Chair for Cognitive Systems
Department of Electrical and Computer Engineering
Technische Universität München

RoboCup@Home Practical course

Tutorials

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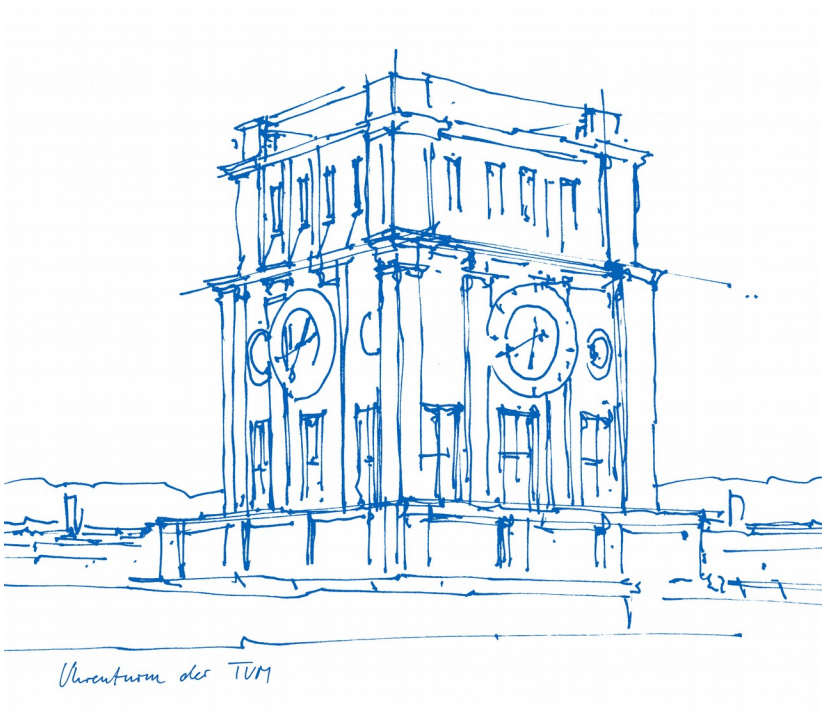

Definition of teams

Group definition for the final project: form groups according to the students' knowledge to address different challenges of the competition.

- Designate a **team leader**.

Different team options (10 students):

- 3 teams (3-3-4)

Definition of teams

Define the teams for the final project

- Define the **name of the team** as well as its **members**
- Designate a **team leader**.
- Choose the **topic** for the final project
- Define a **schedule** to work with the **computers**
- Define a **schedule** to work with the **robot**

Send the above information to robocup.atHome.ics@tum.de by **Thursday 13th Dec.** Feedback to the teams on Friday

Definition of topics

Topic 1: Pick and deliver objects from a new operator (3)

Someone gives the robot an object, the robot needs to grasp it, identify where should the object be stored and navigate to the identified location to store the object. E.g, if it is an apple, it should be stored in the kitchen.

- Identify and learn the new operator's face/body
- Recognizing & grasping different objects,
- Navigate to the location of the object to be stored.

IMPORTANT: Define the strongest capabilities of your team: navigation, perception, and/or learning.

Definition of topics

Topic 2: Identify and find persons in the environment (3)

The robot has a library of known persons. Tiago should be able to identify the known persons and learn new ones on-demand while moving through the 2nd floor from ICS.

- Identify known persons and greeting them
- Detect and learn/infer unknown persons
- Gender detection in crown environments, e.g. females or males.
- Count the know and unknown persons, e.g. 2 females & 3 males

IMPORTANT: Define the strongest capabilities of your team: navigation, perception, and/or learning.

Definition of topics

Topic 3: Restaurant Challenge (3-4)

The robot identifies a calling person from a table. The robot should navigate to the table and take the order, e.g. bring me an orange. The robot should go to the bar and grasp one orange (the bar has different objects). The robot returns to the guest to deliver the order.

- Find a calling person (the operator can wave or shout)
- Identify the gender of the guest and approach him to take the order
- Grasp the desired order from the bar and deliver it to the guest

IMPORTANT: Define the strongest capabilities of your team: perception, learning, navigation, control.

Definition of topics

Topic 4: Compliant grasping: Grasp an object when the object position is not accurate using sensor feedback. (3)

The robot identifies one object to grasp. Then, it should grasp this object as accurate as possible. The robot should compensate the errors produced by the vision system using the force sensor.

- Implement a Cartesian controller (position and orientation). You can use MoveIt to command the pregrasp motion.
- Implement an admittance controller using FT sensor in the wrist.
- Implement Impedance-admittance controller for the gripper.
- PLUS: If you finish the previous tasks fast, implement an auxiliary admittance controller using the robot skin from the gripper.

IMPORTANT: Define the strongest capabilities of your team: control, perception.

Thank you

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