FCML project

Generalities:

The problem is to implement a face recognition module based on a deep network with illustration of functionality on an embedded device:

- Take a CNN. The architecture is at your choice, but since it is expected to work on an embedded device, it should be a compact one such as MobileNet v2/v3, etc
- You can either train it by yourself on very large database or you can take an already trained network (**recommended**). Training is not important, as long as the resulting network is properly trained
    - Already trained networks can be found here:
        - www.dlib.net
        - https://github.com/timesler/facenet-pytorch
        - Etc.
- The project is concentrated on testing. The testing should be on the embedded device (mobile phone, Raspberry Pi, etc.)
    - Porting a pytorch or TensorFLow model on a mobilephone is rather hard.
    - Most often used solution is porting on an emulator of Raspberry Pi

- Each student is assigned to a country. He/she should select five personalities from that country (political leaders, artists, etc) with 7+2=9 portrait images for each. That is a total of 35+10 = 45 images.
- The 5x7=35 images are the reference, while the 5x2 = 10 image are for testing
- For each of the 10 images from testing, the application should return 3 from the 35 images given in the reference set to which is the closest
- "Closest" is based on a distance (upon your choice) and the description is provided by the trained CNN
- Face detection !

- The project should contain
    - working solution demonstrated as such
    - **Short** report (max 2 pag):
        - Problem statement,
        - Database: country, personality chosen, 35+10 images showed
        - The result for each of the 10 images
        - concluding comment
        - The report should be sent to corneliu.florea@upb.ro before actual presentation

Comments

You should make some choices:

- To train or not to train. If you choose to train, you have to make sure that you have access to a capable computer. As mentioned, the recommendation is to used a pre-trained network (i.e. not to train) but this is not mandatory. If you choose to train, make sure that you have a proper database; good examples are: VGGFace, CASIA-2, … anything with at least 250.000 face images
- Which library for deep learning should be used. Here, please have in mind that the project should go on an embedded device. Pytorch and Tensorflow are most common choices
- which embedded device

Other aspects:

- If you choose an already trained network, find on which database was trained, take a look to the images such that the images selected by you will look similar
- Pay attention to the face detection issue
- Preliminary bibliography:
  - Any material available online
  - convolutional neural network http://www.master-taid.ro/Cursuri/MLAV_files/07_08_MLAV_ConvNets_CF.pdf
  - for face recognition: http://master-taid.ro/Cursuri/IVOM_curs/ivom_FaceRecogn_2019.pdf slides 32- 80 (NB the information from these presentations will be reconsidered for second module on FCML and posted as soon as possible on Moodle)

Grading (guidelines):

- no report or the solution does not work : project = 0 pct
- Penalties:
  - the report is too short -10%
  - The project works on PC but not on embedded – -40%

Nr	**Country**	**Student**		**Grade**
1	Bulgaria	ANDREI	Andreea-Ioana	
2	Greece	APOSTOL	Tudor-Matei	
3	Turkey	BACÎREA	Elena-Lorena	
4	China	BAICU	Cosmin-Alexandru	
5	Japan	BRAN	Alexandru-Cristian	
6	Italy	CIOBANU	Ciprian-Valeriu	
7	Russia	CIUREA	Ștefan-Sorin	
8	USA	CONSTANTINA	Vladimir-Iulian	
9	Canada	CORBU	Radu-Vasile	
10	Germany	CRISTEA	Cristian	
11	Hungary	DEACONU	Constantin	
12	Poland	GHERASIM	Marius-Cătălin	
13	Sweden	IONESCU	Bianca-Cristina	

14	France	LĂZĂRESCU	Antonio-Georgian	
15	Denmark	MANU	Florin	
15	Netherlands	MICU	Petru	
16	Belgium	MIHALCEA	Laurenţiu-Cristian	
17	Spain	MIREA	Andrei-Cristian	
18	Austria	MOISE	Gabriel	
19	Czechia	PÎRVU	Ilie-Sergiu	
20	South Africa	POPA	George	
21	Mexico	SAVU	Constantin-Alexandru	
22	Portugal			
23	Finland			
24	South Koreea			
25	Egypt			
26	Brazil	-		
27	India	-		
28	Argentina	-		
29	Australia	-		