

A decorative graphic on the left side of the slide consisting of two overlapping parallelograms. The front one is blue and the back one is a light mint green. They are positioned diagonally, with the blue one partially covering the green one.

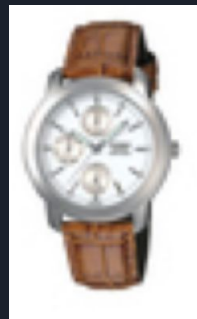
# W281 - Fashion Classification

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# Dataset

4 Classes (Even Spread):

Items	Count
Casual Shoes	1322
Watches	1249
Pants	1139
T-Shirts	1116





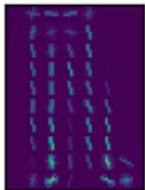
# Features Overview

## Features Explored

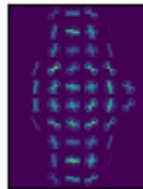
1. HOG
  - a. *Hypothesis:* Gradient Directions/Orientations are different for classes
2. Histograms - RGB and HSV
  - a. *Hypothesis:* Colors for certain objects (watches / pants) may be dark
3. Corner / Keypoints - Harris Corner and SIFT
  - a. *Hypothesis:* Corners are distinct for different objects
4. Texture Based - LBP
  - a. *Hypothesis:* Textures are different for objects
5. Neural Network - VGG16 / ResNet101
  - a. *Hypothesis:* Imagenet embeddings will likely reveal interesting features

# Feature - HOG

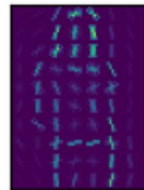
Pants



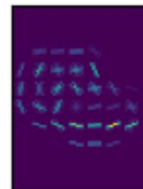
Watches



Tshirts



Casual Shoes

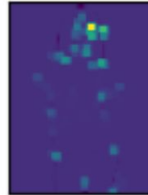


# Feature - Harris Corner

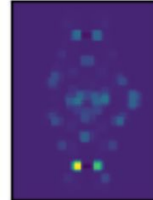
Pants



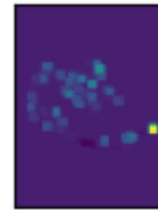
Tshirts



Watches



Casual Shoes



# Feature - SIFT Keypoints

Pants



Tshirts



Watches



Casual Shoes

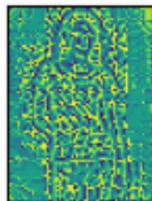


# Feature - LBP

Pants



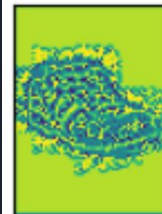
Tshirts



Watches

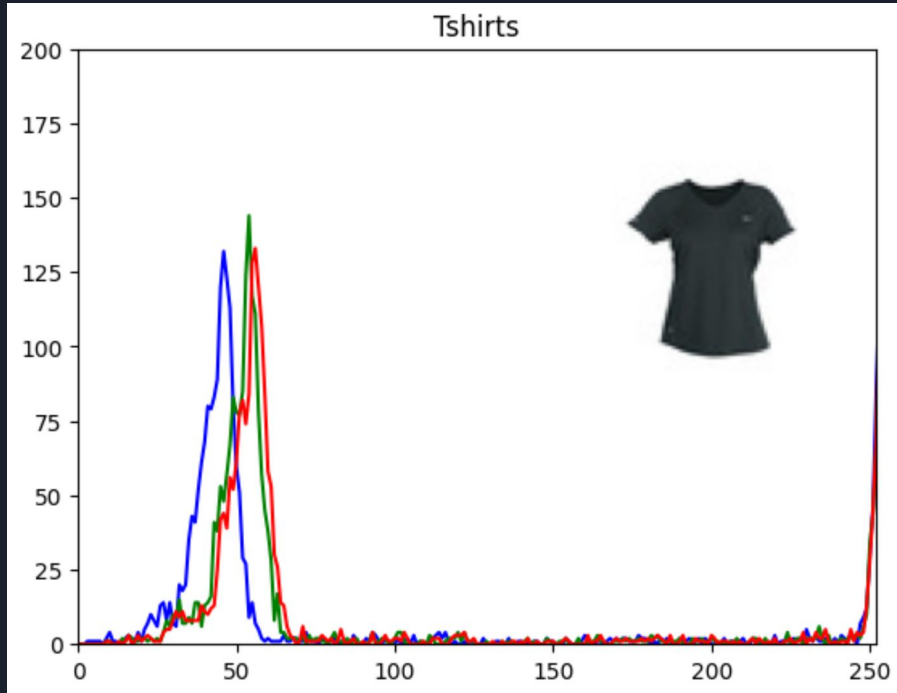


Casual Shoes

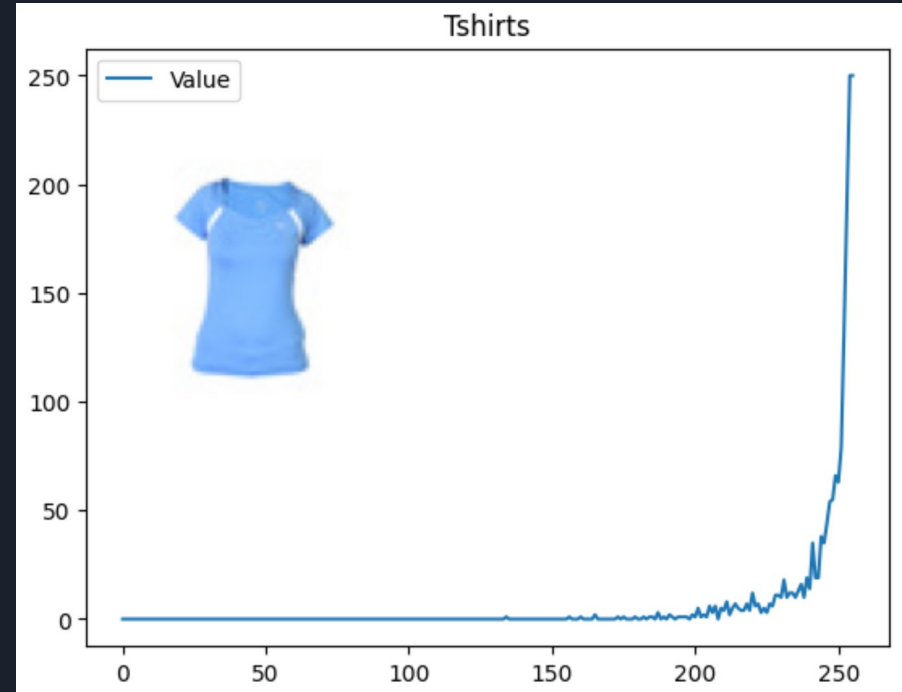


# Feature - Histograms

RGB



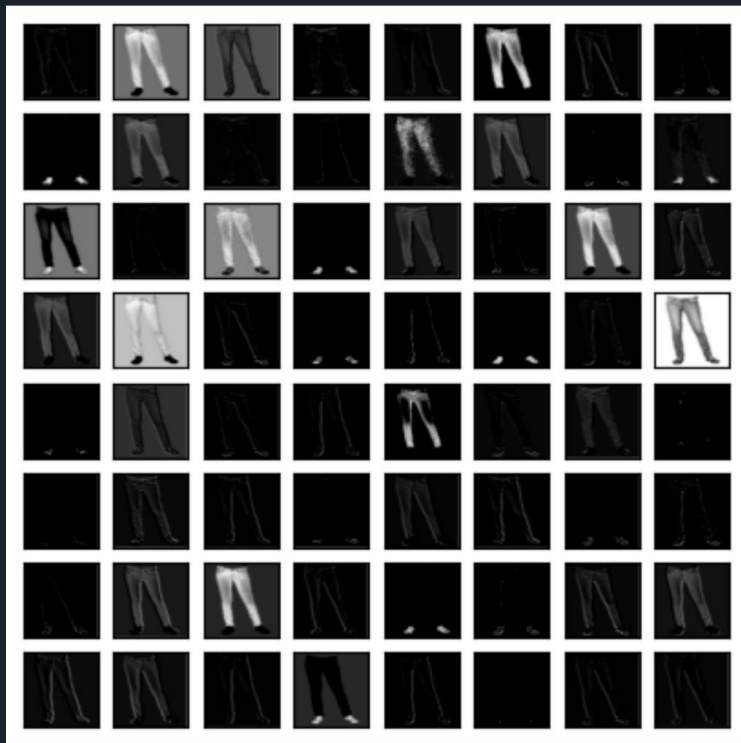
Value (Intensity) in HSV



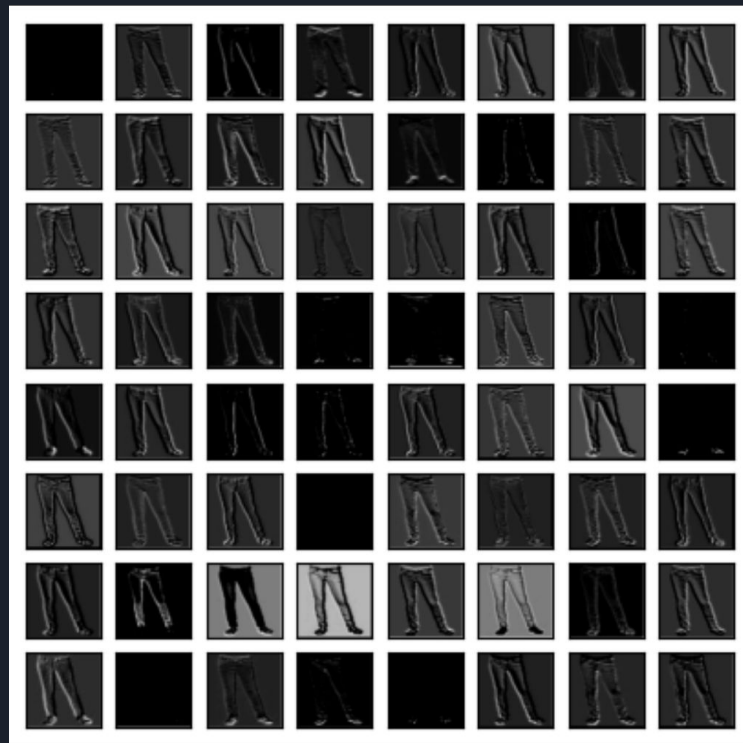


# Feature - VGG16 (Imagenet Embeddings)

Lower Layer - Contrast / Shape



Higher Layer - Texture

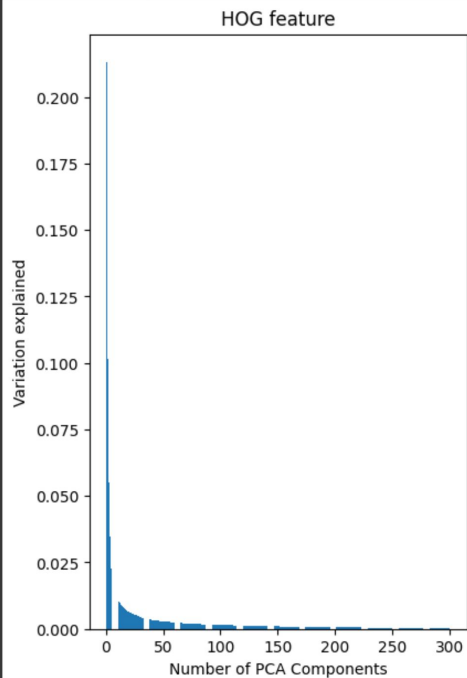


# PCA - On Each Feature

Feature array shape is (3377, 1728)

PCA Transformed feature array shape is (3377, 300)

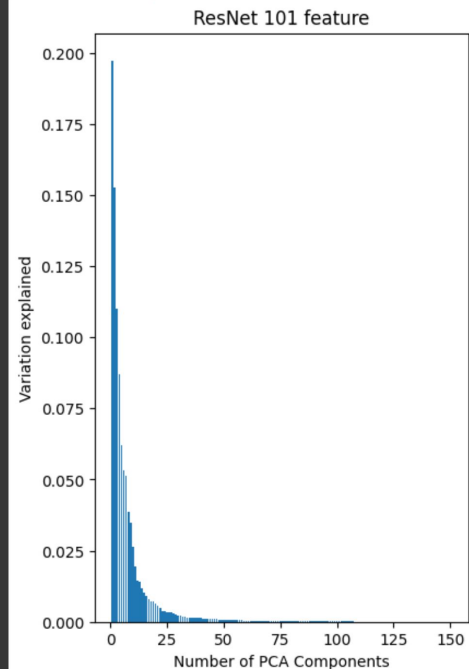
The sum of the explained variance ratio for feature: HOG feature is 0.9447335109885258



Feature array shape is (3377, 1000)

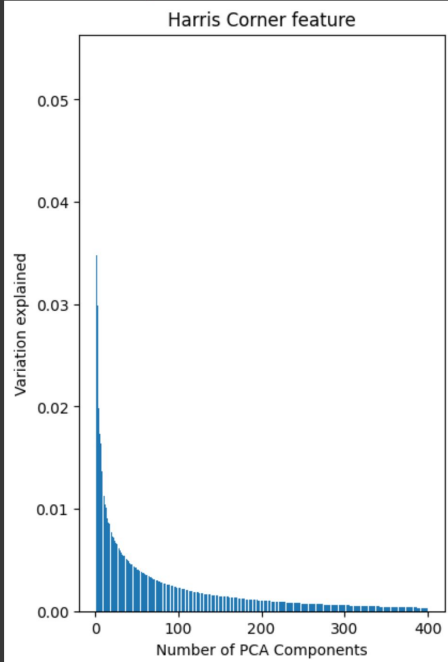
PCA Transformed feature array shape is (3377, 150)

The sum of the explained variance ratio for feature: ResNet 101 feature is 0.9994305447235092

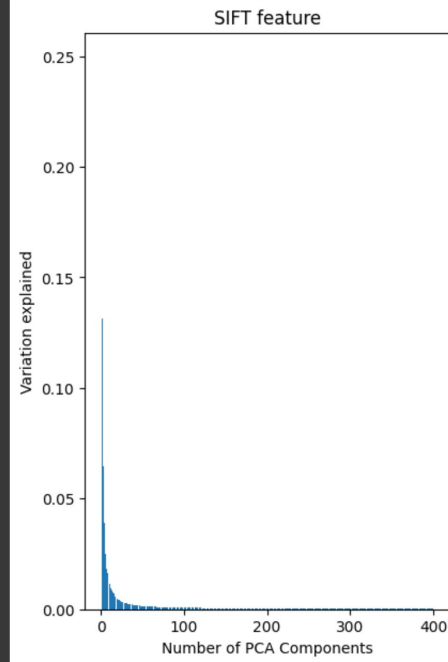


# PCA - On Each Feature

Feature array shape is (3377, 4800)  
PCA Transformed feature array shape is (3377, 400)  
The sum of the explained variance ratio for feature: Harris Corner feature is 0.9073839391639922

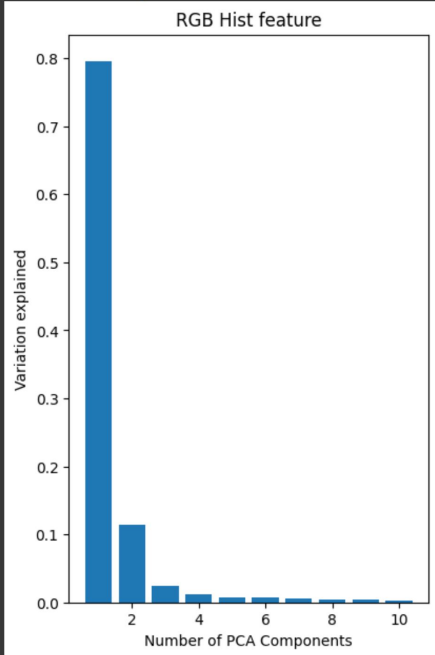


Feature array shape is (3377, 14400)  
PCA Transformed feature array shape is (3377, 400)  
The sum of the explained variance ratio for feature: SIFT feature is 0.8942098080385943



# PCA - On Each Feature

Feature array shape is (3377, 256)  
PCA Transformed feature array shape is (3377, 10)  
The sum of the explained variance ratio for feature: RGB Hist feature is 0.9773766263388097



Feature array shape is (3377, 256)  
PCA Transformed feature array shape is (3377, 10)  
The sum of the explained variance ratio for feature: HSV Hist (Value) feature is 0.9776929831132293

