Final Project Report

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Goal

- Classifying what a person is wearing: Formal Shirt/ T-shirt/ Saree/ Kurti

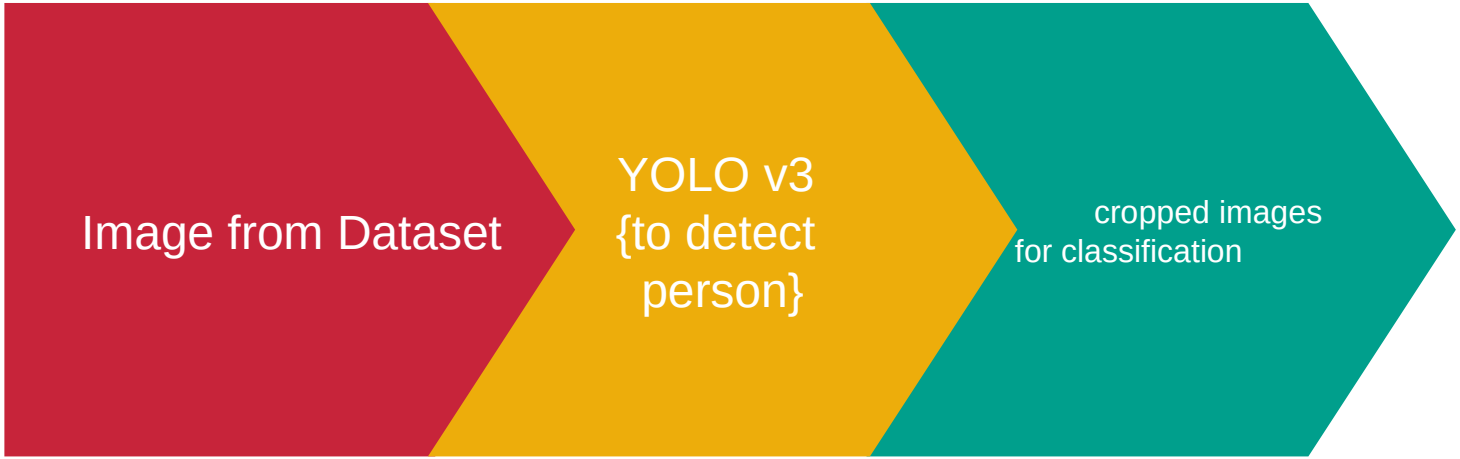
Working Links

- Instruction:
  - Copy the dataset and model folder to the google drive
  - mount the drive in that colab notebook and run all
- Final notebook:
  - https://colab.research.google.com/drive/1mnt8tjd6t4NxYBQO_XDIpIq8_J31y0Bh?usp=sharing
- Classifier Notebook:
  - https://colab.research.google.com/drive/1FZjpdv0AXVUccw4sck-5_CxLYTF5ZKKJ?usp=sharing
- Detection Notebook:
  - https://colab.research.google.com/drive/1mak8zh3MnBB4Do0hJbpCfSgx_XlN8NmV?usp=sharing
- Model link:
  - https://drive.google.com/open?id=19_Wkq2mNlBDUX7-bUaCqYF0ymHRcYtwG
- Original Dataset:
  - https://drive.google.com/drive/folders/1UcbKuhgrwACw8e6uppaEQn0YDjwjFGo0?usp=sharing
- Test Dataset:
  - https://drive.google.com/drive/folders/1Uv1oUYISi5_Vwn3a_Vv0zn3TnfygN5TU?usp=sharing

Approach

- It has 2 parts:
  - Detecting person in the image(Object Detection)
  - Classification of wearing(Image Classifiaction)
- First step : Person Detection can be done by some pretrained models like YOLO/Faster RCNN
- The detected part can be trained for classification later.
- Pretrained YOLO V3 is used to detect person from dataset images
- Detected images(persons) are cropped out from the image for seperate training.
- Our YOLO V3 model used, was pretrained on MS COCO dataset which have one class as person, which is used to detect person and get our region of interest

Architecture for Detection



Preparing Dataset

- Non availability of the labelled dataset was one of the biggest problem, we encountered.
- There are dataset that are having dress with labels.
  - deepfashion & deepfashion2
- The task requires ethenic wear which were not available
- To tackle this problem we made an image scrapper using selenium that will download images from the “google image search”
- Here we encountered another problem: images were of small size, less than (416,416) which is the default that Yolov3 accepts.
- We have modified the image scrapper code to extract high resolution images and images of smaller size are zero padded to make dataset diverse and rich.
- Prepropressing is done manually by us as dataset was not too large and we have to seperate out outliers.
- Example of outliers:
  - Images of another category or none category miscategorized.
  - Unable to see clearly whether the person is wearing what.
  - Too much occulsion.
- After preprocessing of the images, they were passed through YOLO V3 to get Region of Interest seperating only the persons in the images.

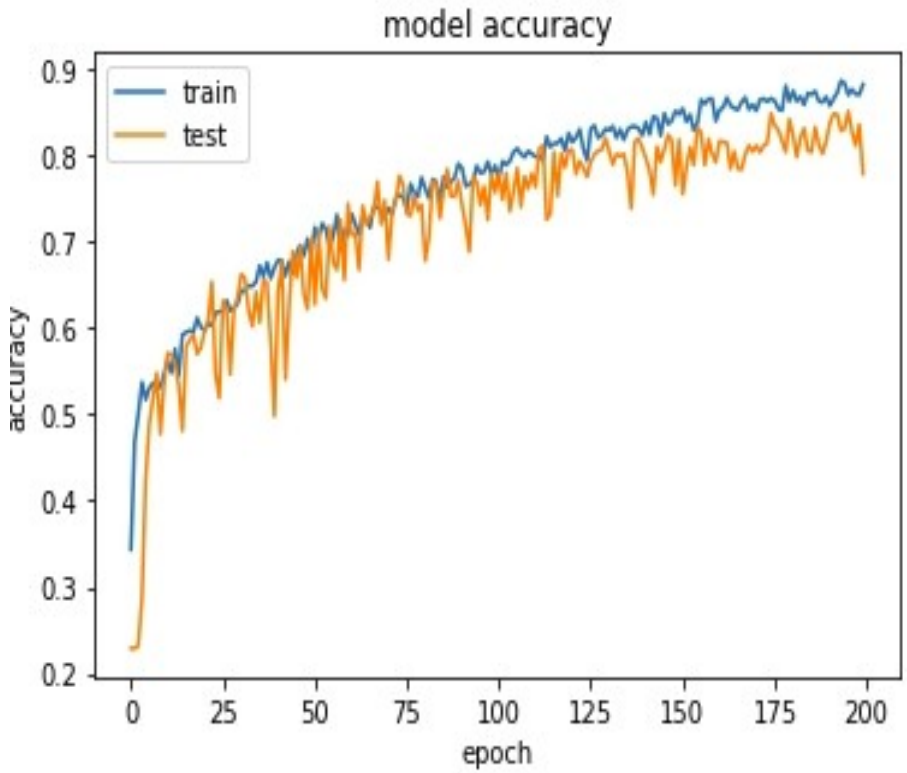
Classifier Training

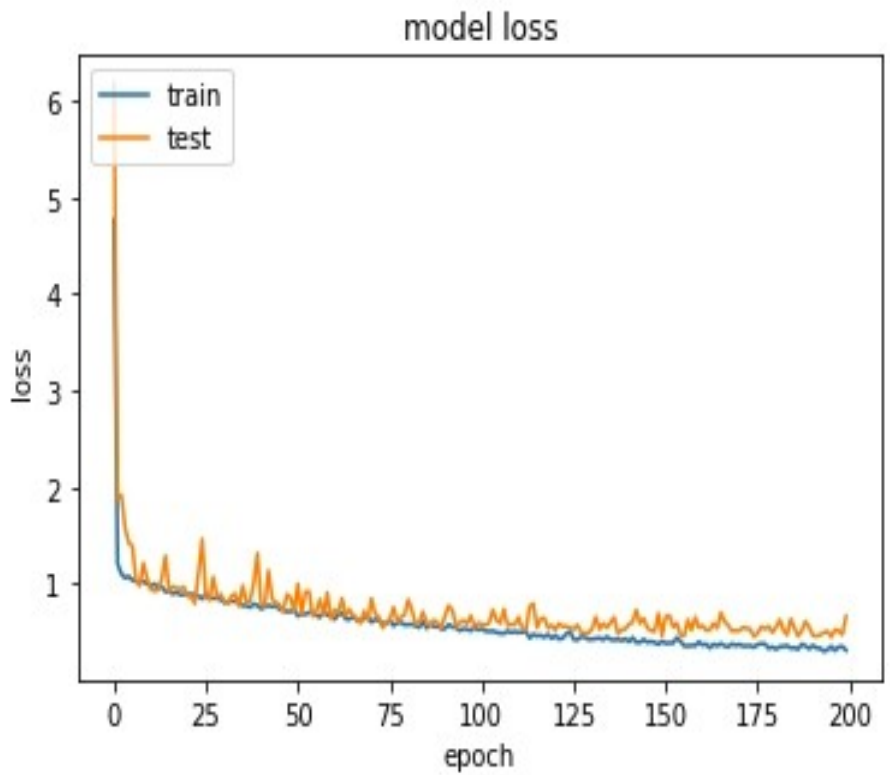
- Detected persons were put in another dataframe along with their labels and the dress classifier was trained seperately.
- We have planned to train a classifier for a bigger dataset like deepfashion2 and apply transfer learning, but due to time and resource constraints we switched to achieve best accuracy with our self made dataset, with smaller network and regularization.

Architecture of Classifier

Classifier Model layout

Classifier training graph

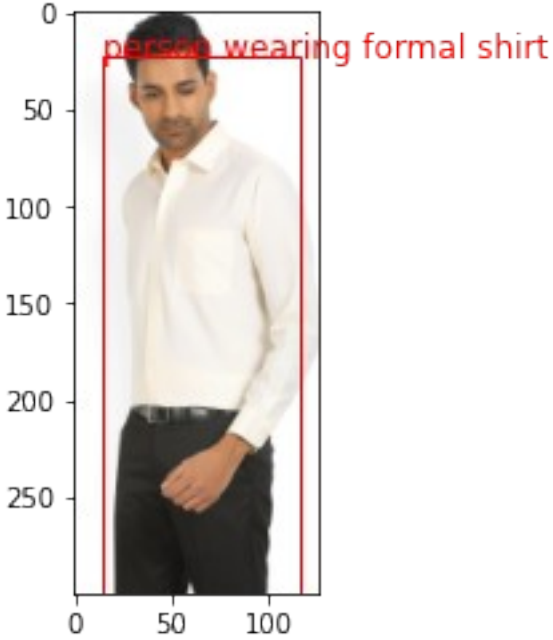


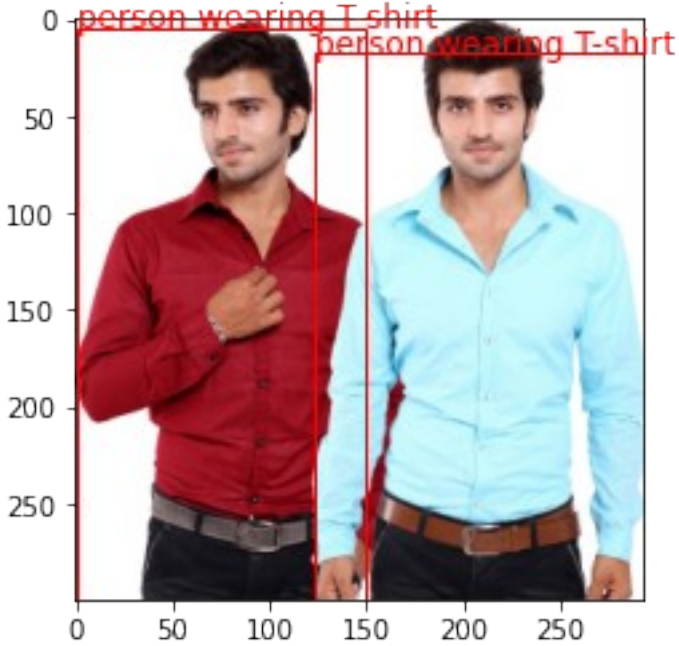


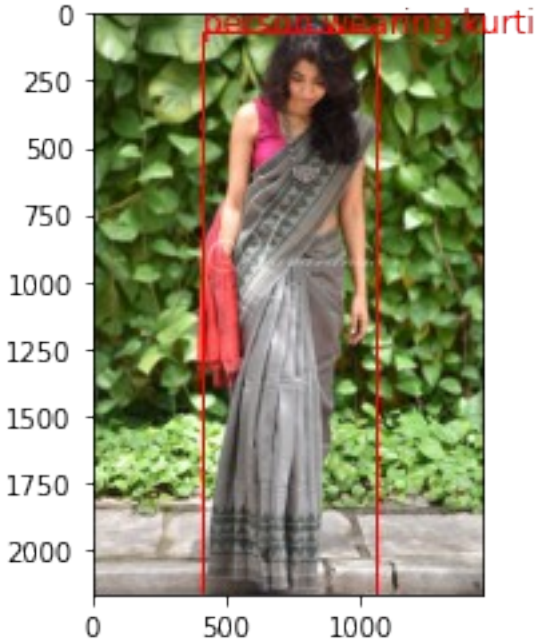
Results

- The accuracy of the classifier was improved on the validation set high as high as 80% which was able to achieve the decent results.
- For the test run, there was 100 images/class and the accuracy was 86.5%.
- The other observation was, that the classifier was working even if the multiple persons were in the image.
- It was able to distinct between T-shirt and formal shirt even if the dataset contained some incorrect labelled images.
- The occlusion below 20% was taken care of and the model was still able to classify.
- The model was able to classify correctly even if there was a posture or position change.
- Model was able to generalize well for two classes saree and kurti due to diverse nature of the dataset.
- It still was having difficulty in classifying T-shirts since they were in all kinds of varieties like with collar without it, full sleeve half sleeve, with buttons without them, jersey of football uniforms. This is still the region which can be worked upon by introducing more subclasses in this class.

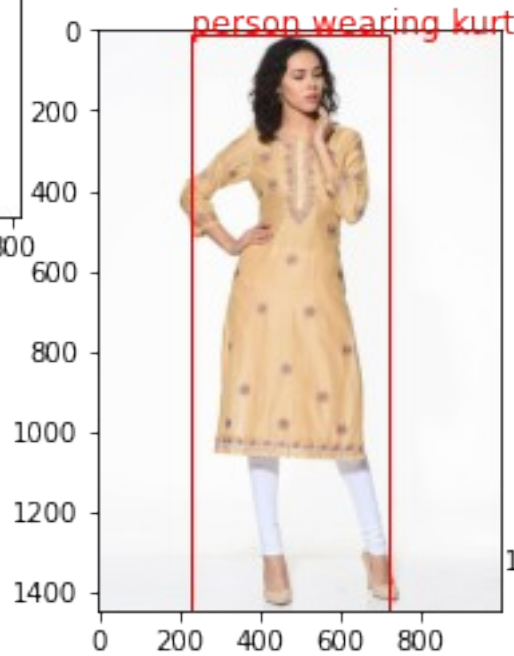
Output Image Results

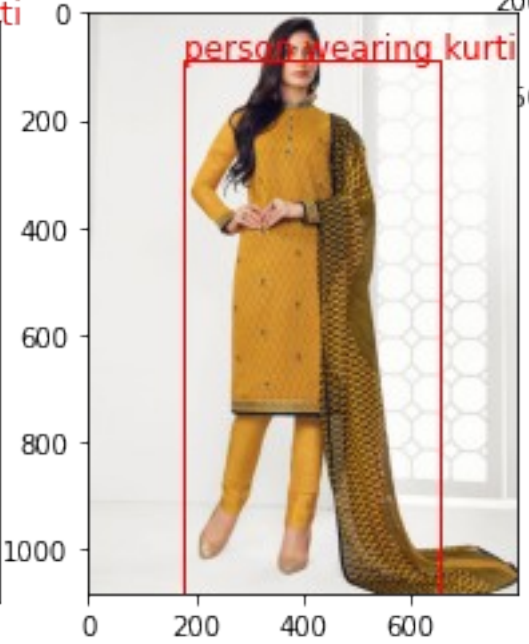

person wearing formal shirt
0
50
100
150
200
250
0
50
100

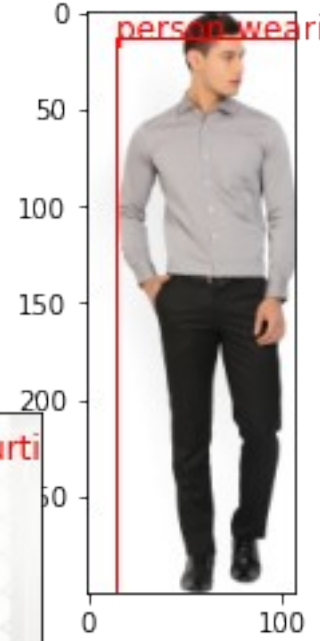

person wearing T-shirt
person wearing T-shirt
0
50
100
150
200
250
0
50
100
150
200
250

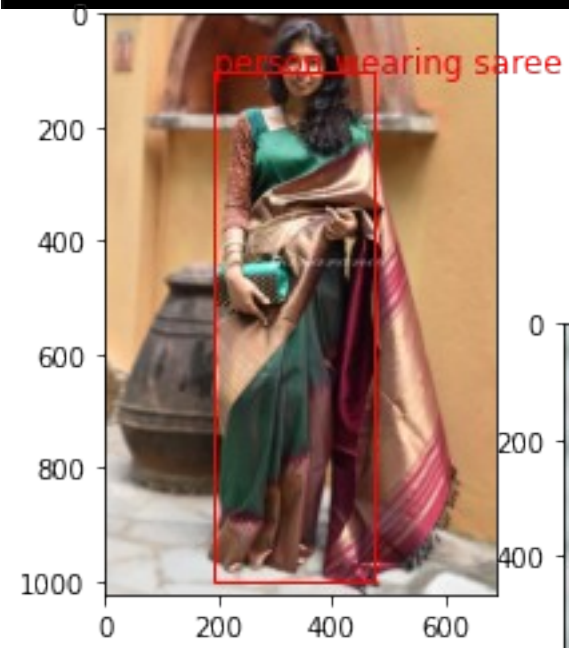

person wearing kurti
0
250
500
750
1000
1250
1500
1750
2000
0
500
1000

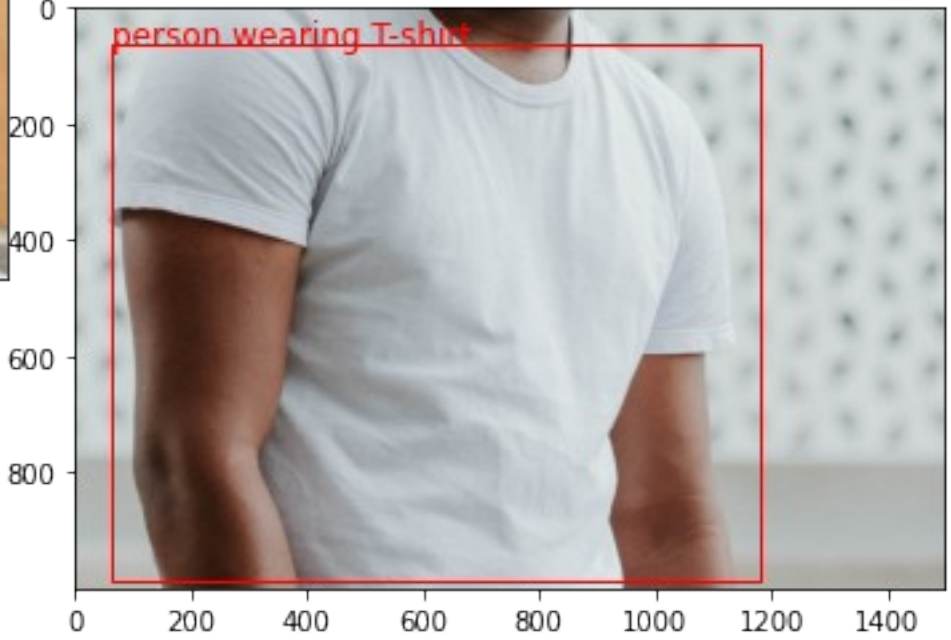
person wearing T-shirt
GILDAN
Softstyle
QUARANTINE
COMFORT.
SHOP WOMEN

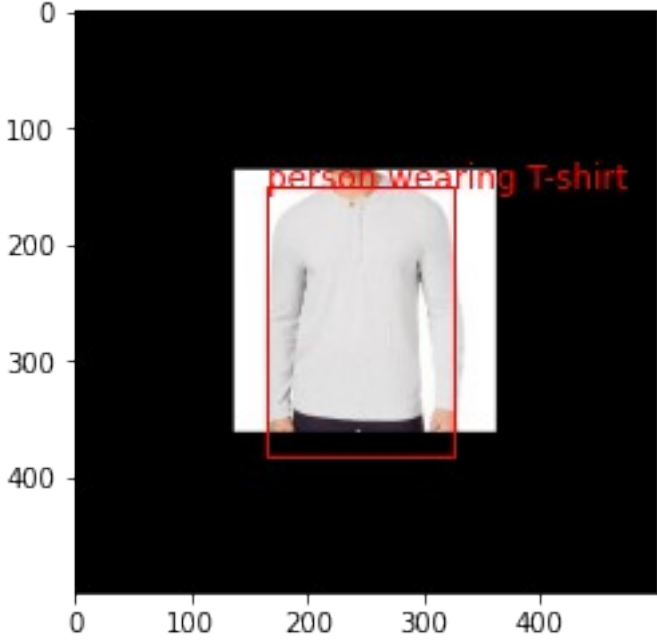

person wearing kurti

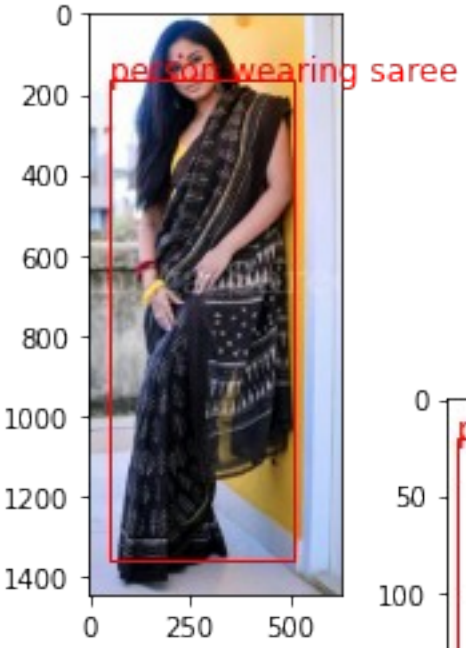

person wearing kurti

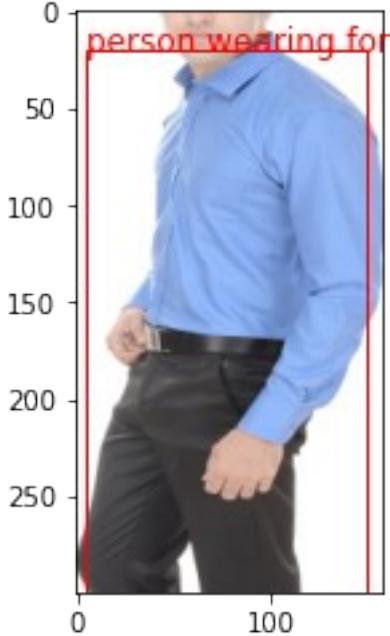

person wearing

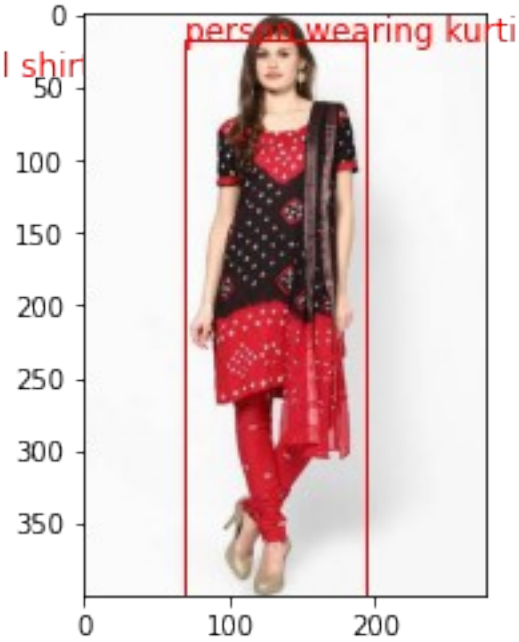

person wearing saree
0
200
400
600
800
1000
0
200
400
600


person wearing T-shirt
0
200
400
600
800
0
200
400
600
800
1000
1200
1400


person wearing T-shirt
0
100
200
300
400
0
100
200
300
400


person wearing saree
0
200
400
600
800
1000
1200
1400
0
250
500


person wearing formal shir
0
50
100
150
200
250
0
100


person wearing kurti
0
50
100
150
200
250
300
350
0
100
200

person wearing saree
0
250
500
750
1000
1250
1500
1750
0
500
1000
1500