Self Case Study 2

1. Creating the Dataset using images scraped from the website

In [63]:

```
#Creating function for acquiring paths of the image files
import os

def getfilespath(path,dc):
    images=[]
    for file in os.listdir(path):
        os.rename(path+file,path+file)
        images.append(path+file)
    return images
```

In [64]:

```
#Getting the file paths for images of men casual shirts
filesPath_Men_casual_shirts = 'Desktop/Selfcase_study2_image_dataset/Men_casual_shirts/'
dc='mcs'
images_of_Men_casual_shirts = getfilespath(filesPath_Men_casual_shirts,dc)
len(images_of_Men_casual_shirts)
```

Out[64]:

```
2012
```

In [34]:

```
#Getting the file paths for images of men casual Trousers
filesPath_Men_casual_trousers = 'Desktop/Selfcase_study2_image_dataset/Men_casual_trousers/'
dc='mct'
images_of_Men_casual_trousers = getfilespath(filesPath_Men_casual_trousers,dc)
len(images_of_Men_casual_trousers)
```

Out[34]:

```
2125
```

In [37]:

```
#Getting the file paths for images of men shorts
filesPath_Men_shorts = 'Desktop/Selfcase_study2_image_dataset/Men_shorts/'
dc='ms'
images_of_Men_shorts = getfilespath(filesPath_Men_shorts,dc)
len(images_of_Men_shorts)
```

Out[37]:

```
2138
```

In [40]:

```
#Getting the file paths for images of men T-shirts
filesPath_Men_T_shirts = 'Desktop/Selfcase_study2_image_dataset/Men_T_shirts/'
dc='mTs'
images_of_Men_T_shirts = getfilespath(filesPath_Men_T_shirts,dc)
len(images_of_Men_T_shirts)
```

Out[40]:

```
2069
```

In [42]:

In [42]:

```
#Getting the file paths for images of Women shorts and skirts
filesPath_Women_shorts_and_skirts =
'Desktop/Selfcase_study2_image_dataset/Women_shorts_and_skirts/'
dc='wss'
images_of_Women_shorts_and_skirts = getfilespath(filesPath_Women_shorts_and_skirts,dc)
len(images_of_Women_shorts_and_skirts)
```

Out[42]:

```
2139
```

In [263]:

```
import pandas as pd

df_1 = pd.DataFrame(images_of_Men_casual_shirts,columns =['File Paths'])
df_1['Dress Type']='Men Casual Shirt'
df_1.head()
```

Out[263]:

	File Paths	Dress Type
0	Desktop/Selfcase_study2_image_dataset/Men_casu...	Men Casual Shirt
1	Desktop/Selfcase_study2_image_dataset/Men_casu...	Men Casual Shirt
2	Desktop/Selfcase_study2_image_dataset/Men_casu...	Men Casual Shirt
3	Desktop/Selfcase_study2_image_dataset/Men_casu...	Men Casual Shirt
4	Desktop/Selfcase_study2_image_dataset/Men_casu...	Men Casual Shirt

In [264]:

```
import pandas as pd

df_2 = pd.DataFrame(images_of_Men_casual_trousers,columns =['File Paths'])
df_2['Dress Type']='Men casual trousers'
df_2.head()
```

Out[264]:

	File Paths	Dress Type
0	Desktop/Selfcase_study2_image_dataset/Men_casu...	Men casual trousers
1	Desktop/Selfcase_study2_image_dataset/Men_casu...	Men casual trousers
2	Desktop/Selfcase_study2_image_dataset/Men_casu...	Men casual trousers
3	Desktop/Selfcase_study2_image_dataset/Men_casu...	Men casual trousers
4	Desktop/Selfcase_study2_image_dataset/Men_casu...	Men casual trousers

In [265]:

```
import pandas as pd

df_3 = pd.DataFrame(images_of_Men_shorts,columns =['File Paths'])
df_3['Dress Type']='Men shorts'
df_3.head()
```

Out[265]:

	File Paths	Dress Type
0	Desktop/Selfcase_study2_image_dataset/Men_shor...	Men shorts
1	Desktop/Selfcase_study2_image_dataset/Men_shor...	Men shorts
2	Desktop/Selfcase_study2_image_dataset/Men_shor...	Men shorts
3	Desktop/Selfcase_study2_image_dataset/Men_shor...	Men shorts
4	Desktop/Selfcase_study2_image_dataset/Men_shor...	Men shorts

In [266]:

```
import pandas as pd

df_4 = pd.DataFrame(images_of_Men_T_shirts,columns =['File Paths'])
df_4['Dress Type']='Men T-shirts'
df_4.head()
```

Out[266]:

	File Paths	Dress Type
0	Desktop/Selfcase_study2_image_dataset/Men_T_sh...	Men T-shirts
1	Desktop/Selfcase_study2_image_dataset/Men_T_sh...	Men T-shirts
2	Desktop/Selfcase_study2_image_dataset/Men_T_sh...	Men T-shirts
3	Desktop/Selfcase_study2_image_dataset/Men_T_sh...	Men T-shirts
4	Desktop/Selfcase_study2_image_dataset/Men_T_sh...	Men T-shirts

In [267]:

```
import pandas as pd

df_5 = pd.DataFrame(images_of_Women_shorts_and_skirts,columns =['File Paths'])
df_5['Dress Type']='Women shorts and skirts'
df_5.head()
```

Out[267]:

	File Paths	Dress Type
0	Desktop/Selfcase_study2_image_dataset/Women_sh...	Women shorts and skirts
1	Desktop/Selfcase_study2_image_dataset/Women_sh...	Women shorts and skirts
2	Desktop/Selfcase_study2_image_dataset/Women_sh...	Women shorts and skirts
3	Desktop/Selfcase_study2_image_dataset/Women_sh...	Women shorts and skirts
4	Desktop/Selfcase_study2_image_dataset/Women_sh...	Women shorts and skirts

In [268]:

```
final_df=pd.concat([df_1,df_2,df_3,df_4,df_5],ignore_index=True)
final_df.shape
```

Out[268]:

```
(10483, 2)
```

In [269]:

```
from tqdm import tqdm

final_df['Type of wear']='wear'
for i in tqdm(final_df['Dress Type']):
    if i=='Women shorts and skirts' or i=='Men shorts':
        final_df.loc[final_df['Dress Type']==i,'Type of wear']='Bottom wear'
       final_df.loc[final_df['Dress Type']==i,'Type of wear']='Bottom wear'
    else:
       final_df.loc[final_df['Dress Type']==i,'Type of wear']='Top wear'
```

```
100%|████████████████████████████████████████████████████████████████| 10483/10483 [00:
26<00:00, 390.75it/s]
```

In [271]:

```
full_shot_img_filepath=os.listdir('Desktop/Selfcase_study2_image_dataset/Full_shot_images_actual')
len(full_shot_img_filepath)
```

Out[271]:

```
1136
```

In [272]:

```
final_df['Full shot/Not a full shot']='Not a full shot'

for i in tqdm(final_df['File Paths']):
    for j in full_shot_img_filepath:
        if i[56:][:-4]==j[:66][:-4]:
           final_df.loc[final_df['File Paths']==i,'Full shot/Not a full shot']='Full shot'

for i in tqdm(final_df['File Paths']):
    for j in full_shot_img_filepath:
        if i[58:][:-4]==j[:66][:-4]:
           final_df.loc[final_df['File Paths']==i,'Full shot/Not a full shot']='Full shot'

for i in tqdm(final_df['File Paths']):
    for j in full_shot_img_filepath:
        if i[49:][:-4]==j[:66][:-4]:
           final_df.loc[final_df['File Paths']==i,'Full shot/Not a full shot']='Full shot'

for i in tqdm(final_df['File Paths']):
    for j in full_shot_img_filepath:
        if i[51:][:-4]==j[:66][:-4]:
           final_df.loc[final_df['File Paths']==i,'Full shot/Not a full shot']='Full shot'

for i in tqdm(final_df['File Paths']):
    for j in full_shot_img_filepath:
        if i[62:][:-4]==j[:66][:-4]:
           final_df.loc[final_df['File Paths']==i,'Full shot/Not a full shot']='Full shot'
```

```
100%|███████████████████████████████████████████████████████████████| 10483/10483
[00:03<00:00, 3070.04it/s]
100%|███████████████████████████████████████████████████████████████| 10483/10483
[00:04<00:00, 2310.05it/s]
100%|███████████████████████████████████████████████████████████████| 10483/10483
[00:04<00:00, 2205.43it/s]
100%|███████████████████████████████████████████████████████████████| 10483/10483
[00:03<00:00, 2852.38it/s]
100%|███████████████████████████████████████████████████████████████| 10483/10483
[00:04<00:00, 2594.84it/s]
```

In [287]:

```
final_df.to_csv('self_casestudy_dataset.csv')
```

2. Exploratory Data Analysis(EDA)

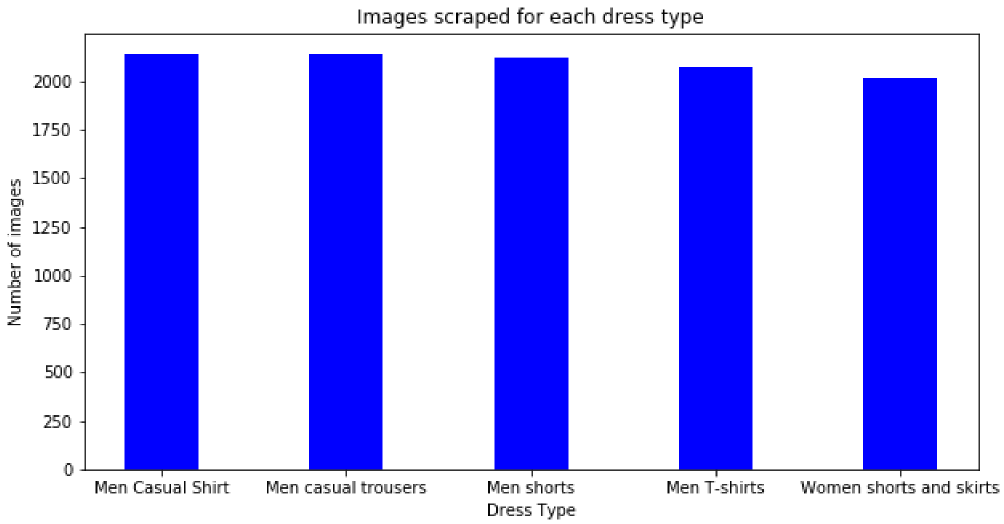
In [1]:

```
import pandas as pd

final_df=pd.read_csv('self_casestudy_dataset.csv')
```

Let us check number of categories in the dataset and number of images for each category

In [2]:

```
import numpy as np
import matplotlib.pyplot as plt

no_of_images_per_each_dress_type = list(final_df['Dress Type'].value_counts().values)
dress_type = list(final_df['Dress Type'].unique())

fig = plt.figure(figsize = (10, 5))

# creating the bar plot
plt.bar(dress_type, no_of_images_per_each_dress_type, color ='blue',
        width = 0.4)

plt.xlabel("Dress Type")
plt.ylabel("Number of images")
plt.title("Images scraped for each dress type")
plt.show()
```



Examples for each dress type

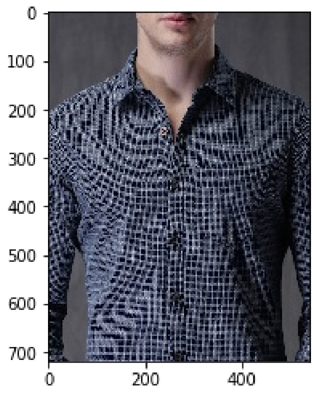
1. Men Casual Shirt

In [4]:

```
import cv2 as cv

img = cv.imread('Desktop/Selfcase_study2_image_dataset/Men_casual_shirts/mcs1img.png')
plt.imshow(cv.cvtColor(img, cv.COLOR_BGR2RGB))
```

Out[4]:

```
<matplotlib.image.AxesImage at 0x2655104be48>
```



1. Men casual trouser

In [5]:

```
img = cv.imread('Desktop/Selfcase_study2_image_dataset/Men_casual_trousers/mct1img.png')
plt.imshow(cv.cvtColor(img, cv.COLOR_BGR2RGB))
```

Out[5]:

```
<matplotlib.image.AxesImage at 0x26550e15630>
```

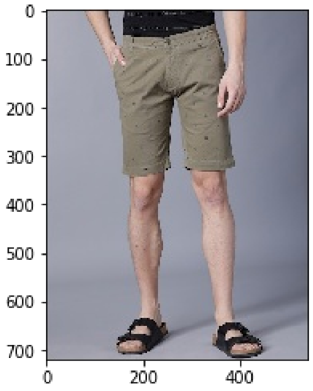
1. Men shorts

In [6]:

```
img = cv.imread('Desktop/Selfcase_study2_image_dataset/Men_shorts/ms1img.png')
plt.imshow(cv.cvtColor(img, cv.COLOR_BGR2RGB))
```

Out[6]:

```
<matplotlib.image.AxesImage at 0x26550fa3e80>
```



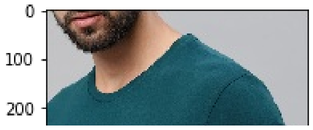
1. Men T-shirts

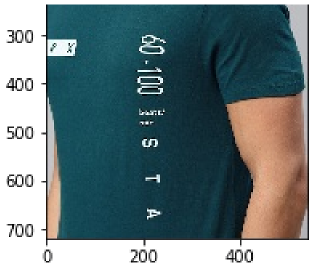
In [7]:

```
img = cv.imread('Desktop/Selfcase_study2_image_dataset/Men_T_shirts/mTs1img.png')
plt.imshow(cv.cvtColor(img, cv.COLOR_BGR2RGB))
```

Out[7]:

```
<matplotlib.image.AxesImage at 0x26550e9b710>
```





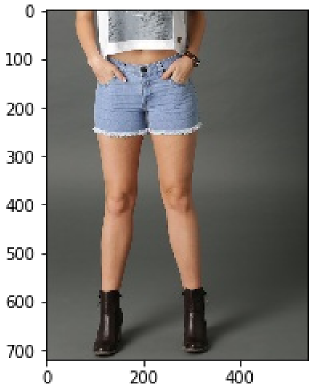
1. Women shorts and skirts

In [8]:

```
img = cv.imread('Desktop/Selfcase_study2_image_dataset/Women_shorts_and_skirts/wss1img.png')
plt.imshow(cv.cvtColor(img, cv.COLOR_BGR2RGB))
```

Out[8]:

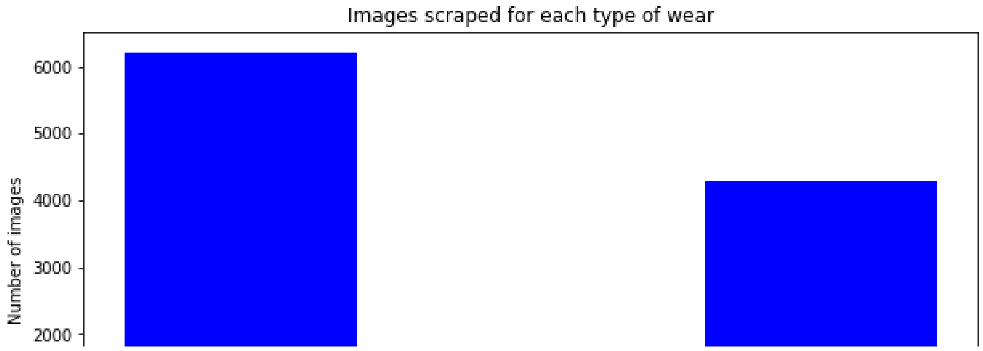
```
<matplotlib.image.AxesImage at 0x26550ef8f60>
```



Let us check number of images for top wear and bottom wear

In [9]:

```
import numpy as np
import matplotlib.pyplot as plt

no_of_images_per_each_dress_wear = list(final_df['Type of wear'].value_counts().values)
wear_type = list(final_df['Type of wear'].unique())

fig = plt.figure(figsize = (10, 5))

# creating the bar plot
plt.bar(wear_type, no_of_images_per_each_dress_wear, color ='blue',
        width = 0.4)

#plt.xlabel("Dress Type")
plt.ylabel("Number of images")
plt.title("Images scraped for each type of wear")
plt.show()
```



1000
0
Top wear
Bottom wear

Examples for Topwear and Bottomwear

1. Topwear

In [10]:

```
img = cv.imread('Desktop/Selfcase_study2_image_dataset/Men_casual_shirts/mcs2img.png')
plt.imshow(cv.cvtColor(img, cv.COLOR_BGR2RGB))
```

Out[10]:

```
<matplotlib.image.AxesImage at 0x2655277a080>
```

1. Bottomwear

In [11]:

```
img = cv.imread('Desktop/Selfcase_study2_image_dataset/Men_casual_trousers/mct2img.png')
plt.imshow(cv.cvtColor(img, cv.COLOR_BGR2RGB))
```

Out[11]:

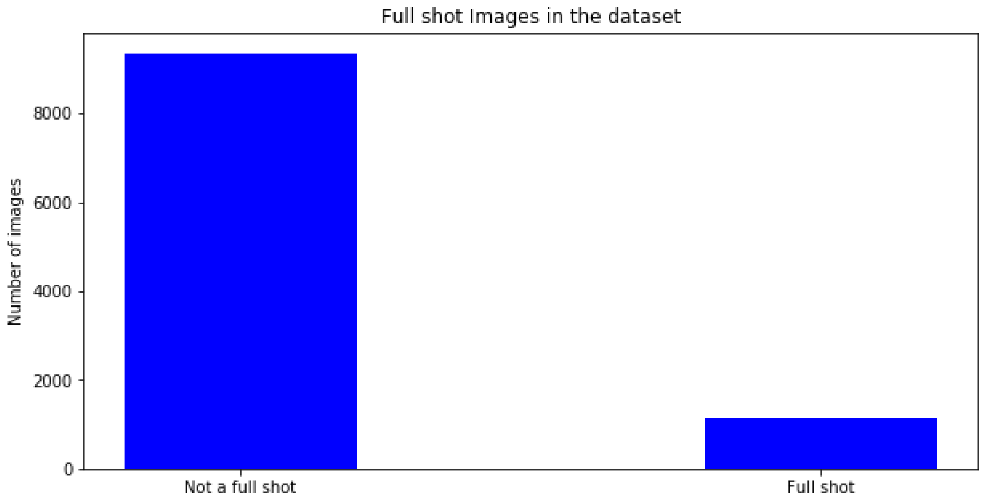
```
<matplotlib.image.AxesImage at 0x265524058d0>
```

Let us check number of fullshot images and non-fullshot images in the dataset

In [12]:

```
import numpy as np
import matplotlib.pyplot as plt
```

```
no_of_images_per_each_shot_type = list(final_df['Full shot/Not a full shot'].value_counts().values
)
shot_type = list(final_df['Full shot/Not a full shot'].unique())

fig = plt.figure(figsize = (10, 5))

# creating the bar plot
plt.bar(shot_type, no_of_images_per_each_shot_type, color ='blue',
        width = 0.4)

#plt.xlabel("Dress Type")
plt.ylabel("Number of images")
plt.title("Full shot Images in the dataset")
plt.show()
```

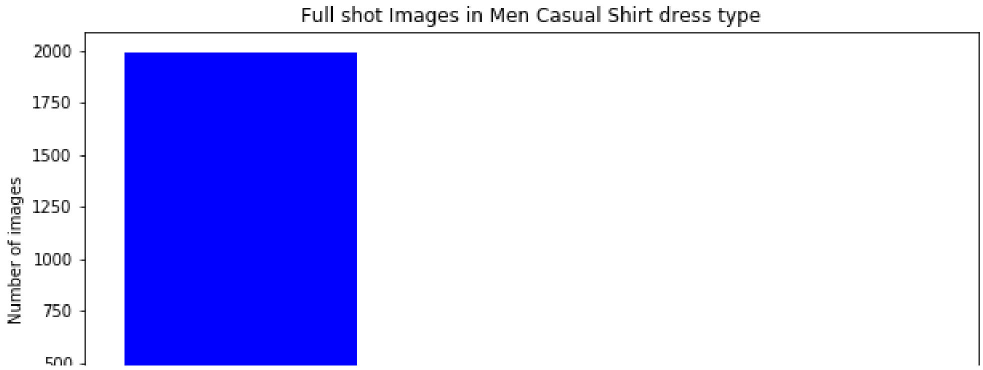


Let us check number of fullshot images and non-fullshot images for each dress type

1. Men Casual shirt

In [279]:

```
#Plotting number of fullshot images and non-fullshot images for dataset having Dress Type='Men Cas
ual shirt'
no_of_images_per_each_shot_type=list(final_df.loc[final_df['Dress Type']=='Men Casual Shirt']
['Full shot/Not a full shot']\
                                .value_counts().values)
shot_type = list(final_df.loc[final_df['Dress Type']=='Men Casual Shirt']['Full shot/Not a full sh
ot'].unique())

fig = plt.figure(figsize = (10, 5))

# creating the bar plot
plt.bar(shot_type, no_of_images_per_each_shot_type, color ='blue',
        width = 0.4)

#plt.xlabel("Dress Type")
plt.ylabel("Number of images")
plt.title("Full shot Images in Men Casual Shirt dress type")
plt.show()
```



300
250
0
Not a full shot
Full shot

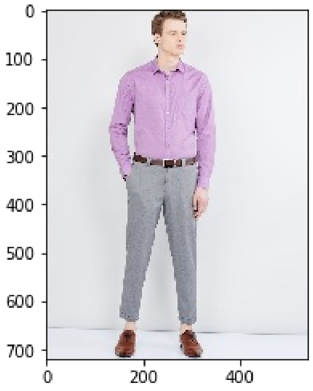
Example of Full shot image in men casual shirt dress type

In [13]:

```
img = cv.imread('Desktop/Selfcase_study2_image_dataset/Men_casual_shirts/mcs23img.png')
plt.imshow(cv.cvtColor(img, cv.COLOR_BGR2RGB))
```

Out[13]:

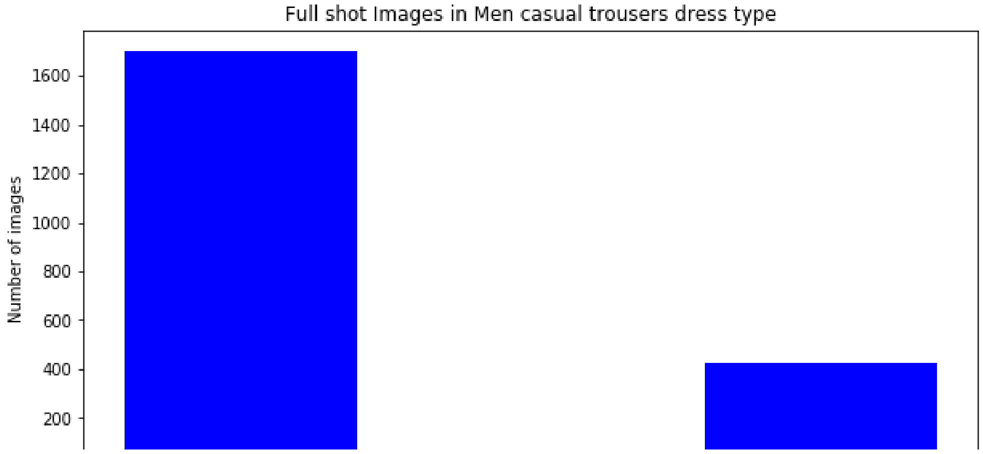
```
<matplotlib.image.AxesImage at 0x265524b0ef0>
```



1. Men casual trousers

In [283]:

```
#Plotting number of fullshot images and non-fullshot images for dataset having Dress Type='Men cas
ual trousers'
no_of_images_per_each_shot_type= list(final_df.loc[final_df['Dress Type']=='Men casual trousers']\
                                      ['Full shot/Not a full shot'].value_counts().values)
shot_type = list(final_df.loc[final_df['Dress Type']=='Men casual trousers']['Full shot/Not a full
shot'].unique())

fig = plt.figure(figsize = (10, 5))

# creating the bar plot
plt.bar(shot_type, no_of_images_per_each_shot_type, color ='blue',
        width = 0.4)

#plt.xlabel("Dress Type")
plt.ylabel("Number of images")
plt.title("Full shot Images in Men casual trousers dress type")
plt.show()
```



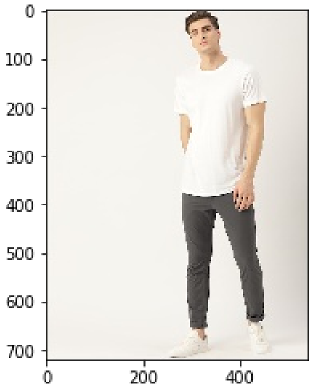
Example of Full shot image in men casual trouser dress type

In [14]:

```
img = cv.imread('Desktop/Selfcase_study2_image_dataset/Men_casual_trousers/mct3img.png')
plt.imshow(cv.cvtColor(img, cv.COLOR_BGR2RGB))
```

Out[14]:

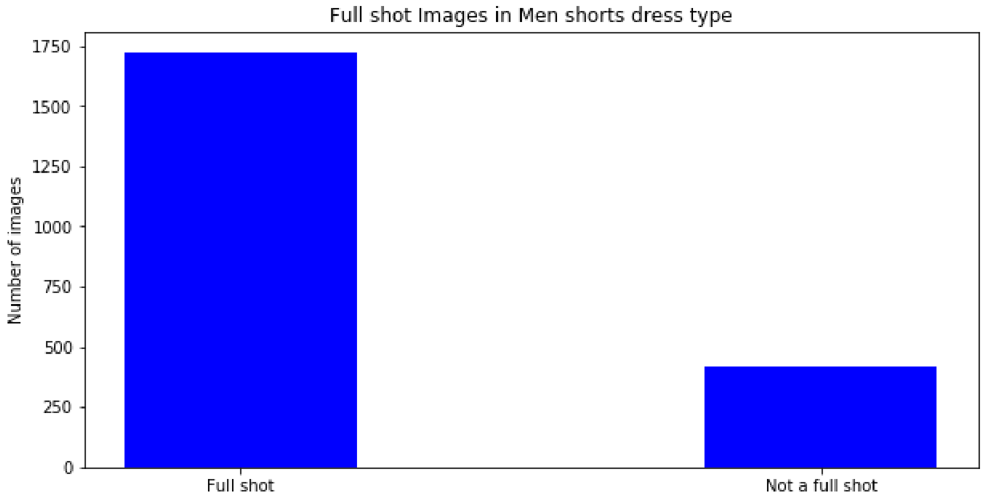
```
<matplotlib.image.AxesImage at 0x26552906780>
```



1. Men shorts

In [284]:

```
#Plotting number of fullshot images and non-fullshot images for dataset having Dress Type='Men shorts'
no_of_images_per_each_shot_type= list(final_df.loc[final_df['Dress Type']=='Men shorts']\
                                      ['Full shot/Not a full shot'].value_counts().values)
shot_type = list(final_df.loc[final_df['Dress Type']=='Men shorts']['Full shot/Not a full shot'].unique())

fig = plt.figure(figsize = (10, 5))

# creating the bar plot
plt.bar(shot_type, no_of_images_per_each_shot_type, color ='blue',
        width = 0.4)

#plt.xlabel("Dress Type")
plt.ylabel("Number of images")
plt.title("Full shot Images in Men shorts dress type")
plt.show()
```



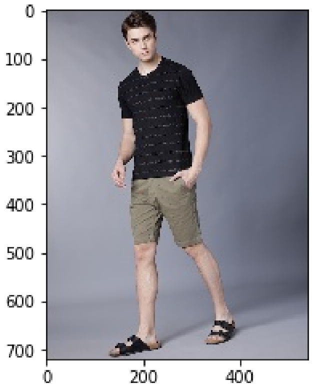
Example of Full shot image in men short dress type

In [19]:

```
img = cv.imread('Desktop/Selfcase_study2_image_dataset/Men_shorts/ms0img.png')
plt.imshow(cv.cvtColor(img, cv.COLOR_BGR2RGB))
```

Out[19]:

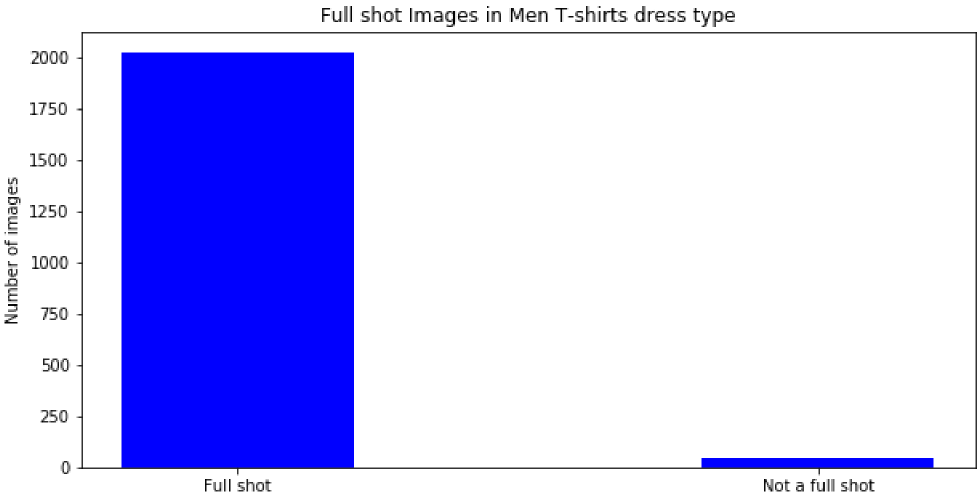
```
<matplotlib.image.AxesImage at 0x265528cff28>
```



1. Men T-shirts

In [285]:

```
#Plotting number of fullshot images and non-fullshot images for dataset having Dress Type='Men T-s
hirts'
no_of_images_per_each_shot_type= list(final_df.loc[final_df['Dress Type']=='Men T-shirts']\
                                              ['Full shot/Not a full shot'].value_counts().values)
shot_type = list(final_df.loc[final_df['Dress Type']=='Men T-shirts']['Full shot/Not a full shot']
.unique())

fig = plt.figure(figsize = (10, 5))

# creating the bar plot
plt.bar(shot_type, no_of_images_per_each_shot_type, color ='blue',
        width = 0.4)

#plt.xlabel("Dress Type")
plt.ylabel("Number of images")
plt.title("Full shot Images in Men T-shirts dress type")
plt.show()
```



Example of Full shot image in men T-shirt dress type

In [22]:

```
img = cv.imread('Desktop/Selfcase_study2_image_dataset/Men_T_shirts/mTs0img.png')
plt.imshow(cv.cvtColor(img, cv.COLOR_BGR2RGB))
```

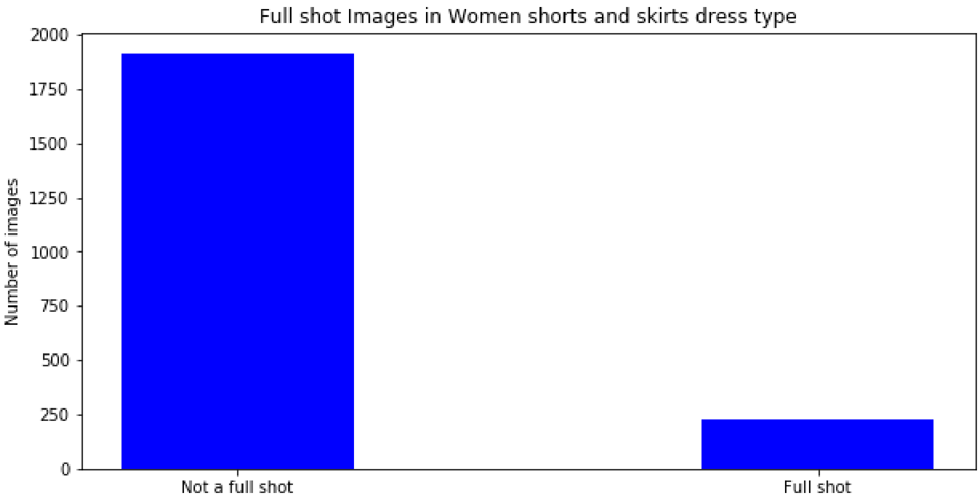
Out[22]:

```
<matplotlib.image.AxesImage at 0x26552ed9160>
```

1. Women shorts and skirts

In [286]:

```
#Plotting number of fullshot images and non-fullshot images for dataset having Dress Type='Women s
horts and skirts'
no_of_images_per_each_shot_type= list(final_df.loc[final_df['Dress Type']=='Women shorts and
skirts']\
                                       ['Full shot/Not a full shot'].value_counts().values)
shot_type = list(final_df.loc[final_df['Dress Type']=='Women shorts and skirts']['Full shot/Not a
full shot'].unique())

fig = plt.figure(figsize = (10, 5))

# creating the bar plot
plt.bar(shot_type, no_of_images_per_each_shot_type, color ='blue',
        width = 0.4)

#plt.xlabel("Dress Type")
plt.ylabel("Number of images")
plt.title("Full shot Images in Women shorts and skirts dress type")
plt.show()
```



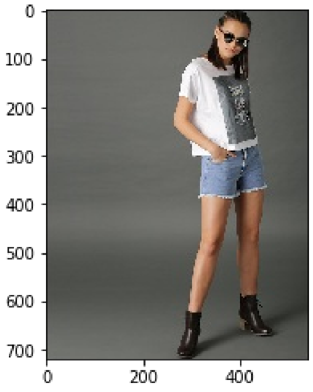
Example of Full shot image in women shorts and skirts dress type

In [27]:

```
img = cv.imread('Desktop/Selfcase_study2_image_dataset/Women_shorts_and_skirts/wss3img.png')
plt.imshow(cv.cvtColor(img, cv.COLOR_BGR2RGB))
```

Out[27]:

```
<matplotlib.image.AxesImage at 0x2655348fbe0>
```



3. Simple pose estimation using opencv for detecting full shot images in the dataset

key points and joints assignment

In [4]:

```
#https://github.com/opencv/opencv/blob/master/samples/dnn/openpose.py
import cv2 as cv
import matplotlib.pyplot as plt

net=cv.dnn.readNetFromTensorflow('graph_opt.pb')

inWidth = 368
inHeight = 368
thr = 0.2

BODY_PARTS = { "Nose": 0, "Neck": 1, "RShoulder": 2, "RElbow": 3, "RWrist": 4,
               "LShoulder": 5, "LElbow": 6, "LWrist": 7, "RHip": 8, "RKnee": 9,
               "RAnkle": 10, "LHip": 11, "LKnee": 12, "LAnkle": 13, "REye": 14,
               "LEye": 15, "REar": 16, "LEar": 17, "Background": 18 }

POSE_PAIRS = [ ["Neck", "RShoulder"], ["Neck", "LShoulder"], ["RShoulder", "RElbow"],
               ["RElbow", "RWrist"], ["LShoulder", "LElbow"], ["LElbow", "LWrist"],
               ["Neck", "RHip"], ["RHip", "RKnee"], ["RKnee", "RAnkle"], ["Neck", "LHip"],
               ["LHip", "LKnee"], ["LKnee", "LAnkle"], ["Neck", "Nose"], ["Nose", "REye"],
               ["REye", "REar"], ["Nose", "LEye"], ["LEye", "LEar"] ]
```

Initially a full shot image is taken for experiment

In [29]:

```
img = cv.imread('Desktop/Selfcase_study2_image_dataset/Men_casual_shirts/mcs15img.png')
plt.imshow(cv.cvtColor(img, cv.COLOR_BGR2RGB))
```

Out[29]:

```
<matplotlib.image.AxesImage at 0x265534f0898>
```

Function that finds the keypoints and returns initial image with keypoints and joints

In [30]:

```
#https://github.com/opencv/opencv/blob/master/samples/dnn/openpose.py
def pose_estimation(frame):
    frameWidth = frame.shape[1]
    frameHeight = frame.shape[0]

    net.setInput(cv.dnn.blobFromImage(frame, 1.0, (inWidth, inHeight), (127.5, 127.5, 127.5), swapR
B=True, crop=False))
    out = net.forward()
    out = out[:, :19, :, :]  # MobileNet output [1, 57, -1, -1], we only need the first 19
elements

    assert(len(BODY_PARTS) == out.shape[1])

    points = []
    for i in range(len(BODY_PARTS)):
        # Slice heatmap of corresponging body's part.
        heatMap = out[0, i, :, :]

        # Originally, we try to find all the local maximums. To simplify a sample
        # we just find a global one. However only a single pose at the same time
        # could be detected this way.
        _, conf, _, point = cv.minMaxLoc(heatMap)
        x = (frameWidth * point[0]) / out.shape[3]
        y = (frameHeight * point[1]) / out.shape[2]
        # Add a point if it's confidence is higher than threshold.
        points.append((int(x), int(y)) if conf > thr else None)

    for pair in POSE_PAIRS:
        partFrom = pair[0]
        partTo = pair[1]
        assert(partFrom in BODY_PARTS)
        assert(partTo in BODY_PARTS)

        idFrom = BODY_PARTS[partFrom]
        idTo = BODY_PARTS[partTo]

        if points[idFrom] and points[idTo]:
            cv.line(frame, points[idFrom], points[idTo], (0, 255, 0), 3)
            cv.ellipse(frame, points[idFrom], (3, 3), 0, 0, 360, (0, 0, 255), cv.FILLED)
            cv.ellipse(frame, points[idTo], (3, 3), 0, 0, 360, (0, 0, 255), cv.FILLED)

    t, _ = net.getPerfProfile()
    freq = cv.getTickFrequency() / 1000
    cv.putText(frame, '%.2fms' % (t / freq), (10, 20), cv.FONT_HERSHEY_SIMPLEX, 0.5, (0, 0, 0))
    return frame,points
```

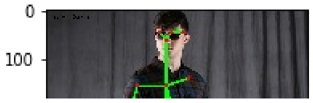
Key points and joint on the initial image

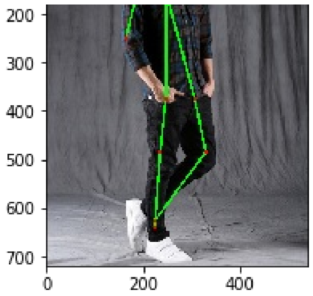
In [31]:

```
estimated_image,points = pose_estimation(img)
plt.imshow(cv.cvtColor(estimated_image, cv.COLOR_BGR2RGB))
```

Out[31]:

```
<matplotlib.image.AxesImage at 0x2655355b3c8>
```





Using simple pose estimation seperating full shot images from the dataset

In [32]:

```
from tqdm import tqdm

full_shot_imagepaths=[]
for i in tqdm(final_df['File Paths']):
      img=cv.imread(i)
      estimated_image,points = pose_estimation(img)
      if points[9]!=None and points[12]!=None and points[10]!=None and points[13]!=None and points[
14]!=None and points[15]!=None:
          full_shot_imagepaths.append(i)
```

```
100%|████████████████████████████████████████████████████████████████████████████| 10483/10483
[1:06:22<00:00,  2.63it/s]
```

In [43]:

```
len(full_shot_imagepaths)
```

Out[43]:

```
1143
```

Out of 1143 images that are predicted as full shot images 1136 are the actual full shot images.

Shifting all the predicted full shot images to a specific folder in the system

In [44]:

```
import shutil, os
files = full_shot_imagepaths
for f in tqdm(files):
    shutil.copy(f, 'Desktop/Selfcase_study2_image_dataset/Full_shot_images_predicted')
```

```
100%|███████████████████████████████████████████████████████████████████████████████| 1143/1143
[00:01<00:00, 978.09it/s]
```

Bounding boxes on the full shot images to recognize different dress types(using yolo_v3)

In [10]:

```
import cv2 as cv
import numpy as np

#Load YOLO
net = cv.dnn.readNet("Downloads/yolov3_custom_7000.weights","Downloads/yolov3_custom.cfg")
classes = []
with open("Downloads/classes.names","r") as f:
    classes = [line.strip() for line in f.readlines()]
```

In [11]:

```
layer_names = net.getLayerNames()
```

```
outputlayers = [layer_names[i[0] - 1] for i in net.getUnconnectedOutLayers()]
colors= np.random.uniform(0,255,size=(len(classes),3))
```

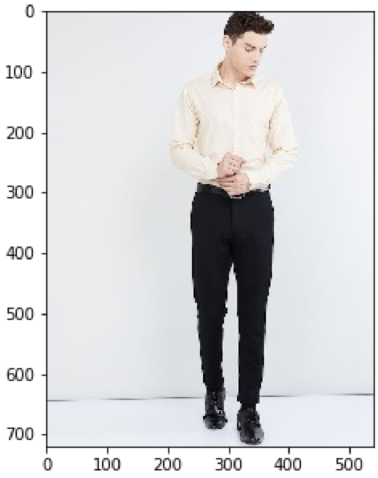
Initial full shot images with out any bounding boxes

In [12]:

```
import matplotlib.pyplot as plt

#loading image
img = cv.imread("Desktop/Selfcase_study2_image_dataset/Full_shot_images_actual/mcs114img.png")
img = cv.resize(img,None,fx=1,fy=1)
height,width,channels = img.shape
plt.figure(figsize=(10, 5))
plt.imshow(cv.cvtColor(img, cv.COLOR_BGR2RGB))
```

Out[12]:

```
<matplotlib.image.AxesImage at 0x25c31139630>
```

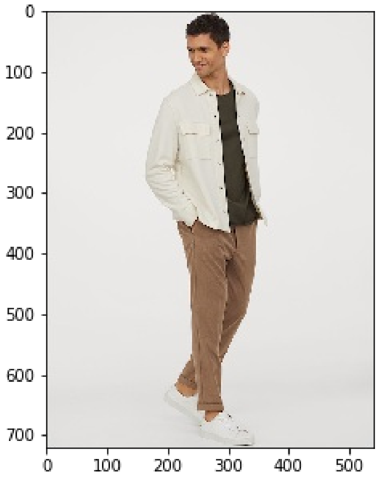


In [13]:

```
#loading image
img = cv.imread("Desktop/Selfcase_study2_image_dataset/Full_shot_images_actual/mct1067img.png")
img = cv.resize(img,None,fx=1,fy=1)
height,width,channels = img.shape
plt.figure(figsize=(10, 5))
plt.imshow(cv.cvtColor(img, cv.COLOR_BGR2RGB))
```

Out[13]:

```
<matplotlib.image.AxesImage at 0x25c31540550>
```



In [14]:

```
img = cv.imread("Desktop/Selfcase_study2_image_dataset/Full_shot_images_actual/ms7img.png")
img = cv.resize(img,None,fx=1,fy=1)
height,width,channels = img.shape
plt.figure(figsize=(10, 5))
plt.imshow(cv.cvtColor(img, cv.COLOR_BGR2RGB))
```

Out[14]:

```
<matplotlib.image.AxesImage at 0x25c31442128>
```

In [15]:

```
img = cv.imread("Desktop/Selfcase_study2_image_dataset/Full_shot_images_actual/mTs621img.png")
img = cv.resize(img,None,fx=1,fy=1)
height,width,channels = img.shape
plt.figure(figsize=(10, 5))
plt.imshow(cv.cvtColor(img, cv.COLOR_BGR2RGB))
```

Out[15]:

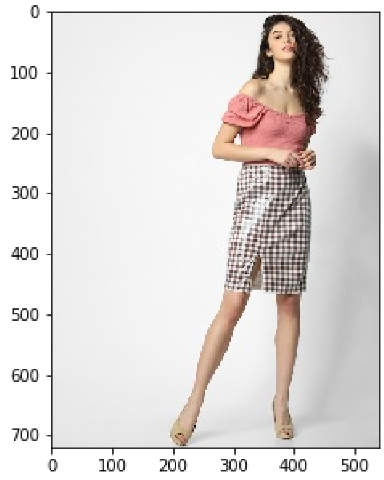
```
<matplotlib.image.AxesImage at 0x25c31498cc0>
```

In [22]:

```
img = cv.imread("Desktop/Selfcase_study2_image_dataset/Full_shot_images_actual/wss23img.png")
img = cv.resize(img,None,fx=1,fy=1)
height,width,channels = img.shape
plt.figure(figsize=(10, 5))
plt.imshow(cv.cvtColor(img, cv.COLOR_BGR2RGB))
```

Out[22]:

```
<matplotlib.image.AxesImage at 0x25c3136ec50>
```



In [16]:

```
#Creating bounding box function
#https://medium.com/analytics-vidhya/object-detection-with-opencv-python-using-yolov3-481f02c6aa35
from tqdm import tqdm

def yolo_v3_boundingbox(img):

    #detecting objects
    blob = cv.dnn.blobFromImage(img,.00392,(416,416),(0,0,0),swapRB = True,crop=False)

    net.setInput(blob)
    outs = net.forward(outputlayers)
    #print(outs[1])


    #Showing info on screen/ get confidence score of algorithm in detecting an object in blob
    class_ids=[]
    confidences=[]
    boxes=[]
    for out in tqdm(outs):
        for detection in out:
            scores = detection[5:]
            class_id = np.argmax(scores)
            confidence = scores[class_id]
            if confidence > 0.5:
            #object detected
               center_x= int(detection[0]*width)
               center_y= int(detection[1]*height)
               w = int(detection[2]*width)
               h = int(detection[3]*height)

               #cv2.circle(img,(center_x,center_y),10,(0,255,0),2)
               #rectangle co-ordinaters
               x=int(center_x - w/2)
               y=int(center_y - h/2)
               #cv2.rectangle(img,(x,y),(x+w,y+h),(0,255,0),2)

               boxes.append([x,y,w,h]) #put all rectangle areas
               confidences.append(float(confidence)) #how confidence was that object detected and s
how that percentage
               class_ids.append(class_id) #name of the object tha was detected

    indexes = cv.dnn.NMSBoxes(boxes,confidences,0.4,0.6)

    img1=[]
    font = cv.FONT_HERSHEY_PLAIN
    for i in tqdm(range(len(boxes))):
        if i in indexes:
           x,y,w,h = boxes[i]
           label = str(classes[class_ids[i]])
           color = colors[i]
           img1.append(img[y:y+h,x:x+w])
           cv.rectangle(img,(x,y),(x+w,y+h),color,2)

           cv.putText(img,label,(x,y+30),font,2,(255,0,0),3)
    return img,img1
```

Full shot images after applying yolo_v3

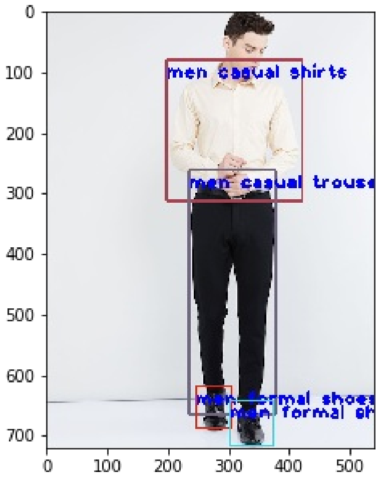
In [32]:

```
import matplotlib.pyplot as plt

final_img,img_parts=yolo_v3_boundingbox(img)
plt.figure(figsize=(10, 5))
plt.imshow(cv.cvtColor(final_img, cv.COLOR_BGR2RGB))
```

```
100%|██████████████████████████████████████████████████████████████████████| 3/3 [00
:00<00:00, 69.19it/s]
100%|████████████████████████████████████████████████████████████████████| 4/4
[00:00<00:00, 4116.10it/s]
```

Out[32]:

```
<matplotlib.image.AxesImage at 0x1ab17044390>
```



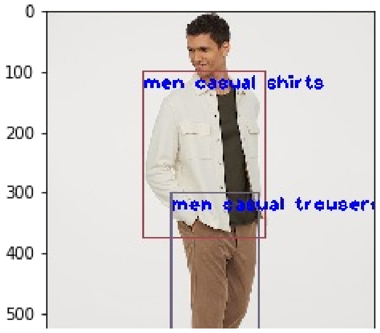
In [35]:

```
import matplotlib.pyplot as plt

final_img,img_parts=yolo_v3_boundingbox(img)
plt.figure(figsize=(10, 5))
plt.imshow(cv.cvtColor(final_img, cv.COLOR_BGR2RGB))
```

```
100%|██████████████████████████████████████████████████████████████████████| 3/3 [00
:00<00:00, 28.88it/s]
100%|████████████████████████████████████████████████████████████████████| 4/4
[00:00<00:00, 4002.20it/s]
```

Out[35]:

```
<matplotlib.image.AxesImage at 0x1ab169a5da0>
```



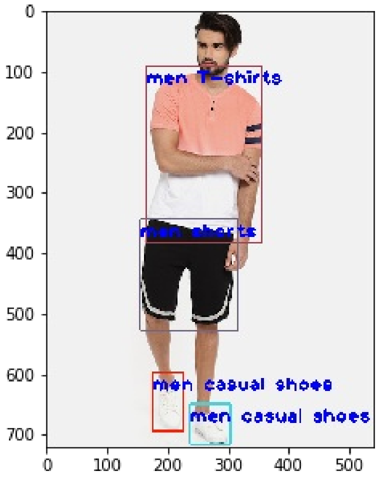
In [45]:

```
import matplotlib.pyplot as plt

final_img,img_parts=yolo_v3_boundingbox(img)
plt.figure(figsize=(10, 5))
plt.imshow(cv.cvtColor(final_img, cv.COLOR_BGR2RGB))
```

```
100%|████████████████████████████████████████████████████████████████████████████████████| 3/3 [00
:00<00:00, 73.17it/s]
100%|████████████████████████████████████████████████████████████████████████████████████████████|
4/4 [00:00<?, ?it/s]
```

Out[45]:

```
<matplotlib.image.AxesImage at 0x1ab174565f8>
```



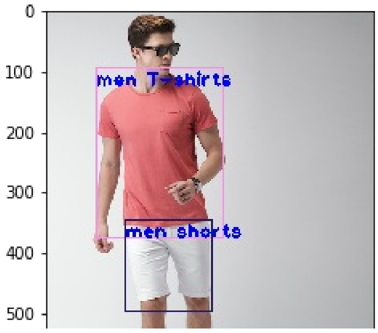
In [17]:

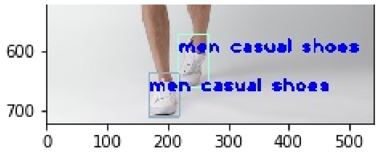
```
import matplotlib.pyplot as plt

final_img,img_parts=yolo_v3_boundingbox(img)
plt.figure(figsize=(10, 5))
plt.imshow(cv.cvtColor(final_img, cv.COLOR_BGR2RGB))
```

```
100%|████████████████████████████████████████████████████████████████████████████████████| 3/3 [00
:00<00:00, 63.83it/s]
100%|███████████████████████████████████████████████████████████████████████████████████| 4/4 [00:
00<00:00, 499.99it/s]
```

Out[17]:

```
<matplotlib.image.AxesImage at 0x25c31582748>
```





In [18]:

```
cv.imwrite('full_img1.jpg',final_img)
```

Out[18]:

```
True
```

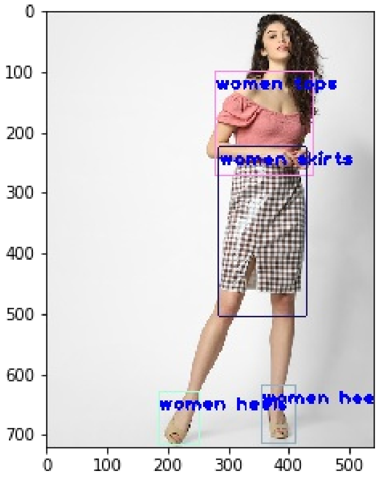
In [23]:

```
import matplotlib.pyplot as plt

final_img,img_parts=yolo_v3_boundingbox(img)
plt.figure(figsize=(10, 5))
plt.imshow(cv.cvtColor(final_img, cv.COLOR_BGR2RGB))
```

```
100%|██████████████████████████████████████████████████| 3/3 [00
:00<00:00, 63.96it/s]
100%|█████████████████████████████████████████████████| 4/4
[00:00<00:00, 1997.53it/s]
```

Out[23]:

```
<matplotlib.image.AxesImage at 0x25c313d3828>
```



In [24]:

```
cv.imwrite('full_img2.jpg',final_img)
```

Out[24]:

```
True
```

In [20]:

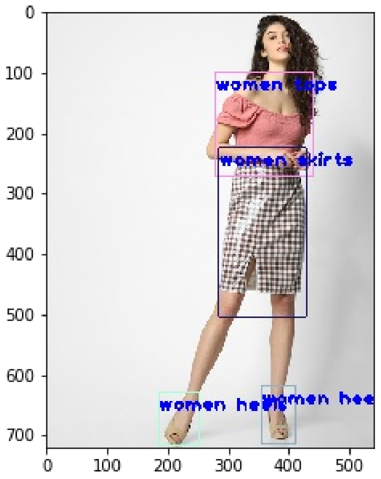
```
import matplotlib.pyplot as plt

final_img,img_parts=yolo_v3_boundingbox(img)
plt.figure(figsize=(10, 5))
plt.imshow(cv.cvtColor(final_img, cv.COLOR_BGR2RGB))
```

```
100%|██████████████████████████████████████████████████| 3/3 [00
:00<00:00, 75.00it/s]
100%|███████████████████████████████████████████████████████|
4/4 [00:00<?, ?it/s]
```

```
1/1 [00:00<?, ?it/s]
```

Out[20]:

```
<matplotlib.image.AxesImage at 0x25c316a9198>
```



In [100]:

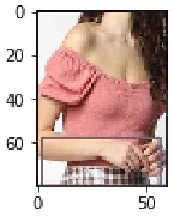
```
img_parts_1=img_parts[0]
img_parts_2=img_parts[1]
img_parts_3=img_parts[3]
```

In [101]:

```
resized1 = cv.resize(img_parts_1, (60,80), interpolation = cv.INTER_CUBIC)
plt.figure(figsize=(6, 2))
plt.imshow(cv.cvtColor(resized1, cv.COLOR_BGR2RGB))
```

Out[101]:

```
<matplotlib.image.AxesImage at 0x1ab1c3de8d0>
```

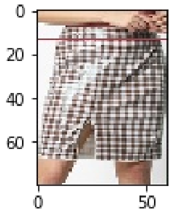


In [102]:

```
resized2 = cv.resize(img_parts_2, (60,80), interpolation = cv.INTER_CUBIC)
plt.figure(figsize=(6, 2))
plt.imshow(cv.cvtColor(resized2, cv.COLOR_BGR2RGB))
```

Out[102]:

```
<matplotlib.image.AxesImage at 0x1ab1ad57ac8>
```

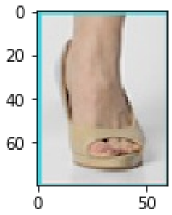


In [103]:

```
resized3 = cv.resize(img_parts_3, (60,80), interpolation = cv.INTER_CUBIC)
plt.figure(figsize=(6, 2))
plt.imshow(cv.cvtColor(resized3, cv.COLOR_BGR2RGB))
```

Out[103]:

```
<matplotlib.image.AxesImage at 0x1ab1ada8cc0>
```



In [104]:

```
#cv.imwrite('main_img.jpg',final_img)
cv.imwrite('img_part13.jpg', resized1)
cv.imwrite('img_part14.jpg', resized2)
cv.imwrite('img_part15.jpg', resized3)
```

Out[104]:

```
True
```