Accuracy of Pinterest Recommendations with Cool Tones and Warm Tones

Group 16: Ashley Rommel (leader), Pallavi Vemuri, Harley Ryan
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Motivation

1. **Motivation:**

   Wanted to evaluate accuracy of Pinterest with color theory when looking at warm and cool tone makeup looks.

   Color Theory studies how colors interact with each other and influence emotions and perceptions.

2. **Research Question:**

   How accurate are Pinterest search results when searching for cool tone makeup looks and warm tone makeup looks?

3. **Modeling Approach:**

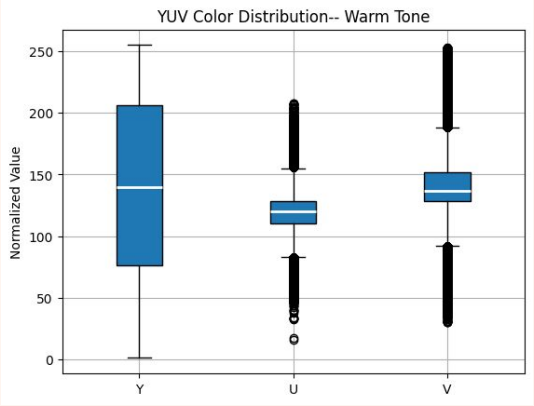
   Compare the YUV average color of each image and classify images as Cool Tone or Warm Tone with Random Forest Classifier.

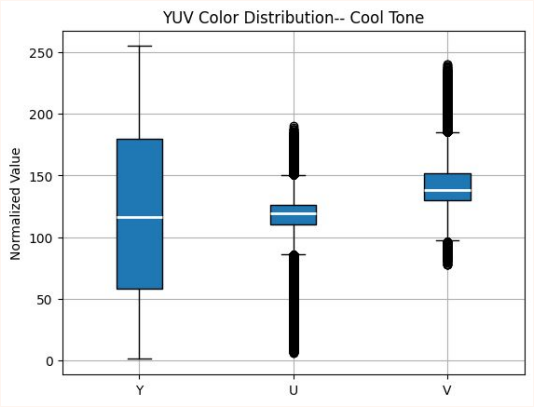
Data Acquisition

Created Pinterest boards for warm tone and cool tone makeup looks based on Pinterest's recommendations.

Final warm tone and cool tone datasets contain image URLs and their PIL representations.

Column	Description	Potential Responses
Image URL	URL for the specific image	https://i.pinimg.com/474x/3b/1c/ec/3b1cec8e035…
Image	PIL (Python Imaging Library) representation of the image	<PIL.JpegImagePlugin.JpegImageFile image mode=..
YUV_values	Float values of the YUV in the image	(np.float64(108.24634053449995), np.float64(109.74392260625103), np.float64(156.9588175453894)).





Analysis Plan and Justification

Used Random Forest Classifier to classify images as warm or cool tone based on its YUV color.

Random Forest Classifier:

- Handles multi-dimensional data & balanced datasets well
- Handles non-linearity effectively
- Robust to noise
- Computes feature importance scores

Get YUV values for each image

Split data into training and testing sets

Train Random Forest Classifier model

Create Visualizations

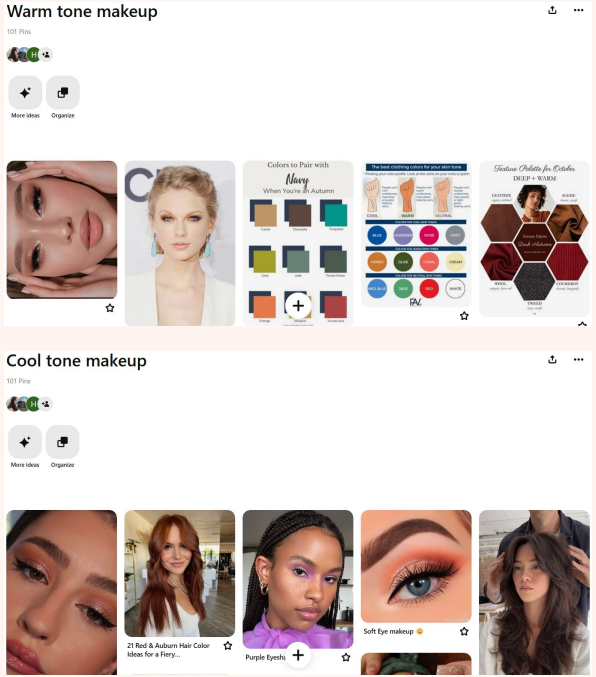
Tricky Analysis Decision

Decided to use Pinterest algorithm to create a board of first 75 recommendations

- API was difficult to use

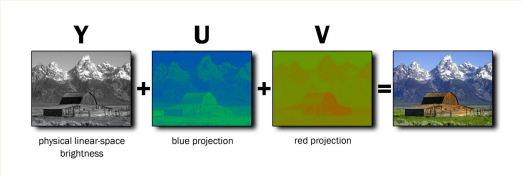
Used PCA visualization instead of other visualizations

- There weren't clear clusters
- Didn't want to force a group fit

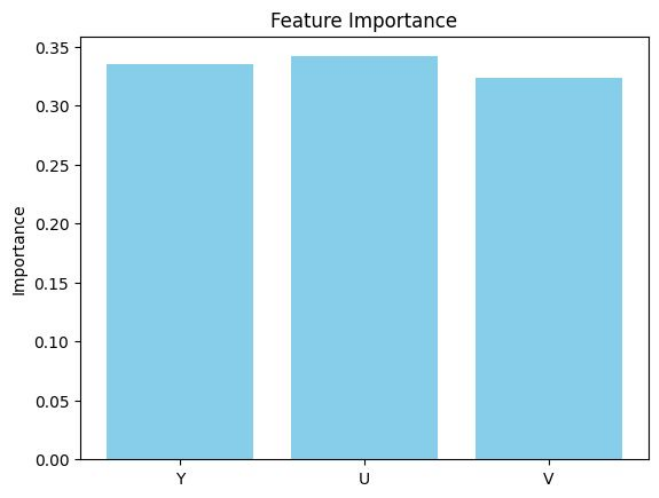


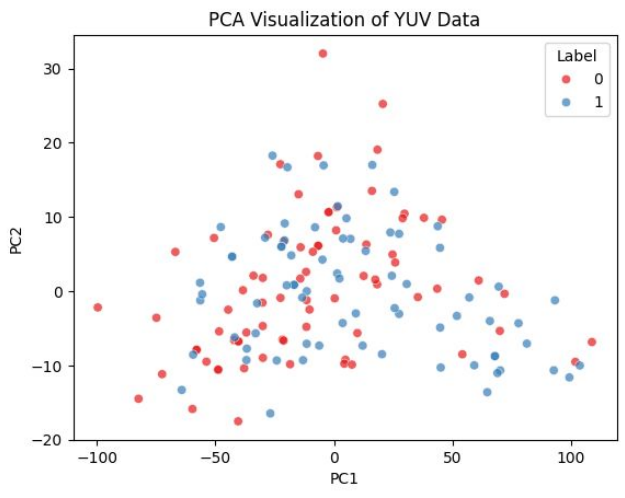
Bias and Uncertainty Validation

- Feature Importance visualization showed same distribution of YUV values
  - Shows that YUV values are all used equally in both warm and cool tones
  - Therefore, YUV values are highly correlated
- Confidence scores are low
  - The model is uncertain for many predictions



Results



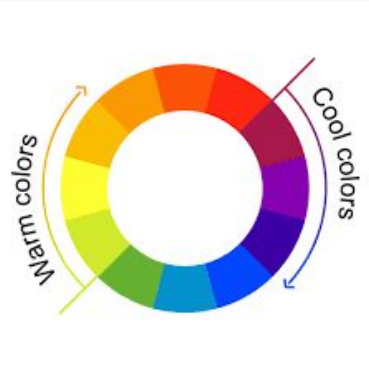


Pinterest does not accurately recommend makeup looks of warm or cool tones, or there is no distinction between warm and cool tones.

- Feature importance scores are the same
- Distributions in PCA visualization are similar

Next Steps

- Do more analysis on color theory
  - Look at other warm and cool toned pictures like outfits or landscapes
- Further questions:
  - Could users incorrectly tagging their makeup looks as a certain tone affect the analysis?
  - Could Pinterest's algorithm be unable to differ warm and cool tones in its algorithm or, overall, just be flawed, which could affect the analysis?



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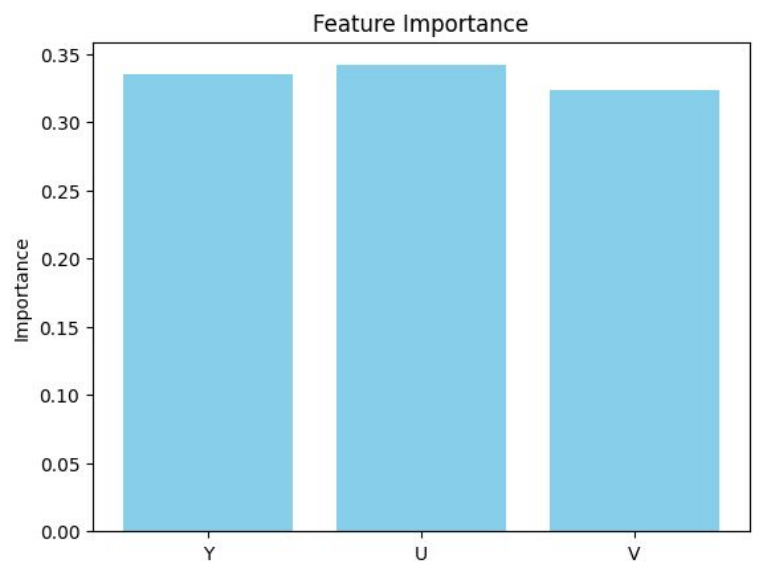
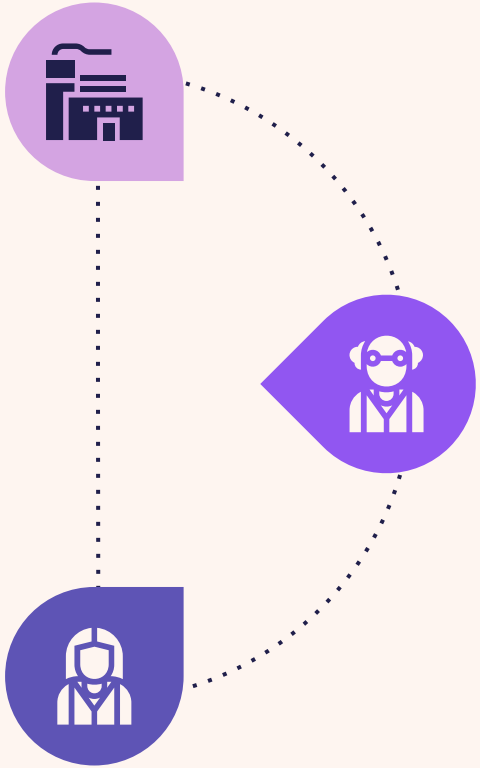
Closing

YUV values are observed to be used equally to distinguish warm and cool tones.





Thanks

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youremail@freepik.com
+34 654 321 432
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