Eye Gaze Tracking - Speech Type Classification

Project Overview

This project classifies speech as either 'Scripted' or 'Natural' based on video eye-tracking data. It uses eye aspect ratio (blink detection), gaze direction, and head movement as behavioral indicators, processed through a Deep Neural Network trained on labeled data.

Features

- Upload video for eye-gaze-based behavioral analysis
- Track blink frequency, gaze direction, and head movement
- Predict speech type using a trained DNN (Keras)
- Interactive GUI built with PyQt5
- Gaze and head movement plots

Model Information

- Framework: TensorFlow/Keras
- Input shape: (1, 30, 64, 64, 3)
- Architecture: Sequential with LSTM or CNN layers
- Output: Binary (0 = Scripted, 1 = Natural)
- File: speech_type_classifier.h5

Requirements

- Python >= 3.8
- PyQt5
- TensorFlow
- OpenCV
- dlib
- matplotlib
- shape_predictor_68_face_landmarks.dat
- speech_type_classifier.h5

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How to Run

1. Clone this repo.
2. Install dependencies using pip:

   pip install -r requirements.txt
3. Ensure the following files are in place:

   - shape_predictor_68_face_landmarks.dat

   - speech_type_classifier.h5
4. Launch the application:

   python main.py

Output

- GUI displays live prediction of speech type
- Video frames analyzed in real time
- Plots for gaze and head movement
- Feedback through status labels

Repository Contents

- EyeGazeApp.py - UI layout
- main.py - Full application logic
- EyeGazeApp.ui - PyQt designer layout
- speech_type_classifier.h5 - Trained ML model
- shape_predictor_68_face_landmarks.dat - Facial landmarks model

Contact

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