CSC752: Autonomous Robotic Systems

Fall 2020

Final projects

Each student is expected to present a final project at the end of the semester. The project can be anything that is useful for the RoboCanes agent. This includes a wide range of topics. You can work on modeling, behavior or motions for example. The project can be narrowed down to a detail in the agent, for example a ROS node for a special motion to pickup a specific object or using our virtual agent eEva for a special communication between a human and the HSR. Another direction would be collecting information about the environment and use this later for decision making or communication. An example would be to identify soda can in the world and the store the information and then use this Pose2D/3D info for manipulation later. The project can consist of an implementation in the agent, but you can create external tools.

We strongly recommend that the project is chosen related to your research interests. However, we will also provide suggestions for project topics. At this point we ask you do create a **project proposal** which is **due** on or before **September 28, 2020** before the class starts. This is not an assignment but it requires some thoughts about what you want to do for your project. It is important to take this serious as this is part of every project in the scientific world.

At the end of the semester each student will be asked to present their project in class and turn in a conference-like paper (min. 8 pages LNCS, ≈3,500 words) after the end of the semester on or before December 4, 2020.

Project proposal

- The project proposal should be *at most two pages.*

- It should be written in the LNCS format and template. Please commit all necessary files to the SVN. Create a folder `project` and a subfolder `proposal`. Places files in the 'proposal' folder.

- The following information should be present in the proposal:

  1. Title.
  2. The main idea:
     (a) To what category does the project belong? Modeling, motions, behavior, ...?
     (b) What is the goal/motivation of the project?
     (c) Which part of the agent will be improved or what components will be added?
  3. Plans for the implementation (does not have to be complete, describe your ideas):
     (a) What are the requirements for your project? What data are required? Or a is a special environment required?
     (b) What form will the final result have? A prototype in Matlab or an agent ROS node?
     (c) Do you know already which methods you will use? Or a direction?
     (d) What are open problems for that you have to find a solution?
  4. Related work. Please list at least *three related papers.*
  5. References.

Project ideas

Here are some ideas for final projects, you are not limited to use one project of this list. So, if you have another great idea: let's discuss.

- Detecting and tracking world objects included in the YCB data set (VISION).

- Planning node for manipulation/grasping (PLANNING).

- Let's talk: eEVA for HSR (VAs, NLP).

- Race, gender, age, emotion, landmark detection of humans for decision-making (VISION, MODELING).

- Give eEVA personality (at least two different) (MODELING).

- Gesture detection (HSR detects gestures from humans, e.g. pointing at locations) (PERCEPTION, MODELING).

- Follow a human (we would need to find a way to do this in the simulator) (PERCEPTION, MODELING).

- Create a fast and reliable simulation enviroment for a RoboCup@Home competition (TOOLS, 3D MODELING).