Rope Skipping Exercise Project

Files/Scripts:

mediapipe.ipynb

Description: Contains script for pose estimation using the Mediapipe library.

keypoints.ipynb

Description: Extracted keypoint data from Mediapipe for further processing.

video_to_image.ipynb

Description: Script used to break videos into frames to create the dataset.

model_training.ipynb

Description: Contains script for data preparation, defining the ResNet-34 model architecture, orchestrating the training process with customizable parameters, evaluating model performance, and saving model weights for future use.

inference.ipynb

Description: Script for running inference on new data using the trained model.

Integrated.ipynb

Description: Integrated the trained model with Mediapipe.

Conditions.ipynb

Description: Script for incorporating exercise conditions for accurate analysis.

final_integrated.ipynb

Description: Final integration combining the trained model, Mediapipe, and exercise conditions for accurate analysis and inference.

Folders:

Inference:
Contains the final_integrated.py script and a weights folder, crucial for running inference using the final integrated system.

Dataset:

Description: Stores the dataset used for training and testing the model.

Runs:

Description: Contains saved model weights and checkpoints from training sessions.

Raw_Videos:

Description: Raw video data used for creating the dataset and testing the system.

Test_Videos:

Description: Additional video data specifically for testing system performance.

Required Libraries:

matplotlib: For plotting graphs and visualizations.

numpy: For numerical computations and array operations.

Pillow: For image processing tasks.

tensorflow: For machine learning and deep learning tasks, including training and running neural networks.

opencv-python: For computer vision tasks such as image and video processing.

mediapipe: For pose estimation and other computer vision tasks provided by the Mediapipe library.

Inference:

To run the inference code using the final_integrated.ipynb script and the provided weights files in the "inference" folder, follow these instructions:

Mount Google Drive

Setup Environment

Ensure that you have installed required libraries.

Load Model Weights

Make sure to set the correct path to load the model weights from the "weights" folder.

Input/Output Paths

Specify the paths of the input video and the output where you want to save video and text file.

Model Training:

To train the model using the model_training.ipynb notebook, follow these instructions

Load Dataset

Prepare your dataset for model training. Upload or access your dataset within the script.

Define Model Architecture

Define the architecture of your model. Use a pre-defined architecture such as ResNet-34.

Compile Model

Compile your model by specifying the loss function, optimizer, and metrics for training.

Train Model

Train your model using the prepared dataset. Adjust the batch size, number of epochs, and other hyperparameters as needed.

Save Model Weights

After training, save the trained model weights to a specified location for future use.