CIS 5810 Extra Project Proposal – Celebrity Facial Recognition

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Project Summary

Facial recognition technologies are widely used across various industries. For this extra project, our team aims to develop an algorithm that can accurately detect a given celebrity's face from sets of videos or images. The team plans to leverage some widely adopted facial recognition models (such as VGGFace, FaceNet, etc.) and utilize deep learning techniques to extract features and identify the target celebrity's face in the given dataset.

Goals and Objectives

The main goal of the project is to build a facial recognition algorithm that can detect a given celebrity's face from sets of videos or images with a high level of accuracy.

To achieve this, our objectives are:

- Assemble an impactful dataset for training, validation, and testing purposes.
- Accurately label the data to facilitate more effective training.
- Develop a functional facial recognition algorithm capable of detecting faces in videos or images.
- Evaluate the algorithm's performance in terms of accuracy and speed.

Proposed Approach

The proposed approach consists of the following steps:

1. Collect a large dataset of videos containing a certain celebrity's face from various sources, such as movies, interviews, and public appearances.
2. Conduct a review of the widely adopted pre-trained deep learning models, such as VGGFace and FaceNet, and select a model that best fits the purpose of the project.
3. Process and annotate a portion of the dataset for training purposes, ensuring the model makes the right decision in subsequent supervised learning processes. Reserve the rest of the dataset for testing and validation.
4. Build the algorithm by implementing the selected pretrained deep learning model. Freeze the early layers of model, which usually detect basic features like edges, corners, and textures. Subsequently add new layer for classification tasks. Train model once after.

5. Fine-tuning it on the training dataset, and optimizing the results using additional deep learning techniques, such as face alignment
6. Evaluate the algorithm's performance in terms of accuracy and speed.

Related Work

1. *Parkhi, O. M., Vedaldi, A., & Zisserman, A. (2015).* ***Deep face recognition. Proceedings of the British Machine Vision Conference (BMVC).***
   This paper introduces the VGGFace model and demonstrates its effectiveness in face recognition tasks.
2. *Schroff, F., Kalenichenko, D., & Philbin, J. (2015****). FaceNet: A unified embedding for face recognition and clustering. Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR).***
   This paper introduces the FaceNet model and its application in face recognition and clustering.
3. *Xi Yin, Xiang Yu, Kihyuk Sohn, Xiaoming Liu and Manmohan Chandraker Michigan State University NEC Laboratories America §University of California, San Diego****: Feature Transfer Learning for Face Recognition with Under-Represented Data.***
   This paper proposed center-based feature transfer framework to augment the feature space of under-represented subjects from the regular subjects that have sufficiently diverse samples.

TimeLine

- Week 1-2
  - Reviewing and selecting pre-trained models, and setting up development environment
  - Data collection and annotation
- Week 3
  - Model training
- Week 4-5
  - Model fine-tuning, algorithm optimization, and performance evaluation

Duties

- Zhengtao Hu
  - Dataset collection and annotation
  - Model training
  - Model validation and test
- Shu Wang
  - Dataset collection and annotation
  - Pretrained model research and selection
  - Model fine tune