



UNIVERSITÀ DEGLI STUDI DI PADOVA

Gender and age estimation through interaction with
Pepper robot

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Co-supervisor: Gloria Beraldo

07/04/2023

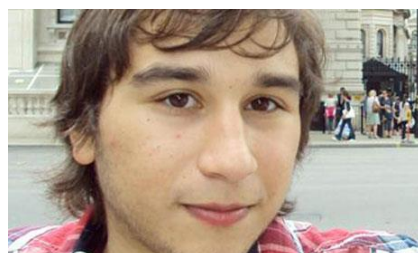
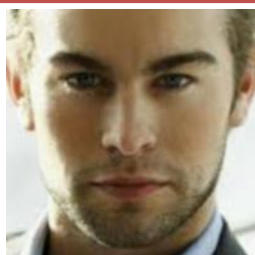
DIPARTIMENTO
DI INGEGNERIA
DELL'INFORMAZIONE

INTELLIGENT AUTONOMOUS SYSTEMS LAB



INPUT DATASET

Test input



JoJoGAN



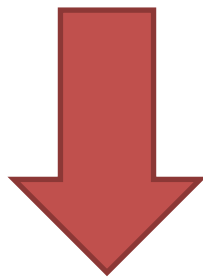
Style references



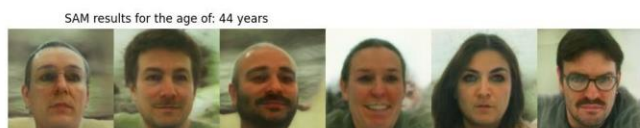
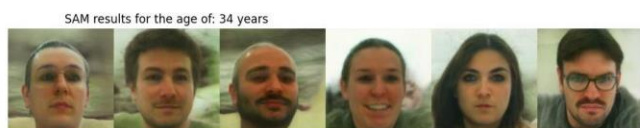
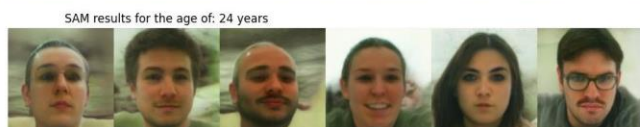
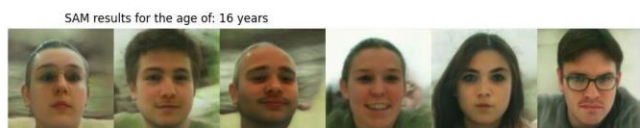
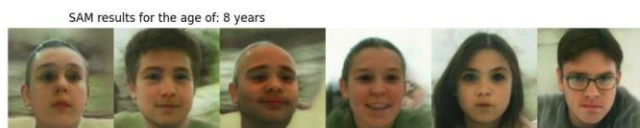
Pepper's camera style

UTKFace Align&Crop or UTKFace into-the-wild

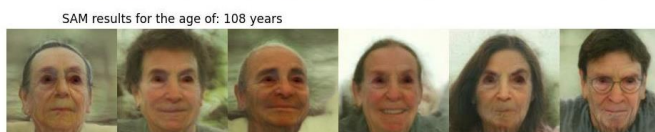
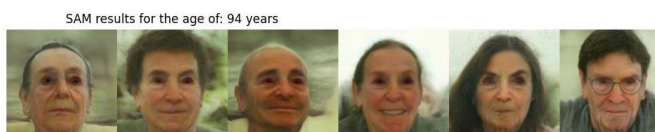
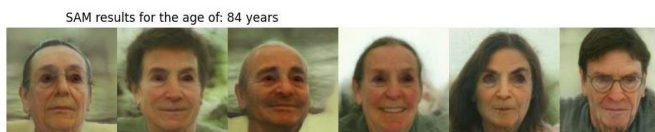
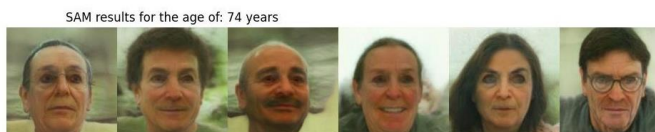
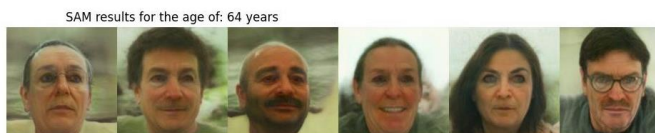
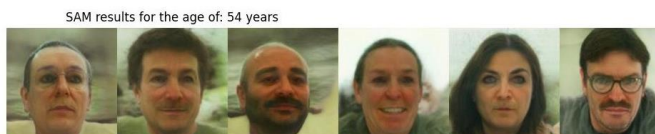
Photos from Pepper's camera are only from people between 20 and 30 years old.



Style-based Age Manipulation (SAM)

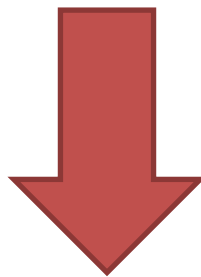


- Pretrained on FFHQ dataset
- Image size 1024x1024 or 256x256



Age groups	Age intervals (years)
0	0-2
1	3-12
2	13-19
3	20-29
4	30-39
5	40-49
6	50-59
7	60-69
8	70-79
9	80-89
10	90-99
11	Over 100

How many images to keep from SAM and how many from the originals for the **style references**?



Testing: 1-shot, 5-shots and 6-shots



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Some results

1-shot

IAS-LAB



100_0_0_20170112213500903.jpg.chip.jpg

Group: 11, config: 0



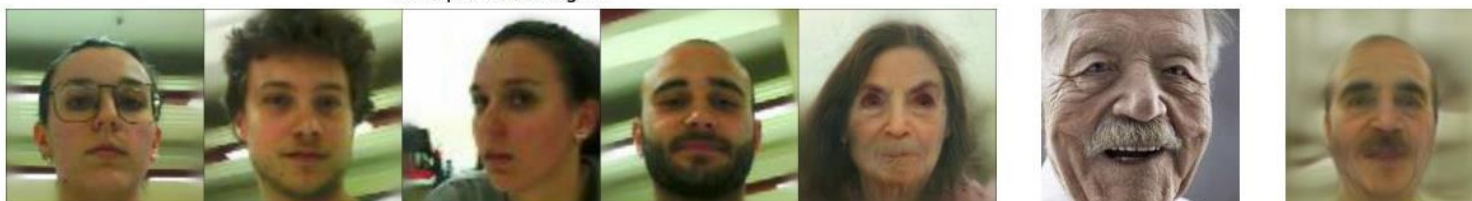
Group: 11, config: 1



Group: 11, config: 2



Group: 11, config: 3



100_0_0_20170112213500903.jpg.chip.jpg

Group: 11, config: 0



Group: 11, config: 1



Group: 11, config: 2



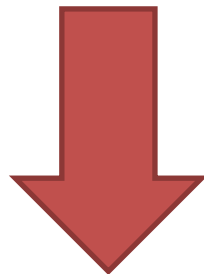
Group: 11, config: 3



Group: 11, config: 4



Which dataset to use for **test input**?



UTKFace Align&Crop vs UTKFace into-the-wild



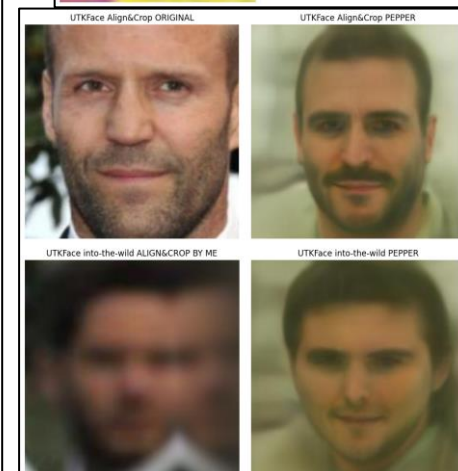
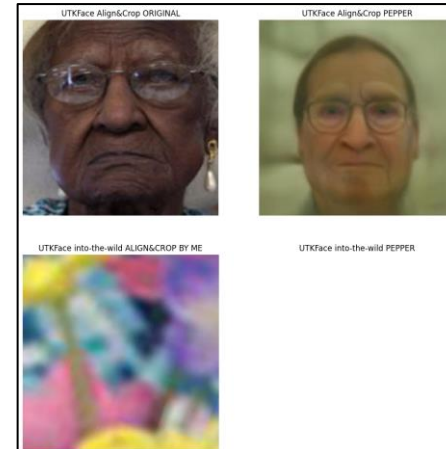
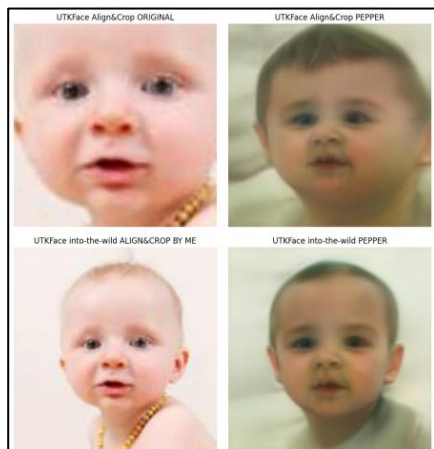
UTKFace Align&Crop vs UTKFace into-the-wild

Already aligned but with a different algorithm than JoJoGAN

Can be align with the same algorithm of JoJoGAN

Recognizes multiple ethnicities

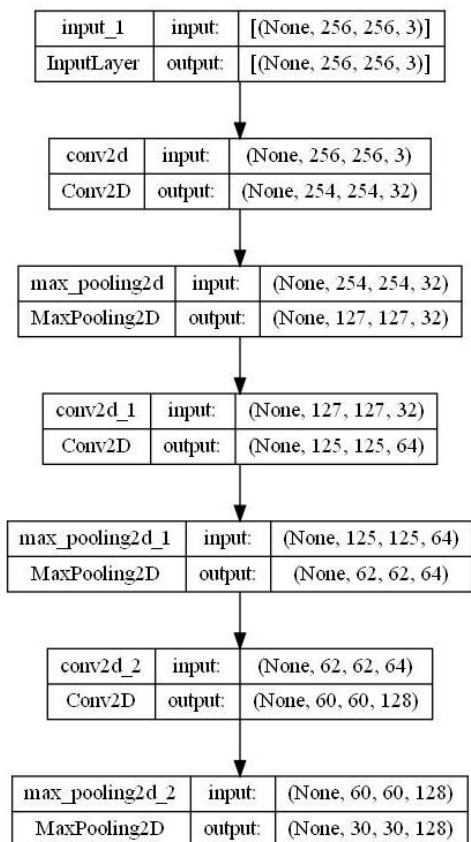
Lost some faces based on their ethnicity



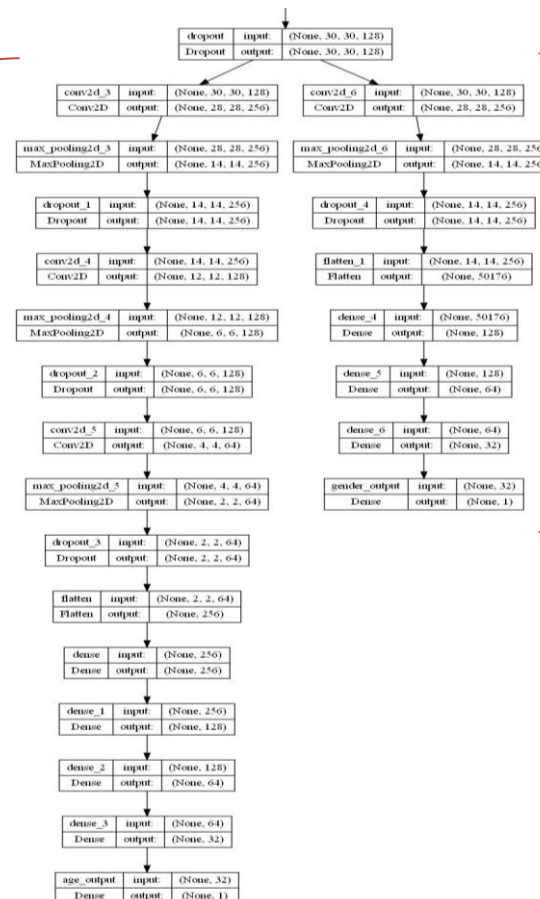
PREDICTION MODEL

CNN

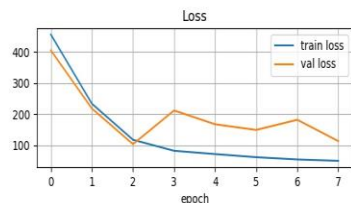
BASE



AGE



GENDER

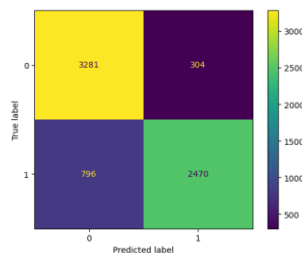
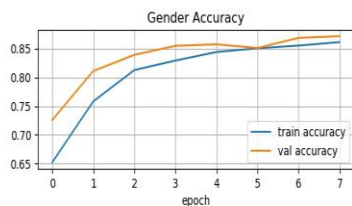
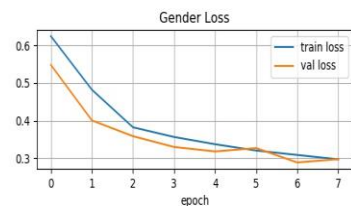
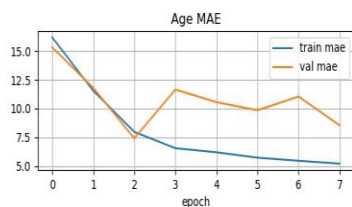
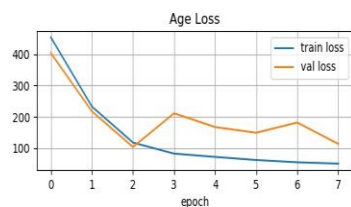


Precision on gender: 0.89

Precision on age: 0.97

Recall on gender: 0.75

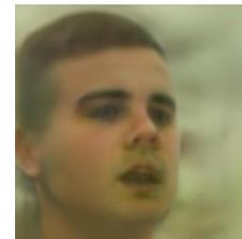
Recall on age: 0.92



Actual: Male, 50
Pred: Male, [32]



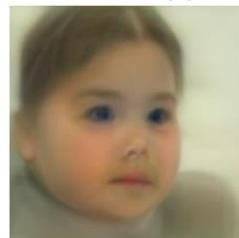
Actual: Male, 26
Pred: Male, [23]



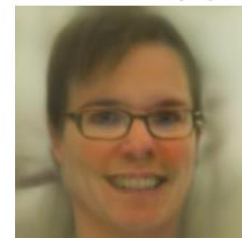
Actual: Female, 2
Pred: Male, [3]



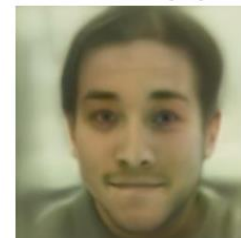
Actual: Female, 3
Pred: Male, [4]



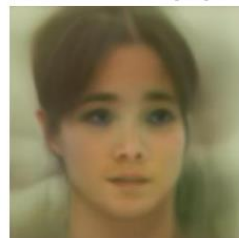
Actual: Female, 50
Pred: Female, [56]



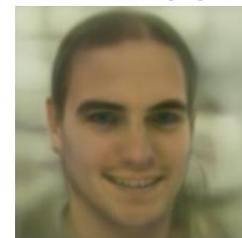
Actual: Male, 26
Pred: Male, [22]



Actual: Female, 23
Pred: Female, [17]

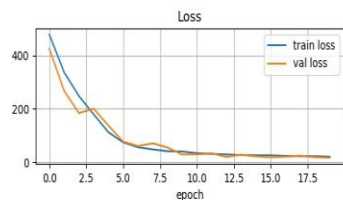


Actual: Male, 25
Pred: Male, [15]



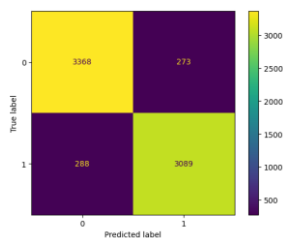
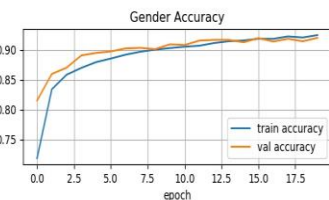
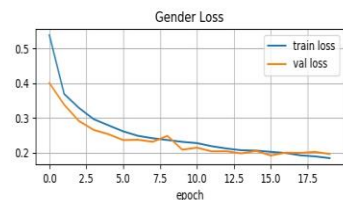
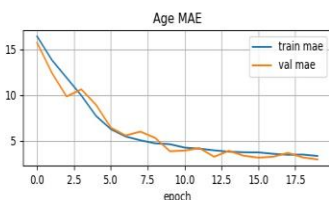
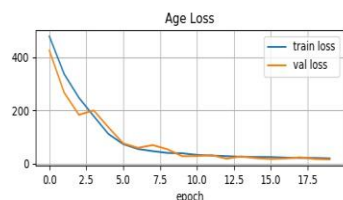
Actual: Female, 3
Pred: Male, [4]





Precision on gender: 0.92
Precision on age: 0.97

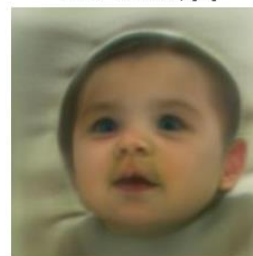
Recall on gender: 0.91
Recall on age: 0.97



Actual: Male, 65
Pred: Male, [68]



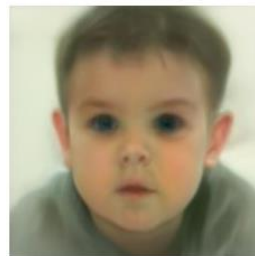
Actual: Male, 1
Pred: Female, [2]



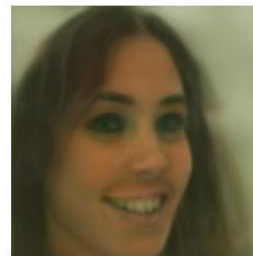
Actual: Male, 45
Pred: Male, [50]



Actual: Male, 4
Pred: Male, [3]



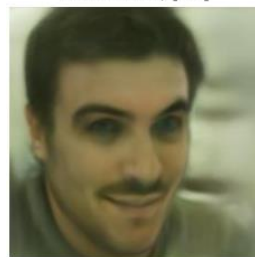
Actual: Female, 26
Pred: Female, [25]



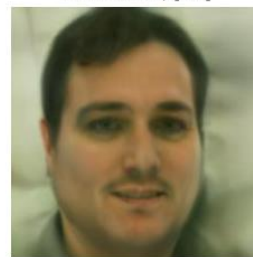
Actual: Female, 26
Pred: Female, [26]



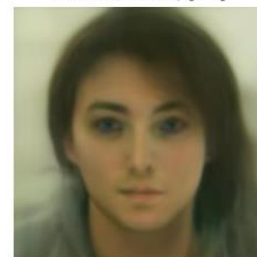
Actual: Male, 35
Pred: Male, [29]

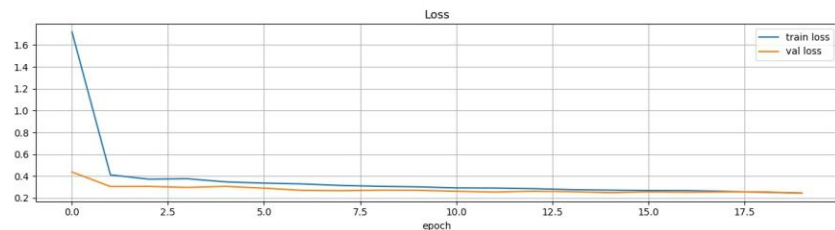


Actual: Male, 34
Pred: Male, [37]



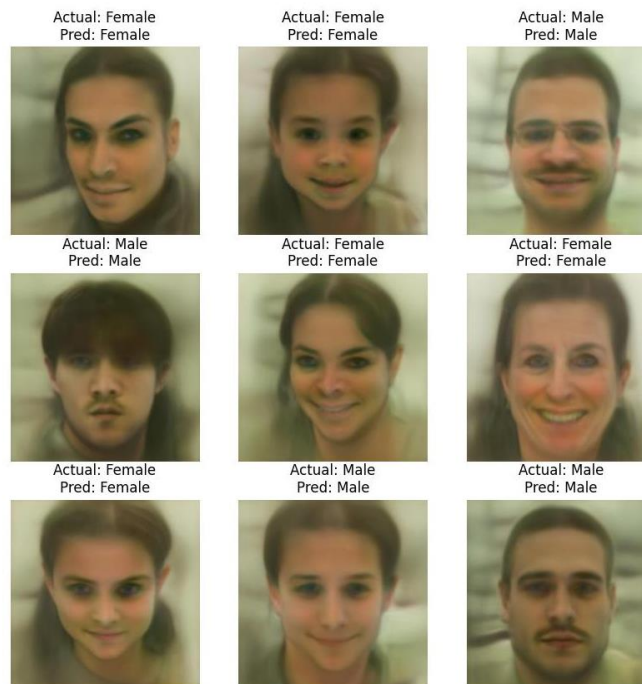
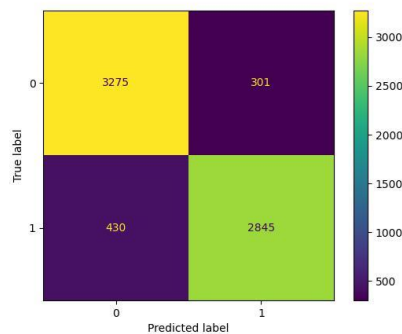
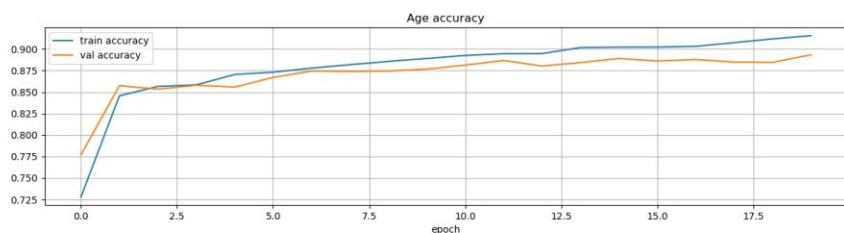
Actual: Female, 24
Pred: Female, [25]

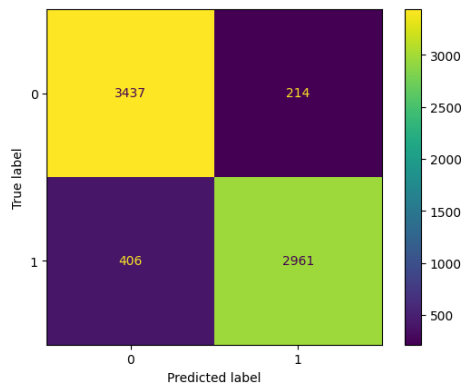
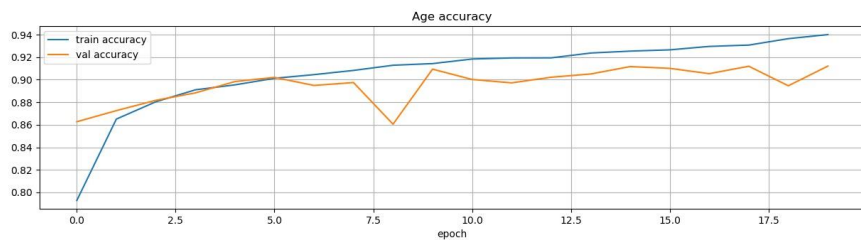
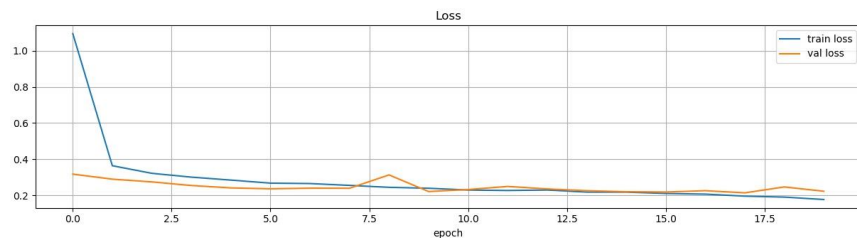




Precision: 0.90
Recall: 0.87

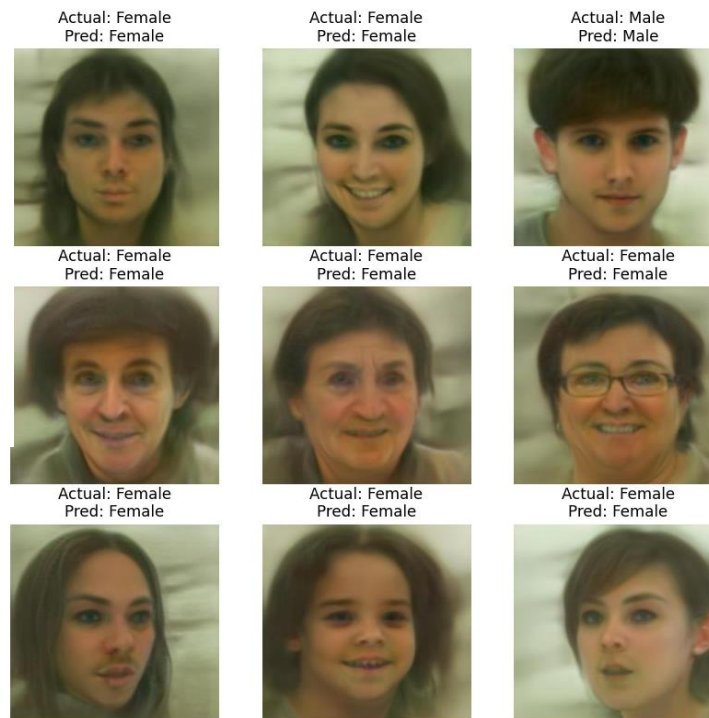
0: male
1: female

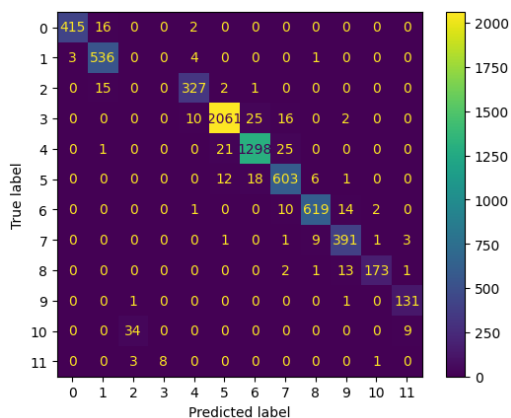
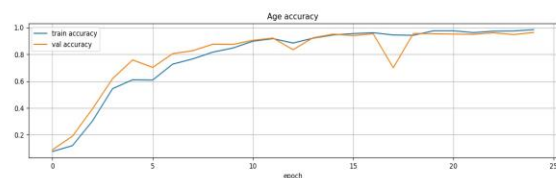
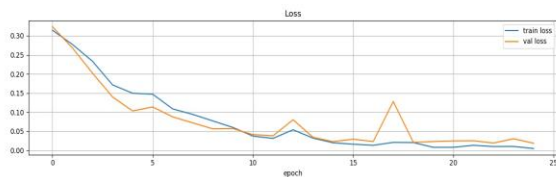




Precision: 0.93
Recall: 0.88

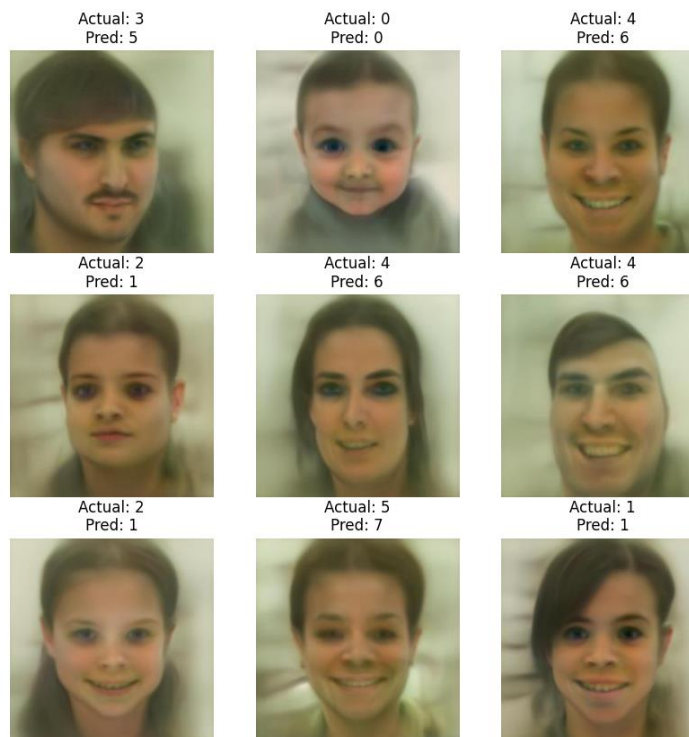
0: male
1: female



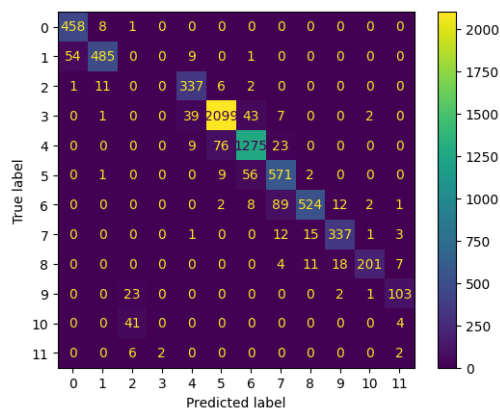
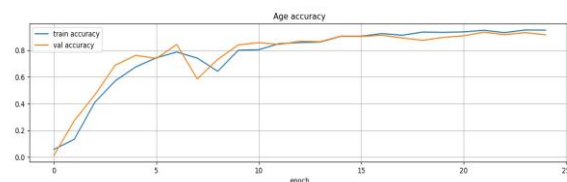
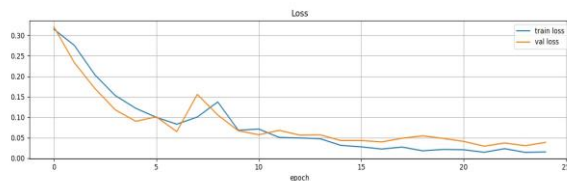


Precision: 0.99

Recall: 0.99



Age groups	Age intervals (years)
0	0-2
1	3-12
2	13-19
3	20-29
4	30-39
5	40-49
6	50-59
7	60-69
8	70-79
9	80-89
10	90-99
11	Over 100



Precision: 0.99

Recall: 0.99

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