we classified into **season categories** like **Warm Spring** or **Cool Winter**.

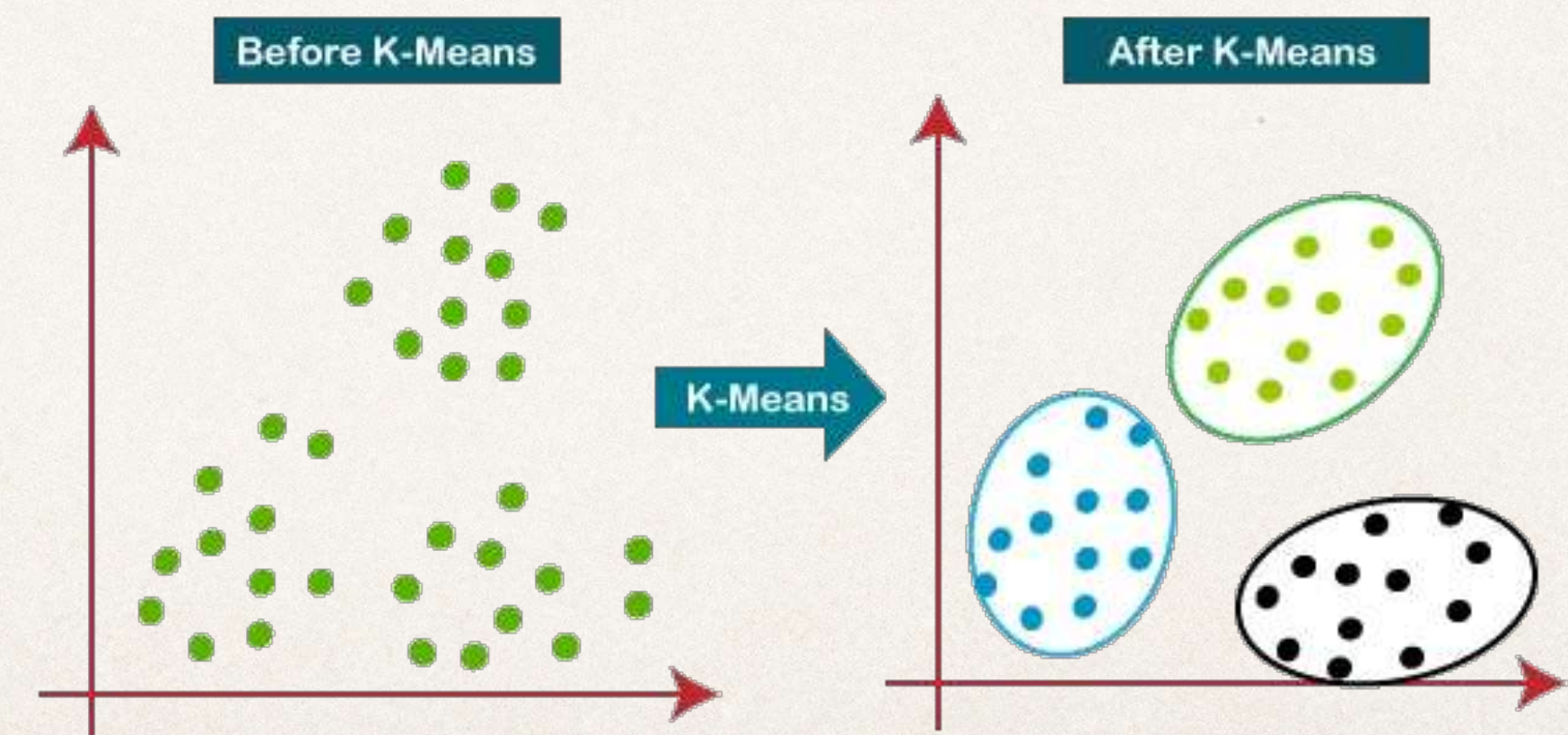
CSV Data Handling

- All the extracted data (filename, R, G, B, skin tone, season, recommended palette) was saved into a **structured dataset** (dataset.csv) using **Pandas**.
- This allowed easy analysis and further use.

K-Means Clustering

How KMeans Clustering Helped

- KMeans helped us automatically group pixel colours and find the most dominant skin colour without manually checking each image.
- KMeans grouped the image pixels into clusters, and we picked the central colour of the biggest cluster as the user's skin tone.



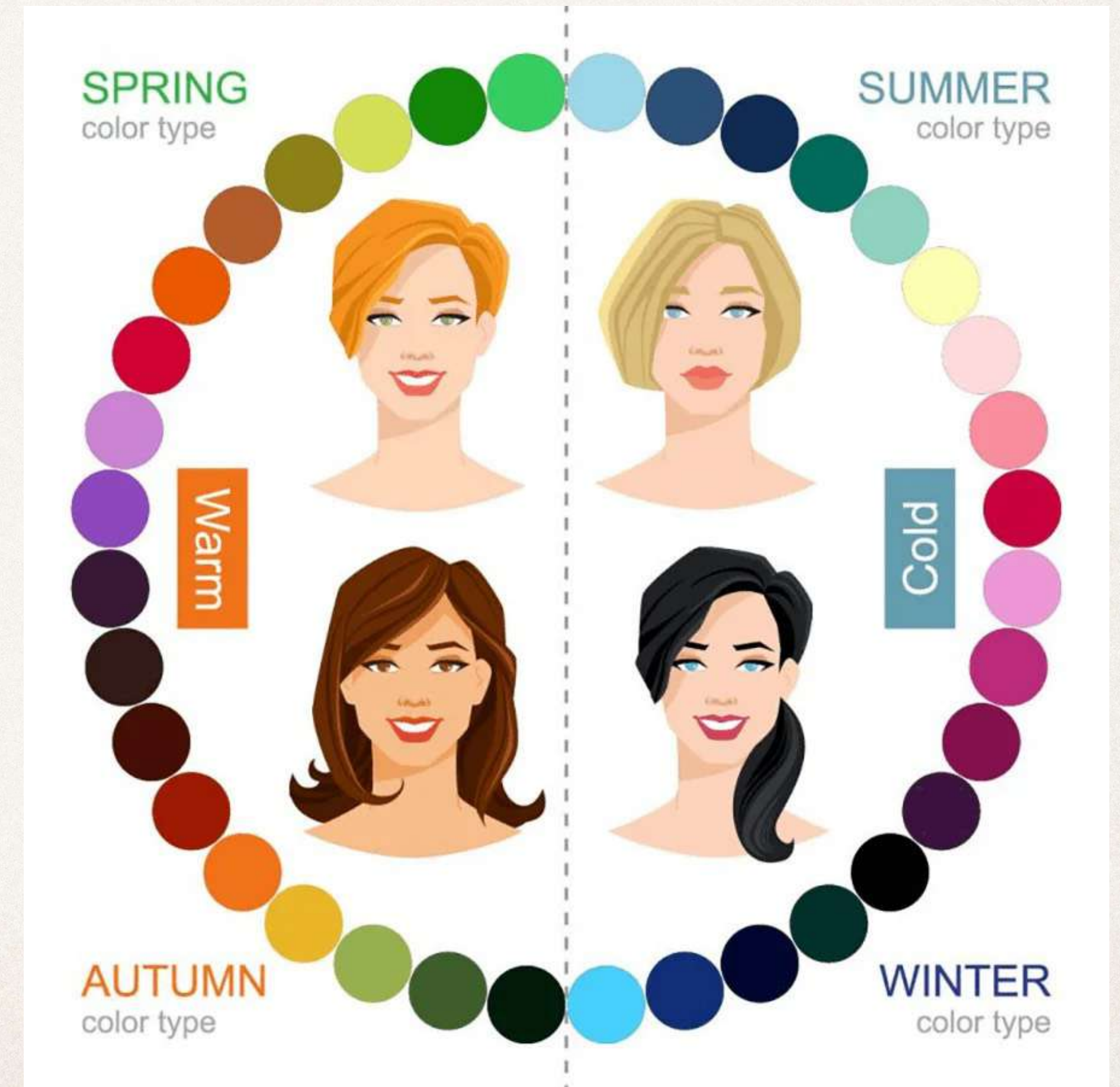
Conclusion

Created a lightweight, user-friendly AI application.

Helps users identify their best colour matches based on skin tone.

Combines image processing, simple machine learning, and colour science.

Ready for further improvements and real-world applications.



“The best colour in the whole world is the one that looks good on you.”

—*Coco Chanel*