

Facial Attribute Classification

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Dataset

- Celeb A Dataset
- 200,000 images of people's faces
- Centered and aligned



Visualizing the Data

- 202599 images, 40 attributes

```
202599
5_o_Clock_Shadow Arched_Eyebrows Attractive Bags_Under_Eyes Bald Bangs Big_Lips Big_Nose Black_Hair Blond_Hair Blurry Brown_Hair
Bushy_Eyebrows Chubby Double_Chin Eyeglasses Goatee Gray_Hair Heavy_Makeup High_Cheekbones Male Mouth_Slightly_Open Mustache Narrow_Eyes
No_Beard Oval_Face Pale_Skin Pointy_Nose Receding_Hairline Rosy_Cheeks Sideburns Smiling Straight_Hair Wavy_Hair Wearing_Earrings
Wearing_Hat Wearing_Lipstick Wearing_Necklace Wearing_Necktie Young
000001.jpg -1 1 1 -1 -1 -1 -1 -1 -1 -1 1 -1 -1 -1 -1 -1 1 1 -1 1 -1 -1 -1 1 1 -1 1 -1 1 -1 -1 1
000002.jpg -1 -1 -1 1 -1 -1 -1 1 -1 -1 -1 1 -1 -1 -1 -1 -1 1 -1 1 -1 -1 1 -1 -1 -1 1 -1 -1 -1 -1 -1 1
000003.jpg -1 -1 -1 -1 -1 -1 1 -1 -1 -1 1 -1 -1 -1 -1 -1 -1 -1 1 -1 -1 1 1 -1 -1 1 -1 -1 -1 -1 -1 1
000004.jpg -1 -1 1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 1 -1 -1 1 -1 -1 -1 1 1 -1 1
000005.jpg -1 1 1 -1 -1 -1 1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 1 -1 -1 -1 1 1 -1 -1 1 -1 -1 -1 -1 -1 1
000006.jpg -1 1 1 -1 -1 -1 1 -1 -1 -1 -1 1 -1 -1 -1 -1 -1 1 -1 -1 1 -1 -1 1 -1 -1 -1 -1 -1 1 1 -1 1
000007.jpg 1 -1 1 1 -1 -1 1 1 1 -1 -1 -1 1 -1 -1 -1 -1 -1 -1 1 -1 -1 1 -1 -1 -1 -1 1 -1 -1 -1 -1 1
000008.jpg 1 1 -1 1 -1 -1 1 -1 1 -1 -1 -1 -1 -1 -1 -1 -1 1 -1 -1 -1 1 -1 -1 -1 -1 -1 -1 -1 -1 -1 1
000009.jpg -1 1 1 -1 -1 1 1 -1 -1 -1 -1 -1 -1 -1 -1 -1 1 1 -1 1 -1 -1 1 -1 1 -1 -1 1 -1 -1 -1 1
000010.jpg -1 -1 1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 1 1 -1 -1 -1 -1 1 -1 -1 -1 -1 -1 -1 1 -1 -1 1
```

Visualizing our Data - Continued

- Not Attractive

038089.jpg



182916.jpg



191408.jpg



063326.jpg



042655.jpg



- Attractive

000006.jpg



000007.jpg



000008.jpg



000009.jpg



000010.jpg



Preparing Our Data

- Generator Object

Model Performance

- CNN model architecture

Model: "sequential"

| Layer (type) | Output Shape | Param # |
|--------------------------------|---------------------|---------|
| conv2d (Conv2D) | (None, 62, 62, 32) | 896 |
| max_pooling2d (MaxPooling2D) | (None, 31, 31, 32) | 0 |
| conv2d_1 (Conv2D) | (None, 29, 29, 64) | 18496 |
| max_pooling2d_1 (MaxPooling2D) | (None, 14, 14, 64) | 0 |
| conv2d_2 (Conv2D) | (None, 12, 12, 128) | 73856 |
| max_pooling2d_2 (MaxPooling2D) | (None, 6, 6, 128) | 0 |
| flatten (Flatten) | (None, 4608) | 0 |
| dense (Dense) | (None, 128) | 589952 |
| dense_1 (Dense) | (None, 1) | 129 |

=====
Total params: 683,329
Trainable params: 683,329
Non-trainable params: 0

Accuracy of our model

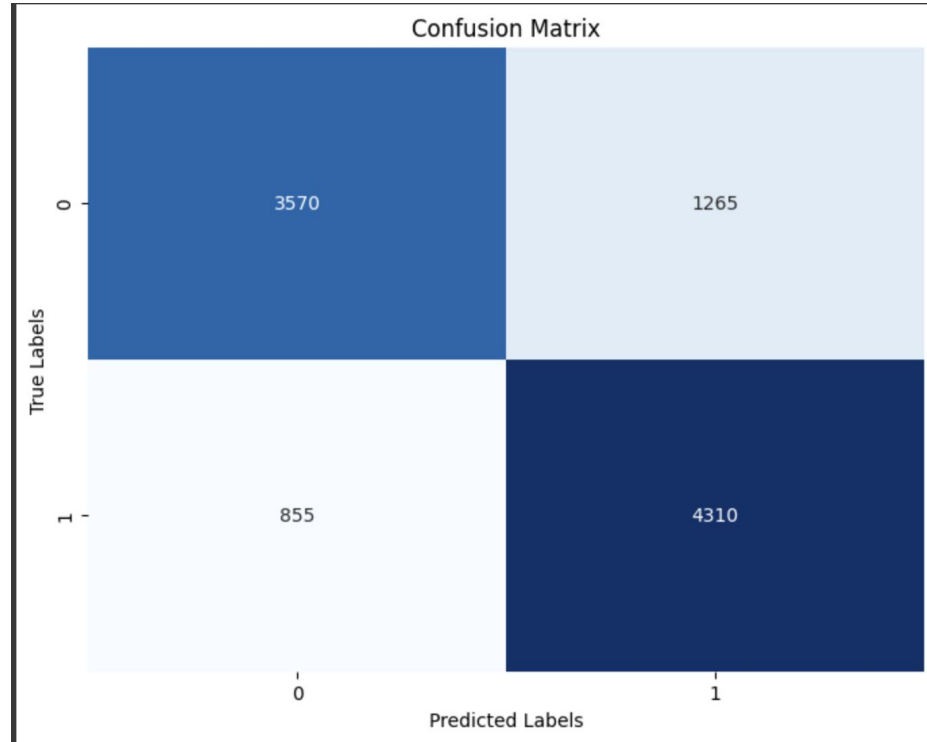
Using Generator object

```
Epoch 1/3  
20259/20259 [=====] - 292s 14ms/step - loss: 0.4810 - accuracy: 0.7645 - val_loss: 0.4491 - val_accuracy: 0.7809  
Epoch 2/3  
20259/20259 [=====] - 279s 14ms/step - loss: 0.4458 - accuracy: 0.7869 - val_loss: 0.4417 - val_accuracy: 0.7873  
Epoch 3/3  
20259/20259 [=====] - 279s 14ms/step - loss: 0.4343 - accuracy: 0.7936 - val_loss: 0.4346 - val_accuracy: 0.7892
```

Using Reduced Dataset

```
Epoch 8/10  
1000/1000 [=====] - 5s 5ms/step - loss: 0.3328 - accuracy: 0.8432 - val_loss: 0.4697 - val_accuracy: 0.7839  
Epoch 9/10  
1000/1000 [=====] - 5s 5ms/step - loss: 0.3157 - accuracy: 0.8509 - val_loss: 0.5059 - val_accuracy: 0.7814  
Epoch 10/10  
1000/1000 [=====] - 5s 5ms/step - loss: 0.2966 - accuracy: 0.8633 - val_loss: 0.5329 - val_accuracy: 0.7750
```

Evaluation/Results



Extensions

- Trying other models good at face recognition (e.g VGG Face)
- Adding other facial attributes (facial hair, makeup, glasses...)