

## Final Project for CSE 402

**Description:** Celebrity Face dataset is a publicly available dataset for face recognition. It consists of 17 classes (celebrities), each of which has 100 face images. **Data** are available on D2L/Assessments/Final Project. In this final project, we will develop approaches and evaluate their performance on this dataset.

**Due:** Dec. 9, 2025, 11:59PM

**Note:** This is a team project. Team members can work on the code together but need to submit their own report. Each person in the team needs to submit the code, and their own report. Please read the **grading policy** on the second page carefully.

### Code (three components should be in the code)

1. **Data preparation:** please split the data into 10 folds. Each fold should have 10 face images of one identity. Train your model on 9 folds (9 folds \* 10 images \* 17 classes= 1530 images) and test on 1 fold (1 fold \* 10 images \* 17 classes=170 images). Repeat this process until all the folds have been tested. This is called leave-one-out cross-validation (LOOCV) and gives us an overall face recognition accuracy of this dataset.

2. **Face recognition models (choose one of the 2 options)**

**Option 1:** Use pre-trained models. Example:

Step 1: install torchvision using the below command:

*pip install torch torchvision*

Step 2: Import models from torchvision:

*import torchvision.models as models*

*alexnet = models.alexnet(pretrained=True)*

There might be some other models but they might not be optimized for face recognition so you may want to seek methods to improve the performance.

**Option 2:** Develop your own models utilizing all possible resources on the Internet.

3. **Evaluation:** Then report the average recognition accuracy using LOOCV scheme. Draw a confusion matrix.

### Report (please include the following components in the report)

1. Clearly state everyone's contributions in your team, not only your own contribution. 1 point out of 10 will be deducted if this part is missing on your report.
2. Please describe your model **in detail** and what schemes you have tried to improve the performance.
3. Report the face recognition accuracy using LOOCV scheme on the Celebrity dataset.
4. Draw a confusion matrix, and discuss who's faces can be easily confused with others.
5. Submit your report as LASTNAME\_FIRSTNAME.pdf

### Bonus (5 points per team)

We will give bonus to the top-3 performing teams. Each team will receive 5 points as a bonus. Each person will receive a bonus of 5 points/#members in the team.

**Grading policy (10 totals)**

1. Data preparation in the code, 1 point
2. Face recognition models, 2 points
3. LOOCV evaluation scheme, 0.5 point
4. Confusion matrix, 0.5 point
5. Describe everyone's contribution in the report, 1 point
6. Detailed description of face recognition model, 2 points
7. Schemes for improving the performance, 0.5 point
8. Face recognition accuracy using LOOCV, 0.5 point
9. Confusion matrix, 0.5 point
10. Discussion about the results, 0.5 point
11. Report readability, 1 point

We will randomly pick code from teams and evaluate on our side. If we cannot repeat the reported results or not even close (small performance variations are normal and acceptable), then we may consider this as an act of academic dishonesty and give the project a score of 0.