AI Fitness Trainer

*Progress Report #2*

# TL; DR

**On track (*Github:***[*AI-FitnessTrainer*](https://github.com/aminuabdusalam/AI-FitnessTrainer)*)***.** Built basic pose estimation program for detection of all 33 pose landmarks by **9/4.**

# Project Goals (Recap)

The goal of the project can be summarized as developing an **AI fitness trainer** embedded with **storage and recommender systems** and an **AI virtual mouse**.

The AI fitness trainer will help the user lose weight, gain muscle, and accomplish other fitness goals. In addition, it'd attempt to understand the client goals, develop a fitness routine, recommend a healthy eating plan, and ensure all exercises are performed correctly.

# Highlights

* Built basic pose estimation program for detection of pose landmarks <https://github.com/aminuabdusalam/AI-FitnessTrainer/commit/BasicPoseEstimationProgram>
  + Added Training Videos <https://github.com/aminuabdusalam/AI-FitnessTrainer/commit/AddedTrainerVideos>
  + Added image showing the 33 pose landmarks <https://github.com/aminuabdusalam/AI-FitnessTrainer/commit/PoseLandmarksImage>
  + Imported and utilized cv2 and Mediapipe for capturing/processing the videos and leveraging pre-trained Pose Model.
  + Checked that cv2 was capturing video and calculated frame rate. Reduced frame rate to 50 framepersecond (fps) since it was quite fast (500 fps) just for testing, but initial fast fps is never issue since the model would automatically slow down the video whenever it ingests video anyways.
  + Created an object of the MediaPipe pose model.
  + Then, converted the video from BGR colorspace (because that’s how cv2 captures the image) to RGB colorspace to ease processing of the image for the pose model.
  + After image was sent to model for detection of the landmarks, the Mediapipe drawing utilities were used in drawing lines connecting the detected landmarks.
  + Next, the info of each 33 landmarks was extracted. This info includes the coordinate of the landmarks. *Snippet of info for landmarks 30 and 31 from the program can be found below:*

Text

Description automatically generatedA picture containing chart

Description automatically generated*an image explaining what the 33 landmarks of the human body are.*

* + Finally, the image is displayed for 1 millisecond with the frame rate of the image being rendered on the image window. *Snippet from program can be found below:*

A screenshot of a video game

Description automatically generated A screenshot of a video game

Description automatically generated with medium confidence

# Lowlights

None

# Next Steps

* Continue build of module for Pose Estimation and complete by 09/19.
  + Revamp current basic program into a module that can be used for the Personal Trainer
  + Create a poseDetector class containing methods such as findPose, findPosition, and findAngle and attributes such as the mediapipe drawing utilities and pose model, whether the model should detect upperbody, and whether the model should always detect and track or only re-detect when tracking confidence is low.

# Timeline

This section lists the milestones of the project spread across two semesters (Fall 2022 and Spring 2023).

|  |  |  |  |
| --- | --- | --- | --- |
| **Milestones** | | **ETA** | **Status** |
| **Requirements Gathering** (Project Idea, Project Proposal) | | 08/22 | Completed |
| **Design Exploration** (Setup and Installation of necessary technologies, Addition of Project to remote repo, Skill Preparation, Framework Project) | | 08/29 | Completed |
| **Implementation** | Complete Pose Estimation Build | 09/19 | **In Progress** |
| Complete AI Personal Trainer Build | 10/25 | Not Started |
| Partly Complete Storage System Build | 10/31 | Not Started |
| **Quality Testing** | | 11/7 | Not Started |
| **Midpoint Presentation Draft** | | 11/14 | Not Started |
| **Midpoint Demo & Report** | | 11/21 | Not Started |
|  | **WINTER BREAK** | | |
| **Project Review** (Current status and Re-evaluation of Next Steps as Needed) | | 01/16 | Not Started |
| **Implementation** | Complete Storage System Build | 01/30 | Not Started |
| Complete Recommender System Build | 02/20 | Not Started |
| Complete Hand Tracking Build (Stretch Goals) | 03/13 | Not Started |
| Complete AI Virtual Mouse Build (Stretch Goals) | 03/27 | Not Started |
| **Quality Testing** | | 04/3 | Not Started |
| **Final Presentation Draft** | | 04/10 | Not Started |
| Final Demo & Report | | 04/17 | Not Started |