

Image Classification of Traditional Indian Clothing

Kelly Butler



Lehenga (the skirt)
with a blouse and
a dupatta

Nehru jacket



Women's mojaris



Saree



Men's kurta



Women's
kurta



Palazzos



Sherwani



Blouse



Gown



Dupatta



Salwar with
dupatta



Dhoti pants



Men's
mojaris

Business Problem

- Can a highly accurate model be created to classify images of traditional Indian clothing for a new e-commerce site in the U.S.?
- This site wants a model that will easily classify the Indian clothing since many of these clothes are quite similar.
- Most machine-learning image-classification models have been trained on western clothing.
- A model exists that does this classification (Rajput and Aneja). However, the images for this model were scraped from the web in 2020 or early 2021 (the paper does not specify) and may be out of date.

Data From Kaggle

15 Class Labels

7500 validation images

7500 test images

91166 training images

| Class Label | Number of Images |
|----------------------|------------------|
| Women's Kurtas | 11694 |
| Sarees | 10791 |
| Blouses | 9174 |
| Leggings and Salwars | 7787 |
| Men's Kurtas | 6951 |
| Dupattas | 6587 |
| Nehru jackets | 6491 |
| Lehenga | 5753 |
| Gowns | 5211 |
| Petticoats | 4441 |
| Dhoti Pants | 4145 |
| Palazzos | 3375 |
| Women's Mojaris | 3228 |
| Sherwanis | 2992 |
| Men's Mojaris | 2546 |

Newly Scrapped Test Data



500 images of
each type



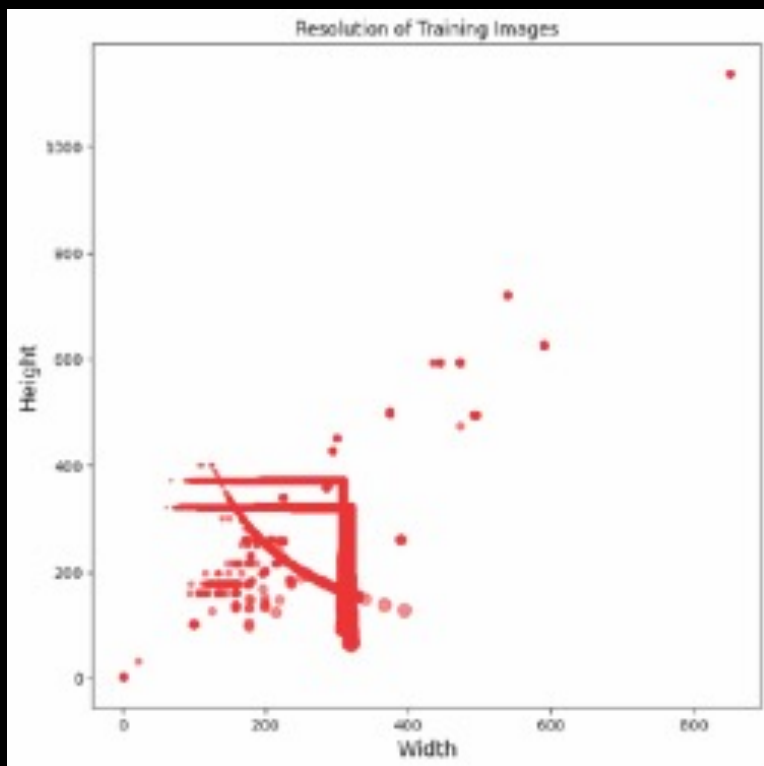


Image resolution in the training set

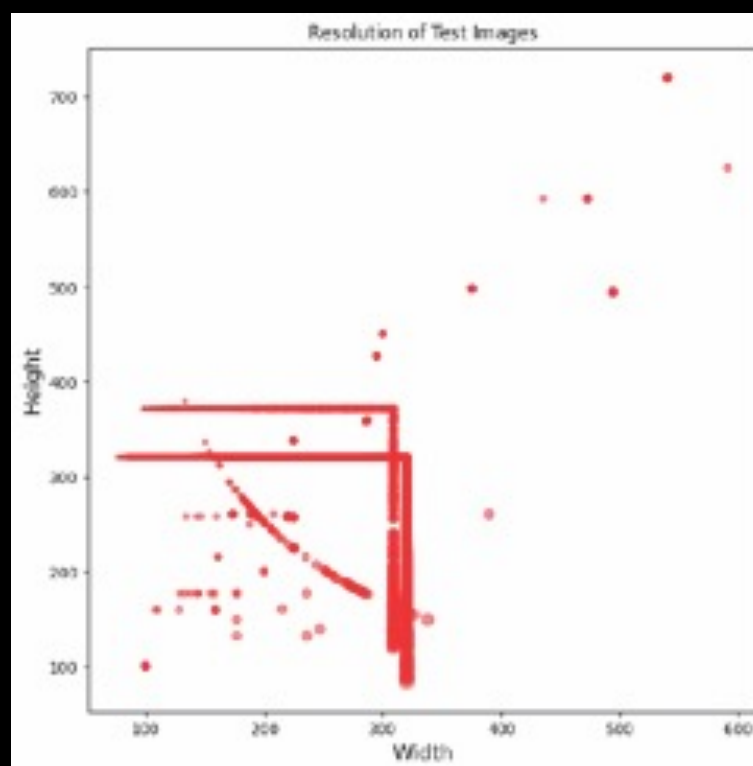


Image resolution in the test set

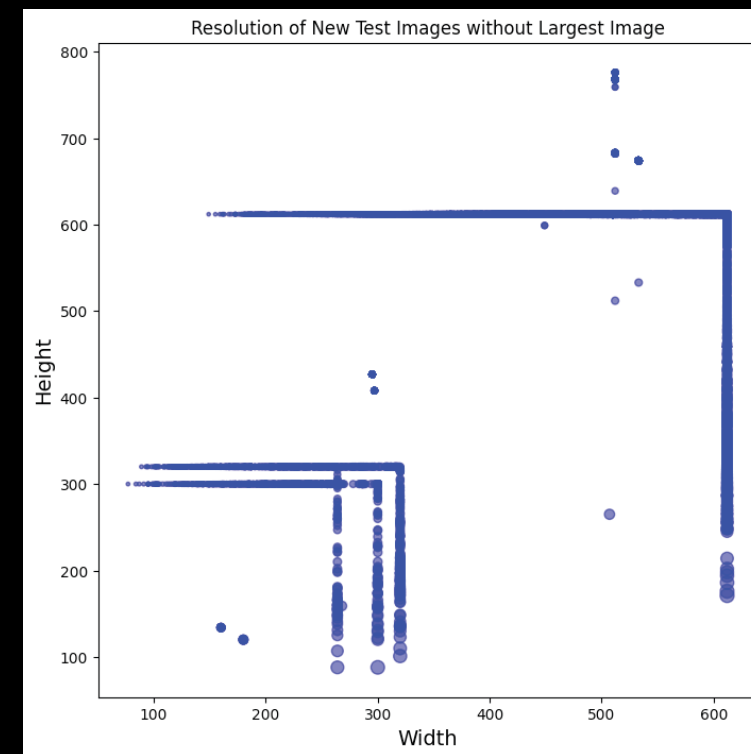
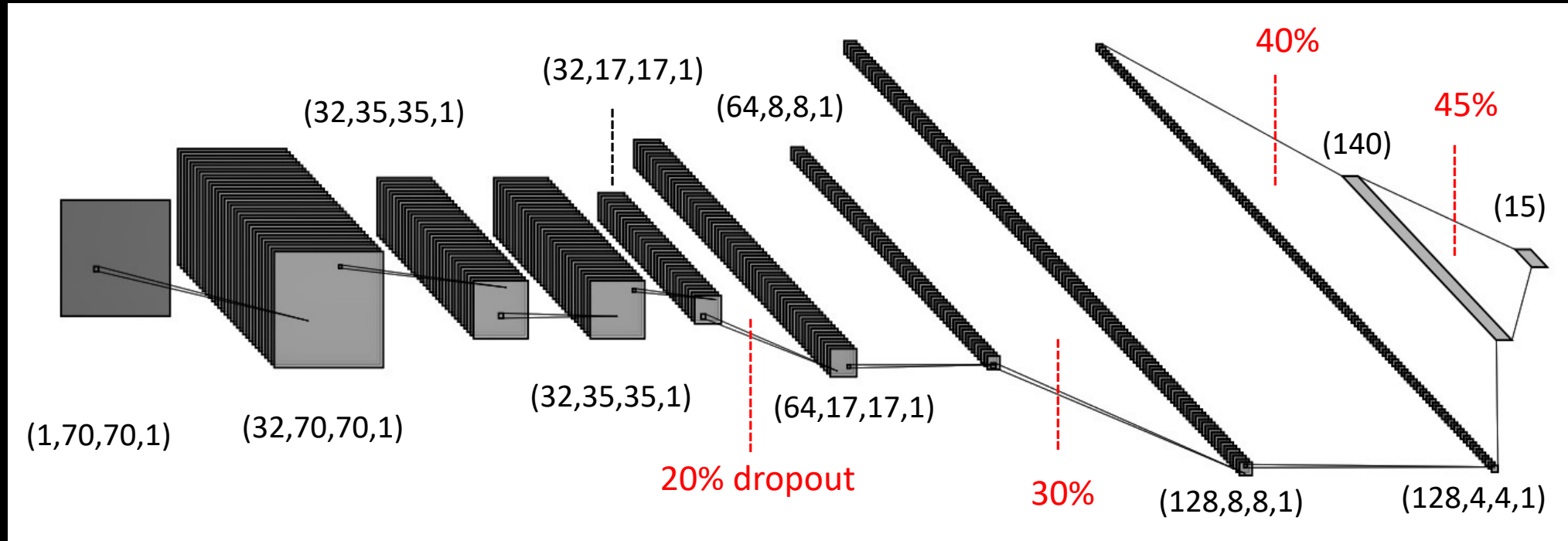


Image resolution in the new test set



Image Sizes





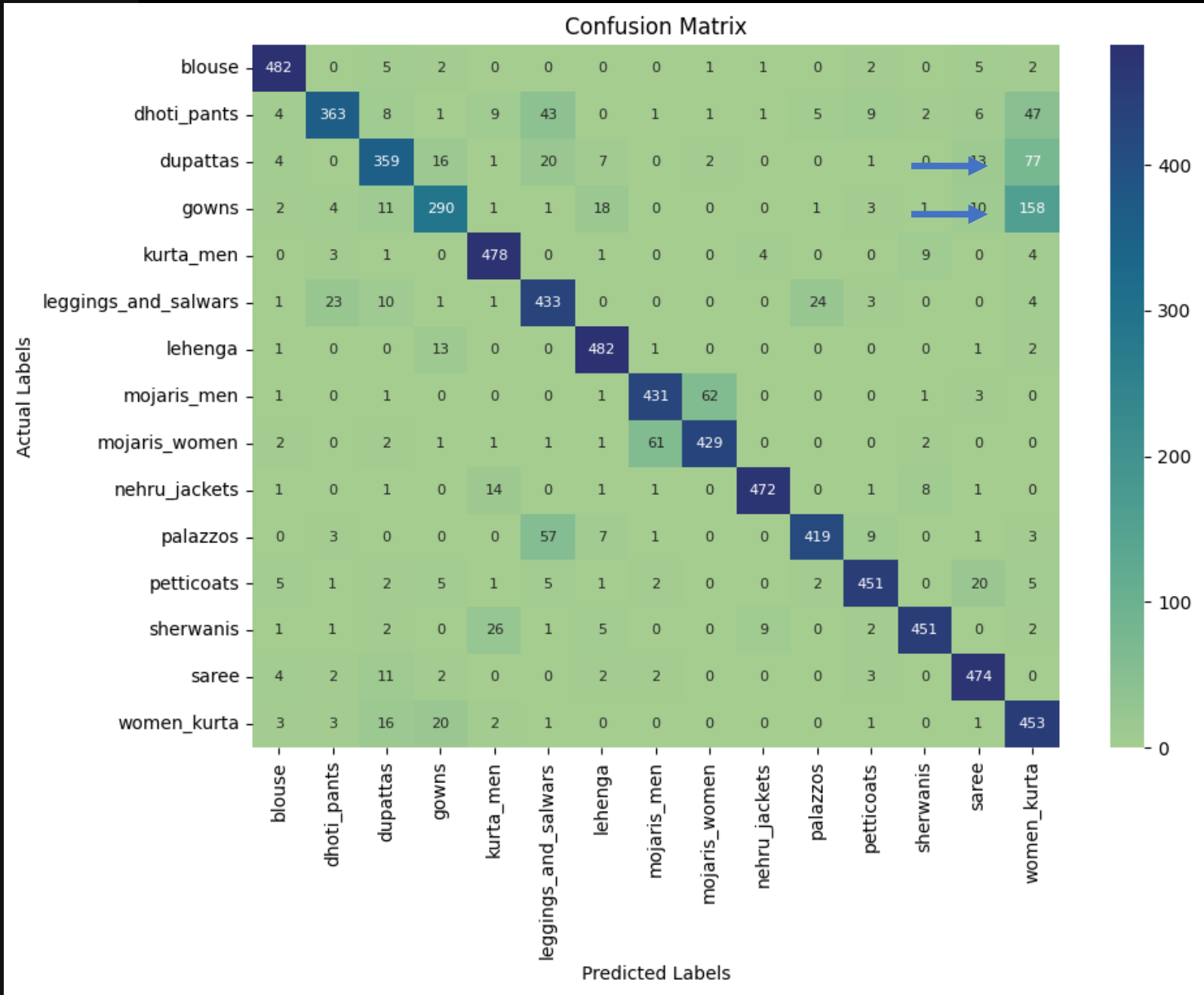
Convolutional Neural Network

Metrics

| | Accuracy | Precision | Recall | F1 Score |
|-----------------------|----------|-----------|---------|----------|
| Original test dataset | 86.23 % | 85.98 % | 84.68 % | 84.61 % |
| New test dataset | 63.91 % | 68.59 % | 63.91 % | 63.59 % |

Confusion Matrix

Original Test Data



Comparing Training and Test Images

Training set:
Women's
Kurta



Test set:
Gown

Predicted label:
Women's Kurta

Comparing Training and Test Images

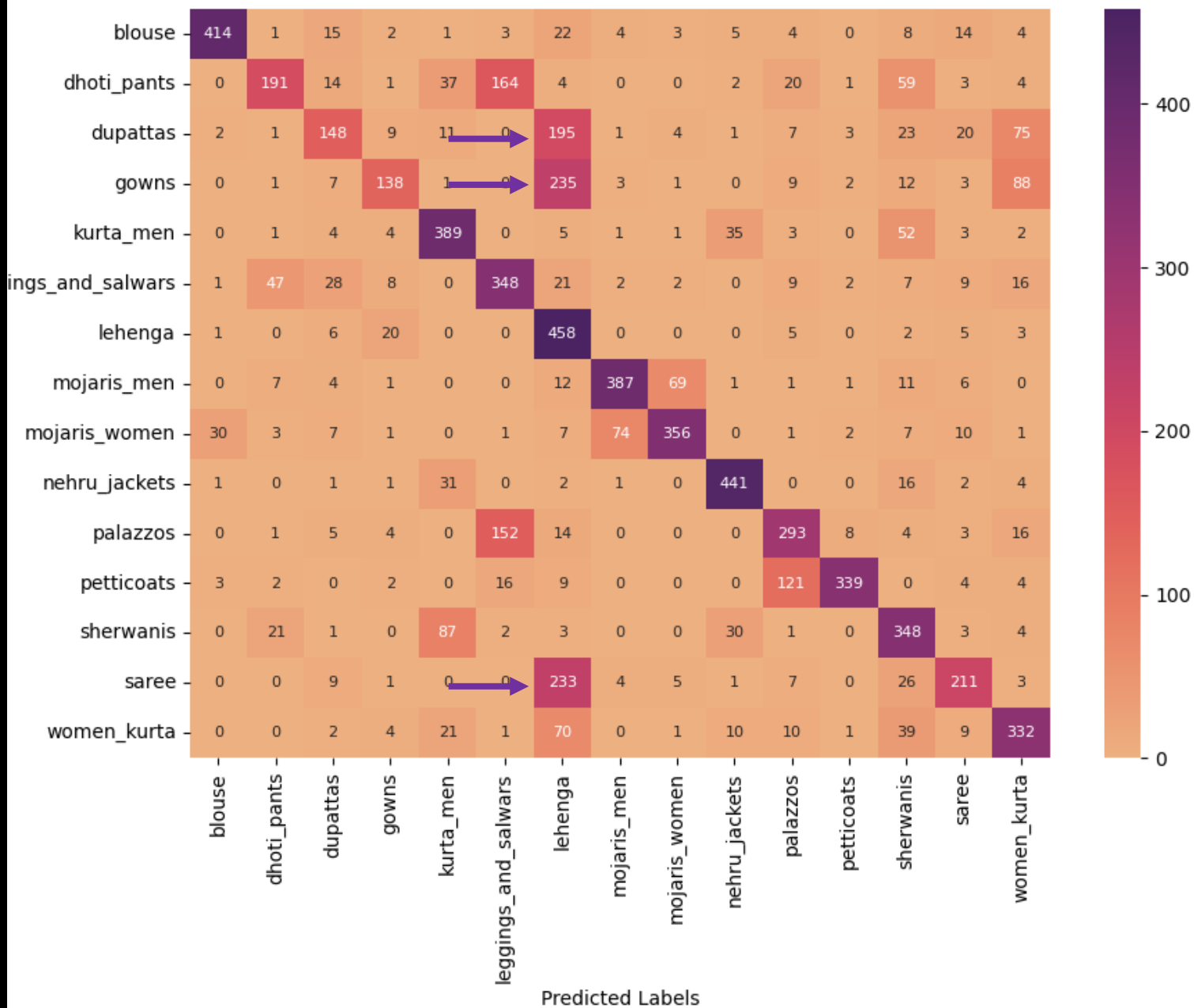


Training set
Women's Kurta



Test set
Dupatta
Predicted:
Women's Kurta

Confusion Matrix for New Test Data



Confusion Matrix Newly Scraped Test Data



Mis-labeled Training Images

Men's Mojari

Training Number

Product Title

56696

Ladies Jutti Women Jutti Women Mojari Tan



56958

Womens Mojari



Business Insights

- Since the accuracy with newly acquired data was 63.91% significantly lower than the 86.23% for the original test set, a new model needs to be trained on current images from other e-commerce sites.
- It is imperative that the data used in training a new model be correctly categorized. The product title may be a better way of determining the category than the label used in searching for the image.
- Much of the change in images may not reflect a change in the fashion of clothing in each category but a rather a change in the way they are presented.
- Many clothes are shown in conjunction with one another. A multi-class multi-label model may be a better approach.