Facial Recognition Challenge

Preamble

Today in this information era, data is secured by passwords, encryption keys, fingerprints and many other modes. The human face plays an important role in our social interaction and in conveying people's identity. Biometric face recognition technology has received significant attention in the past several years due to its potential for applications in both law enforcement and non-law enforcement agencies.

As compared with other biometrics systems using fingerprint, palm print and iris, face recognition has distinct advantages because of its non-contact process. Images can be captured from a distance without touching the person and face can be extracted from that image. The identification does not require interacting with the person. In addition, recognized face images can be recorded and archival can later help to identify the person(s).

Problem Statement:
Given a data set consisting of facial images and their sketches, retrieve all images (real and sketches) which are *similar* to the given test image.

Figure of merit
Maximal accuracy in retrieval of all 14 images of the subject from the dataset.

Dataset collection:

- Each individual has to capture his/her face photograph using camera phones (Mug shots).
- There will be a total of seven (7) expressions you need to capture, which are as follows:
    - Neutral
    - Happy
    - Sad
    - Surprise
    - Fear
    - Disgust
    - Anger
- Now after capturing these expressions, you need to convert all these seven files in to sketch files. So there will; a total of 14 images (7 normal RGB images + 7 Sketch images).

Image saving format and dataset annotation:

- The most important part of the process is file name saving format and dataset annotation.

- You need to save the filename of images in this given manner:
  - For RGB images: Enrollmentnumber_Male/Female_Expression_RGB.png
    - i.e: 1641002_Male_Anger_RGB.png
    - i.e: 1844004_Female_Disgust_RGB.png
  - For Sketch images: Enrollmentnumber_Male/Female_Expression_Sketch.png
    - i.e: 1641002_Male_Anger_Sketch.png
    - i.e: 1844004_FeMale_Disgust_Sketch.png

- You need to save the dataset annotation in .CSV file in a given manner, I have also attached the sample file .csv format:

File Name	Enrollment Number	Gender	Expressions	Image type
1641002_Male_Anger_RGB.png	1641002	Male	Anger	RGB
1844004_Female_Disgust_RGB.png	1844004	Female	Disgust	RGB
1641002_Male_Anger_Sketch.png	1641002	Male	Anger	Sketch
1844004_Female_Disgust_Sketch.png	1844004	Female	Disgust	Sketch

Dataset Submission

1. You have to upload the images and annotation csv file in google drive folder created by the class representative or a volunteer.
2. Now you must take care for the submission, you need to create your respective folder based on enrolment number and then have to submit images and annotation file. There will be a total of 14 images and their respective annotation.
3. You need to submit the images and annotations files by 31st March 2020 at 11.59 PM.

Team Formation

- Team size: 4 students
- Student may form group on their own with following constraints
- No groups should have all members with same gender.
- Each team member must clearly identify their contribution to the project.
- It is advisable to choose team members with complementary skills

Time Line 24/03/2020 – 15/05/2020 (8 Weeks)

Week	Activity
1	Group formation, Clear role identification of each group member, Data base collection
2	Literature review, existing body of work and identification of the approach for implementation
3	Initial implementations and results, Midsemester documentation initialisation
4	**Mid semester Review** 2 page mid semester report submission in following 2 Column IEEE format Title, Authors, Abstract, Key words, Introduction, Literature survey, Implementation, Results, Conclusions, Reference (IEEE Style) **Demonstrations** **Group wise presentations:** 10 Mins. per group. **It is mandatory for all members to participate in the presentation.** The presentation can have at most ten slides in following flow - Title Slide with Name of students and IDs (1 slide) - Introduction (1 slide) - Problem Statement (1 slide) - Existing body of work (1 slide) - Your Approach (2/3 slides) - Initial Results (2/3 slides) - Role of each group member in the project - Future work (1 slide) - References (1 slide)
5	Refinement of the proposed approach, comparison and improvement over the existing body of work. Final documentation initialisation. Final iterations over the implemented solution
6	
7	**Report submission** 4 page end semester report submission in following 2 Column IEEE format Title, Authors, Abstract, Key words, Introduction, Literature survey, Implementation, Results, Conclusions, Reference (IEEE Style)
8	**Demonstrations** **Group wise presentations:** 15 Mins. per group. **It is mandatory for all members to participate in the presentation.** The presentation can have at most 15 slides in following flow 1. Title Slide with Name of students and IDs (1 slide) 2. Introduction (1 slide) 3. Problem Statement (1 slide) 4. GANTT chart showing the project progress 5. Existing body of work (2 slide) 6. Your Approach (2/3 slides) 7. Final Results (4/5 slides) 8. Conclusions (1 slide)

	9. Role of each group member in the project References (1 slide)

References

https://en.wikipedia.org/wiki/Facial_recognition_system

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Xu, Yong & Li, Zhengming & Yang, Jian & Zhang, David. (2017). A Survey of Dictionary Learning Algorithms for Face Recognition. IEEE Access. PP. 1-1. 10.1109/ACCESS.2017.2695239.
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Wang, Hongjun, Jiani Hu, and Weihong Deng. "Face Feature Extraction: A Complete Review." IEEE Access 6 (2018): 6001-6039.

Chellappa, Rama, Charles L. Wilson, and Saad Sirohey. "Human and machine recognition of faces: A survey." *Proceedings of the IEEE* 83, no. 5 (1995): 705-741.