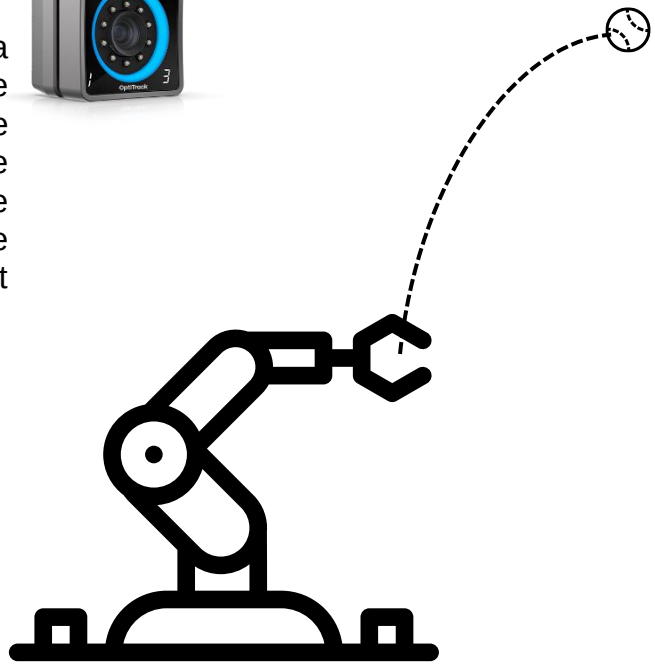
Catching Objects with a Robot Arm

TECHNISCHE UNIVERSITÄT DARMSTADT

Projectseminar (2-3 students, lab work)

The purpose of this project is to develop a system capable of catching a thrown ball using a robotic arm. This task is challenging because it requires quick decision-making and precise coordination among all system components. To track the ball's position, we utilize the OptiTrack motion capture system. This system employs multiple cameras to monitor the ball's movement and provides data that allow us to predict its path. The goal is to use these predictions to adjust the robotic arm's position, ensuring it is in the right place to catch the ball when it arrives. The final report must be written in English. Meetings during the project can be in English or German.



Requirements:

- Programming with C++ and Python
- Experience with ROS 2
- English

Tasks:

- Real-time tracking of the ball using the camera system
- Predicting the motion of the ball based on measurements
- Steer the robot to a catching position
- Evaluate, compare and present the results

Resources:

[1] T. Gold. Catching Objects with a Robot Arm using Model Predictive Control.

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CCPS Control and Cyber-Physical Systems