UTKFace dataset dataset link

About dataset :

UTKFace dataset is a large-scale face dataset with long age span (range from 0 to 116 years old). The dataset consists of over 20,000 face images with annotations of age, gender, and ethnicity.

The images cover large variation in pose, facial expression, illumination, occlusion, resolution, etc.

This dataset could be used on a variety of tasks, e.g., face detection, age estimation, age progression/regression, landmark localization, etc.

Labels:

The labels of each face image is embedded in the file name, formated like [age]_[gender]_[race]_[date&time].jpg

[age] is an integer from 0 to 116, indicating the age.

[gender] is either 0 (male) or 1 (female).

[race] is an integer from 0 to 4, denoting White, Black, Asian, Indian, and Others (like Hispanic, Latino, Middle Eastern.

[date&time] is in the format of yyyymmddHHMMSSFFF, showing the date and time an image was collected to UTKFace.

Implementation details :

We used two algorithms K-Means and Logistic Regression

Pre-Processing :

Extracts features by HOG algorithm , And reading age, gender, and race in lists, Compile a list of age, gender, race and photo features in Dataset.

We got 2190 features per each image , but we sum all this features in one new feature called features

Save this dataset into file .csv

Then normalize dataset by Min-Max Normalization algorithm.

Split data into features and target

features **:** age , race and image

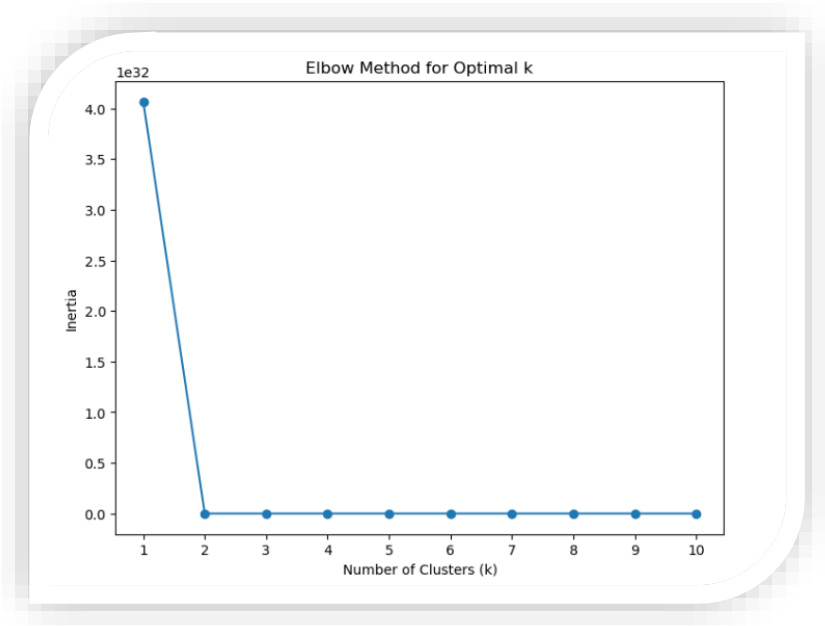
target : gender

And split dataset into 20% test and 80% train by train_test_slpit algoritm.

A)K-Means :

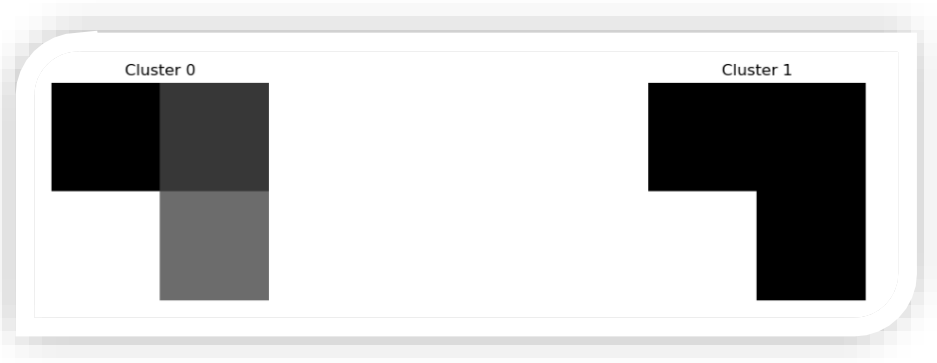
Goal : Classify humans into Male and Female (0 or 1)

Explain Code : select K randomly and loop from 2 to 11 , in each iteration save inertia in lest after end loop compare all inertias and plot Elbow to select right K.



Result:

-The Inertia: 15865.289326214694



-The silhouette score is: 0.9999067077152719
-Visualize the cluster :

B)Logistic Regression :

Goal : Detect Gender

Explain Code: We don't need to sum image features , we used dataset with all image features

Result :

Train Score : 0.8796616685890042

Test Score : 0.7741935483870968

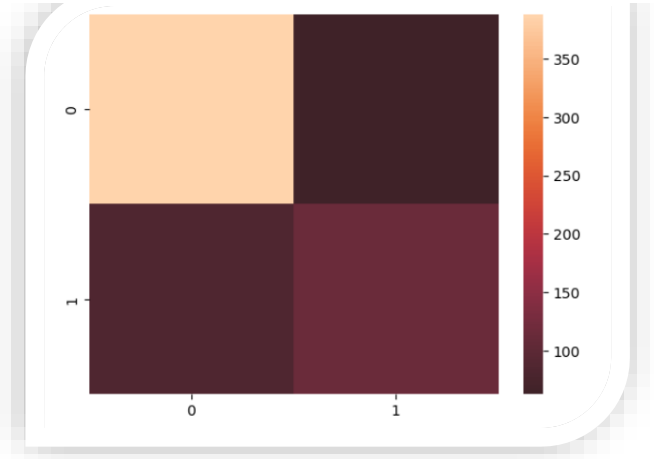
Classes is : [0 1]

Iterations is : [100]

Intercept is : [-4.80416957]

Confusion Matrix :

[[388 63]
[84 116]]



Accuracy Score : 504

F1 Score is : 0.7741935483870968

Recall Score is : 0.7741935483870968

Precision Score is : 0.7741935483870968

Precision Recall Score is : (0.7741935483870968, 0.7741935483870968, 0.7741935483870968, None)

Precision Value is : [0.30721966 0.64804469 1.]

Recall Value is : [1. 0.58 0.]

Thresholds Value is : [0 1]

AUC Value : 0.7201552106430156

fpr Value : [0. 0.13968958 1.]

tpr Value : [0. 0.58 1.]

thresholds Value : [inf 1. 0.]

ROCAUC Score : 0.7201552106430156

Zero One Loss Value : 147