Project 2 - Ethical Facial Recognition

Team Robbie

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Project Structure

1. Data preprocessing-Face region extraction
2. CNN pre-trained model finetune-ResNet18/DenseNet201
3. Naive Bayes Model
4. Ensemble of models

Scikit-learn Models - Approach

- Feature values - columns 9 to 183 (facial keypoints, craniofacial distances, craniofacial areas, craniofacial ratios, facial symmetry measurements and facial contrast measurements)
- Class label - Last column
- Classifiers
  - Naive-Bayes
  - Logistic Regression
  - Random Forest

Scikit-learn Models - Result

- Naive-Bayes - 73%
- Logistic Regression - 78%
- Random Forest - 80%

Improvements

1. Training the CNN from scratch yields accuracy of 65%
2. Training the CNN model without data preprocessing yields accuracy of 60%
3. Fine tuning the CNN model using Imagenet pretrained yields accuracy of 80%
4. Ensemble of different CNN architecture improve the accuracy by 2 percent

Issues

1. The order of predicted results need to match the order listed in test files
2. Datasets have duplicate images (in trained/test csv files)
3. Large dataset requires more time for preprocessing
4. Pretrained model suffer from domain shifting issue

Lesson Learned

1. Pretrained model is not a solver for all, the pretrained dataset domain and target domain should have shared set
2. Ensemble of different structure often have better results than single architecture