Team 34   Robot for Gym Exercise Guidance

Requirement Summary:

Module Name	High Level Requirement	Points
Human Tracking Module	❖ The robot can follow behind the user, and the distance is controlled in the range of 0.7m to 1.3m ❖ No oscillation of position and During a normal walk, the robot was able to keep its tracking object in the center of its field of vision (1/4 to 3/4).	10
Exercise recognition Module	❖ The robot can monitor the person doing exercise and extract human poses. ❖ The robot can do the counting of the exercise.	10
Exercise Evaluation Module	❖ The robot can check whether the person is doing correctly in the exercise and give comments. ❖ The robot can store those evaluation results in the folder, and show those result in a report.	20
GUI Module	❖ The user can use the robot to do the exercise evaluation function purely through the GUI platform.	10
	Total	50

High-Level Requirement List

1. The robot should be able to use KCF algorithm to track and follow the user's location within a certain distance (2-3 meters) with the distance error smaller than 0.2 meter, using depth camera and ultrasonic radar to get the environment information.

2. The robot should be able to recognize body key points and skeleton binding with larger than 0.95 overall high accuracy and speed (fewer than 10 seconds for one minute video), using Mask R-CNN network.

3. The robot should be able to evaluate the user's performance of three common exercising movements, such as jumping rope, squats and push-up.

4. The robot should be able to display the evaluation results on the display screen, and display opinions according to the deviation direction and deviation value of the user's actions.