

Fitness Exercise Recognition

1 Team:

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2 Project description in a nutshell

Background: Correct execution of fitness exercises is essential to avoid injuries and ensure training effectiveness. Especially in unsupervised settings, users often perform movements incorrectly without realizing it. Analysing human motion plays a key role in sports science, fitness coaching, and physical rehabilitation, but traditionally requires expensive motion capture systems.

Purpose: Our project aims to develop a computer vision system that can automatically recognize bodyweight exercises and assess the quality of their execution using video data.

Goal: We use the YOLO (You Only Look Once) object detection framework to identify fitness movements in real time. The system classifies common bodyweight exercises (e.g. squats, push-ups, pull-ups) and evaluates their correctness based on posture, movement range, and body alignment within the detected bounding boxes.

Scope:

- Data collection and manual annotation of exercise classes
- Training a YOLO-based object detection model for exercise classification
- Post-processing and evaluation logic for movement quality
- Optional integration of real-time visual feedback

3 Repository

Code repository (git - public): <https://github.com/Tompus210/ExerciseRecognition>

Video Data repository (Sharepoint): [AI project Fitness Exercise Recognition](#) (also in README.md)