

Artificially Intelligent Home Fitness Trainer 1.0

Specification

Intelligent Fitness is a workout tracking planner app to use computer vision techniques to log your workouts and then use machine learning algorithms to analyze your gym routine.

What problem does the software solve?

Currently, people who love training at the gym on their schedule or want to do the workout at home log their workout exercises, track weights and reps manually in a journal or planner, some also use mobile app with manual input in this purpose and then do the statistical analysis on to compute change in your body.

Intelligent Fitness would help you in utilizing your time to do more workout rather than manually logging records. It would also show you the daily statistical change in your body which keep you motivated.

What already exists?

Fitness training app is not the new concept there are plenty of applications available on Google Play Store, however there is no app up to my knowledge exist that focus on automatic logging of record using camera, the very close to this concept is "Home Workout – No Equipment" app that gives estimated time for the completion of task and then computes record. e.g they would say **do 10 sit-ups in 20 sec** and logged that the person has completed the task.

Who is the target market?

Our targeted audience would be amature people who want to do the workout at home or want to do their workout plan in the gym.

How do people solve the problem now?

Nowadays Gym Goers or the or Fitness Enthusiast perform there to exercise and then pick the paper and pencil and not the weight, time, rep and exercise manually.

Goals

● Log Entry

- Use a mobile camera to log the following:
 - categories (Chest, Back, Legs, etc)
 - exercise (Dumbbell Squeeze Press, Incline dumbbell bench, etc)
- Using Mobile Camera also record weight and reps in Resistance exercises and record distance and time in Cardio exercise.

● Workout Log

- Tap a day in the calendar to display a popup listing the exercises performed on that day
- Navigate to a specific training log by selecting it in the calendar and hitting 'Go!'
 - Filter which days are highlighted
 - e.g.
 - Highlight days where I did bench press and lifted more than 80kg for at least 5 reps
 - Highlight days where I ran outdoors and run more than 3 miles in less than 20 minutes
- Weekly summaries of progress
- Attach comments/notes to sets
- Log Rest time and exercise time.

● Exercise Database

- Includes a selection of categories (Chest, Back, Legs, etc)
- Each category contains a small default list of exercises
- Demonstrations with video from experts for each exercise

● Routines

- Create a routine to provide quick access to your most commonly used exercises
- Assign exercises to a particular day within the routine
- Name a day according to workout (Monday, Chest Day, Workout A, etc)

● Backup/Restore

Backup your data to device storage or an online cloud service (Dropbox

or Google Drive - please ensure you have the corresponding apps installed on your device if you would like to backup to one of these services)

- **Export**

Export your training logs in CSV format so they can be analyzed in your spreadsheet application of choice

- **User Interaction Platform**

Access from Android App.

Out of Scope

- Create custom categories to better suit your training program
- e.g. Olympic Lifts, Plyometrics, Ab Training, etc
- Training Programs - Customized workout programs made for 3, 4 or 5 day splits, fat loss, strong lifts, 5x5, starting strength, bodybuilding, 531, weightlifting, powerlifting, GZCLP, Greyskull, or build your own

Use Case Story

John is a amateur gymer, do workouts daily at his home and log whose activities and tries to analysis his performance after a week. He struggling in maintaining the log during the exercise, and the thing it reduces his time of doing the workout.

Artificially Intelligent Home Fitness Trainer app is designed to optimize your workout schedule and efficiently analysis the performance. He installs the app in his phone and whenever he wants to do any exercise he places the phone in front of him using a tripod and performs the workout. And after doing the whole workout he while traveling or during free time he saw his last workout performance.

Technology Specifications/Considerations

- Android
- Python
- Keras
- OpenCV

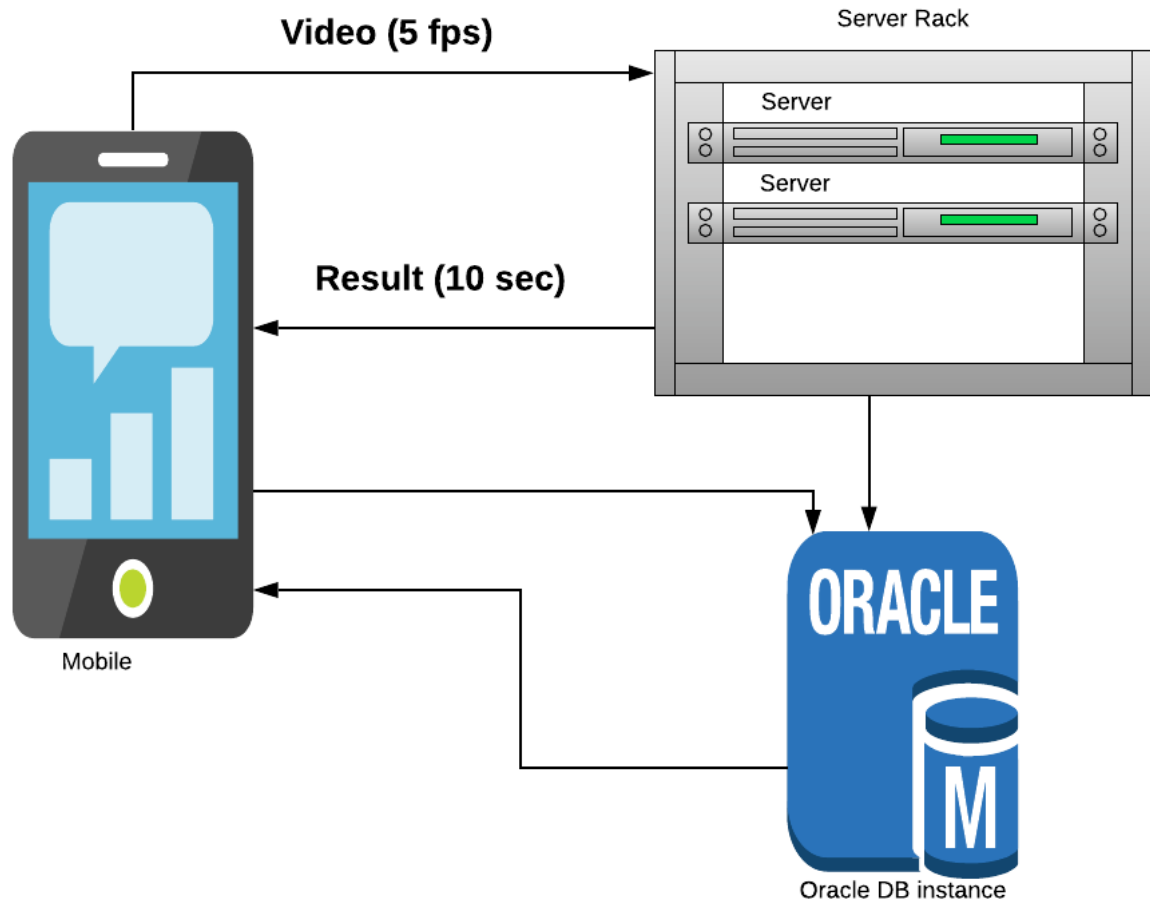
- TensorFlow
- Anaconda
 - Spyder
 - Jupyter Notebook
 - Libraries
 - Scikit term
 - Pandas
 - Numpy
 - Matplotlib
 - Training Models
 - Recurrent Neural Network
 - Long Short Time Memory

Long Term Architecture Considerations

- The idea can be extended for the Gym owners, they can use the CCTV surveillance camera data to train the model for the tracking all the gym-goers separately and log there respective workouts exercises in the gym app. The analyzed results can be then used for the nutritions for the proper creation of the diet plan for the person.
- All the gymers use headphone during the gym you can also use suggest a song with the help of there facial expression.
- Exercise would be detected using the pose estimation on 21 different points so we can also use it to find whether the person performs the exercise correctly or not.

Project Theory

3D Human Pose Machines with Self-supervised Learning would be used for the current pose and then RNN would be used for the exercise and weight classification and LSTM is used for the detection of reps and speed calculation.



Project Management Specification

- Roles:
 - Project Lead: Syed Ahmed Hasan Ovais
 - Project supervise: Dr. Junaid Akhtar
 - Project co-supervisor: Dr. Bacha Rehman
- Communication between project lead and supervisor will be done via mail.
- End of week feedback on what has been done that week to ensure the project stays on track.

Time frame Target:

The Application should be ready for testing in mid of March. Weekly breakdown of tasks to be done will be agreed and road mapped between project lead and supervisor.

Project Life Cycle

