

Coffee Break Scenario Description

The following thoughts try to summarize and concretize the communication between a group of humans and a series of service robots according to the common service script:

Goal: Show multi-joint action (i.e. different cooperation modes, joint perception, decision making, planning and motion coordination).

The basic setting is the coffee break (20-30minutes) in the first day of review. It is planned that the reviewers and presenters will come into the prepared room (most probably in CCRL) and by surprise the robots (together with humans?) will start to serve coffee, water and sweets.

First of all, the robots have to recognize that now the coffee break has started. They will serve plates with sweets and coffee and water coming from the kitchen. If desired the robot will fill a glass, either held by the human or the robot itself or another robot. Naturally, hand-over scenarios are included. If water/coffee is spilled or sweets have fallen down the robots will organize the cleaning. The robots will have to navigate in the presence of many humans. If ways are blocked the robot has to request that the humans go out of their way. The robots recognize that a glass/plate is used and empty and will remove them using a tray if necessary. The robot(s) together with human(s)? will jointly staple things on the tray and a robot will bring the tray to the kitchen where possibly another robot will fill the dishwasher. The robot has to learn which humans he already asked whether he can serve something.

Assumptions and prerequisites:

- Several congeneric mobile robot platforms
- Equipped with
 - Sensors:
 - pan/tilt camera
 - Microphone
 - Actors:
 - Egomotion
 - Manipulation unit
 - Touchscreen
 - Two handed; can carry a tray
- Central processing unit to distribute robots among humans
- Connection of robots to Central Unit (WLAN?)

Who serves whom?

- Goal: Collect the orders; one robot serves a group of guests (sitting at the table / standing in a group)
- A (series of) fix installed camera(s) reports new humans entering through the door
 - After this initialization the body can be tracked
 - Robots first stay in line and wait
 - The identity of a certain human can be gained by his face
 - Usually some people prefer to stay, other will sit down
 - After a short period to observe the "distribution" of humans in the room the robots are assigned to a group (cluster) with individuals

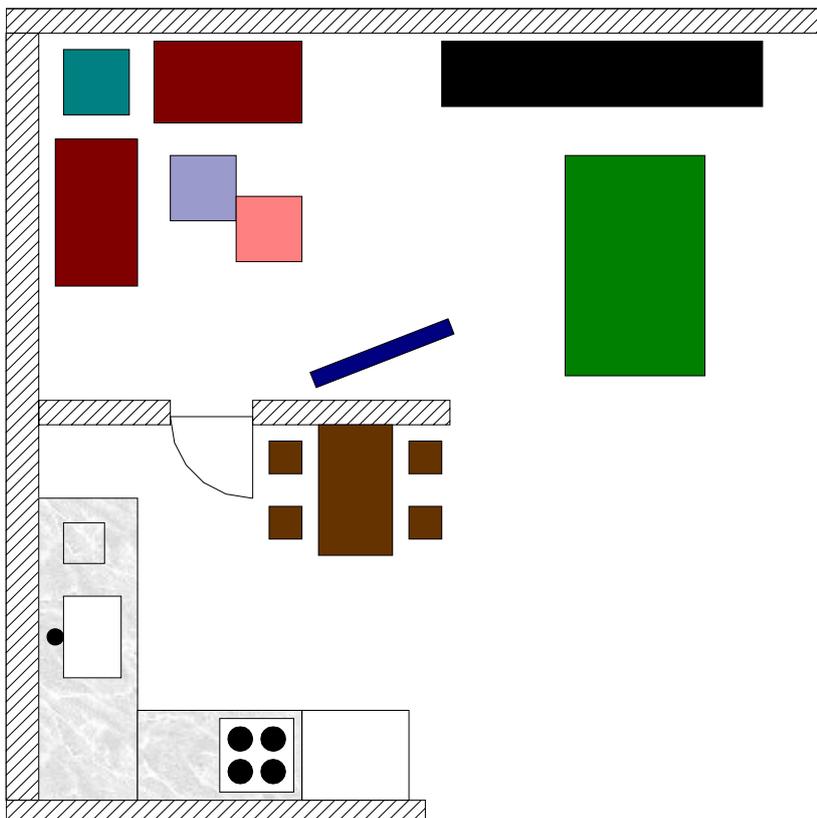
- A robot will then serve "his" guest through the rest of the break
- Each robot collects the orders for all of his guests in a dialog
- He will then catch the drinks and deliver them to the guest (allocation by position)
- Over the room cam reorders and dish collection may be initiated

The service dialog:

Goal: Find out what to bring to guest

- Walk to "cluster" and "look friendly" into the round, while saying:
- "Dear guests - I am your waiter for this break. I will take your orders"
- During this, the robot offers a plate with cookies and says "Do you want a cookie?"
- Fix first person with eyes (and target near field microphone to person)
- Address person and ask "What would you like to drink?" (gender detection helps to differentiate between sir/madam)
- Focus possible answers by displaying available options on touchscreen
- Selection over touch-screen is also possible
- Recognize choice and re-ask if case of doubt: "Do you want a coffee with cream and two spoons sugar?"
- Repeat this for all persons in round
- Transmit order over WLAN and move towards kitchen to get the beverages
- Recognize person and assign correct order to him/her
- After delivery move into the background for 3 minutes
- Then come back, seek empty glasses and ask for reorders

Surveillance of living environment:



Testing (current):

- 2 logitech 9000 webcams / calib pattern:



- Testing of Baumer camera driver
- De-Bayering

Intermediate Setup (Oct?):

- 9 cams (3x3 with 6mm) for kitchen area
- 100% coverage (door area) with redundancy
- 3 computer and 3 switches (1GB)
- 1 cam for registration while entering
- Software:
 - Halcon
 - ItrackU (tracking lib)
- 3d scene representation (tracking)

Long Term:

- 40 cams whole area
- 100% coverage + redundancy
- 10 computer and 10 switches (1GB)
- 1 cam for registration while entering
- Features:
 - Tracking
 - Gestures (pointing)
 - Orientation