CSIT 696: Research Methods in Computing

Template of the project proposal

Project Tile: Face Detection and Emotion Recognition

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Basic Information

The motivation behind choosing the topic Face detection and emotion recognition, is it allows the technologies automate the process of analyzing and understanding facial expressions, eliminating the need for manual evaluation. By automating these tasks, businesses, organizations, and systems can operate more efficiently and save time and resources. However, using face detection and emotion recognition is to gain deeper insights, enhance human-computer interaction, ensure security, provide personalized services, and support mental well-being. These above-mentioned technologies have the potential to enhance various aspects of our lives and enable more intelligent and responsive systems.

Project Objectives

This project, main objective is to develop a reliable and accurate system for face detection and emotion recognition, integrating both components into a unified solution that can be applied in various real-world scenarios. The system should exhibit high performance, efficiency, and usability, ultimately providing valuable insights and enhancing user experiences.

Description of the Data Set

The data set that can be used in this project is taken from the public resource called Kaggle. This dataset has both train and validation data. The training data has seen different classes such as happy, sad, angry, disgust, neutral, surprise, fear. Similarly, the validation has seven different classes, they are happy, sad, angry, disgust, neutral, surprise, fear.

Technique Methodology

Convolutional Neural Network (CNN)

- The possible CNN architecture is used based on the data. The model training can be done by
- Initializing the CNN model with random weights or use pre-trained weights if applicable.
- Splitting the dataset into training and validation sets. The training set is used to update the model's weights, while the validation set helps monitor the model's performance and prevent overfitting.

- Feeding the training images through CNN and comparing the output with the ground truth labels to calculate the loss. Common loss functions for classification tasks include cross-entropy loss.
- Iterating over multiple epochs, where each epoch represents a complete pass through the training dataset. Monitoring the validation loss to determine when to stop training and prevent overfitting.
- Evaluation: Compute various evaluation metrics such as accuracy, precision, recall, F1 score, or confusion matrix to measure the model's effectiveness in face detection and emotion recognition. Also, plotting the improvement of loss.
- Fine-tuning and Hyperparameter Tuning: If the model's performance is not satisfactory, I'm planning to experiment with different hyperparameters, such as learning rate, batch size, network depth, or activation functions. Fine-tuning the model by adjusting its architecture or using data augmentation techniques can also improve performance.

OpenCV (Open-Source Computer Vision Library)

- OpenCV (Open-Source Computer Vision Library) is a widely used open-source library for computer vision tasks, including face detection and emotion recognition.
- OpenCV is used for face detection, and it needs to integrate it with an emotion recognition model that was built before.

However, planning to use the voice notes of happy, sad, angry, disgust, neutral, surprise, fear, to say the person emotions.

Project Schedule

05/28/2023 – Project Proposal
06/04/2023 – Weekly Report - 1 submission
06/11/2023 – Data preprocessing and start to train the model.
06/18/2023 – Weekly Report - 2 submission
06/25/2023 – this week, model can be tested, if needed it can be trained again.
07/02/2023 – Weekly Report - 3 submission
07/09/2023 – algorithm will be developed for face detection, evaluate then need to see if the hyperparameters should be tuned or not.
07/16/2023 – Weekly Report - 4 submission
07/23/2023 – See if have faced any roadblocks, otherwise continue with OpenCV.
07/30/2023 – Weekly Report - 5 submission
08/06/2023 – Test the output using the live facial expressions of mine
08/13/2023 – Weekly Report - 6, Presentation Slides, Rehearsal
08/20/2023 – Project Report
08/24/2023 – Final Presentation