README: Child-Therapist Interaction Analysis - Video Prediction

This Python script performs video frame prediction using a pre-trained convolutional neural network (CNN) model. It analyzes video content by:

Extracting Frames: It reads a video and extracts frames at specified intervals.

Edge Detection: It converts frames to grayscale, applies Gaussian blurring for noise reduction, and then employs Canny edge detection to identify prominent edges.

Prediction: It converts the edge images into PyTorch tensors and feeds them into the trained CNN model for multi-class classification.

Advantages of Separate Prediction Script:

Modular Design: This script separates prediction logic from the potentially complex training process. This improves maintainability and reusability.

Efficiency: It allows you to leverage a pre-trained model without re-running the entire training pipeline for each prediction.

Scalability: This approach is scalable if you plan to deploy the model for real-time analysis or integrate it into a larger application.

Overall Workflow:

Load Video: Provide the path to the video you want to analyze.

Extract Frames: The script automatically extracts frames based on the specified interval.

Preprocess Frames: Frames are converted to grayscale, blurred, and edge detection is applied.

Prediction: The processed frames are fed into the loaded model for prediction.

Interpretation: Based on the predicted class probabilities, the script interprets various aspects of the interaction, such as:

Child's gaze direction (towards therapist or elsewhere)

Therapist's gaze direction (towards child or elsewhere)

Object interaction (ball, puzzle, or something else)

Engagement level between child and therapist

Requirements:

Python 3.x

pandas

NumPy

OpenCV (cv2)

Pillow (PIL)

PyTorch

torchvision

Instructions:

Ensure you have the required libraries installed.

Replace the placeholder paths in the script:

video\_path: Path to the video you want to analyse.

/content/drive/MyDrive/Colab Notebooks/contweights.pth: Path to the weights file for the pre-trained model.

Run the script: python prediction.py

Note:

This script assumes the trained model is a CustomModel class with specific architecture and output branches. Make sure the model definition and weights file are compatible.

This README provides a clear overview of the script's functionality, advantages of using a separate prediction script, and essential instructions for running it.