

Note: Emotion Detection Using TensorFlow/Keras in Google Colab

Objective:

The objective of this project was to develop an emotion detection system using TensorFlow/Keras in Google Colab. The system aims to detect emotions such as anger, disgust, fear, happiness, sadness, surprise, and neutrality from images captured from a webcam.

Key Steps:

1. Data Collection and Preprocessing:

We collected a dataset of facial images labeled with different emotions. Preprocessed the images by resizing them to a common size, converting to grayscale, and normalizing pixel values. We used CK+ dataset.

2. Model Training:

Built a convolutional neural network (CNN) model using TensorFlow/Keras to classify emotions from facial images. Trained the model on the collected dataset using Google Colab's GPU resources for faster training.

3. Model Evaluation:

Evaluated the trained model on a separate test dataset to assess its performance.

Calculated metrics such as accuracy to measure the model's effectiveness in emotion detection.

4. Real-Time Emotion Detection:

Implemented real-time emotion detection using OpenCV to capture images from the webcam. Utilized the trained model to predict emotions from the captured images. Displayed the predicted emotions overlaid on the webcam feed for real-time feedback.

5. Results:

The trained model achieved a test accuracy of approximately 91.88%, indicating its effectiveness in recognizing emotions from facial images. The real-time emotion detection system successfully detected and displayed emotions in real-time from webcam images.

6. Conclusion:

In conclusion, we developed an emotion detection system using TensorFlow/Keras in Google Colab, which can accurately classify emotions from facial images in real-time. This system has various potential applications in fields such as human-computer interaction, emotion analysis, and affective computing.

```
# Step 12: Evaluate the model
test_loss, test_acc = model.evaluate(test_images, test_labels_encoded)
print('Test accuracy:', test_acc)
```

7/7 [=====] - 0s 21ms/step - loss: 0.2738 - accuracy: 0.9188
Test accuracy: 0.9187816977500916

Note: Real-Time Emotion Detection Python Script

Objective:

The objective of this Python script is to perform real-time emotion detection using a pre-trained TensorFlow/Keras model and OpenCV to capture images from a webcam.

Key Features:

1. Model Loading:

The script loads a pre-trained TensorFlow/Keras model for emotion detection. The model is assumed to be saved in the current directory.

Image Preprocessing: It preprocesses the captured webcam images by converting them to grayscale, resizing them to a common size, and normalizing pixel values.

2. Emotion Detection:

Utilizes the loaded model to predict emotions from the preprocessed images. The predicted emotions are overlaid on the webcam feed in real-time using OpenCV.

3. Real-Time Webcam Feed:

Captures images from the default webcam using OpenCV. Displays the webcam feed with predicted emotions overlaid for real-time feedback.

4. Dependencies:

The script requires OpenCV and TensorFlow/Keras libraries to be installed.

Usage:

- To run the script, execute it in a Python environment with the necessary dependencies installed.
- Ensure that the pre-trained model file (trained_model.h5) is present in the same directory as the script.

5. Conclusion:

This Python script provides a simple yet effective solution for real-time emotion detection using a webcam. It demonstrates the integration of machine learning models with computer vision techniques to enable real-time emotion analysis, which has various applications in areas such as human-computer interaction, sentiment analysis, and emotion recognition systems.