Human-Centered Interaction in Robotics

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PROJECT

Personalized Elective Finder

In your previous assignments, you realized several multi-modal behaviors on Pepper, e.g. waving and greeting a person, nodding, swirling, etc. You also created a conversational assistant that provides information about the MAS admission procedure.

In this project, you will build a socially interactive robot that acts as an assistant to help students in finding a list of suitable elective courses as per their preferences. For this, you will use the depicted form of Pepper in qiBullet simulation environment and provide it with social interaction capabilities as follows:

1. Pepper detects a face from the video stream provided by your webcam. Optionally, it can verify whether the face belongs to its authorized users (that is, your group members).

2. When a face is detected, Pepper initiates a multi-modal greeting behavior. Optionally, you can personalize the greeting based on the identity of the person.

3. Pepper is aware that there can be noise and errors in face detection and verification which can lead to temporary loss or misclassification of the face. Pepper possesses necessary checks to deal with such scenarios.

4. After greeting, Pepper initiates a conversation to assist the user in finding a preferred list of elective subjects.

5. Pepper has an internal model of courses that suit different criteria, and it uses this model to infer which courses will best satisfy a user's given preference. Optionally, Pepper can also give a ranking of electives that match the preference of the user. (Hint: Use a Bayesian network).

6. During the conversation with user, Pepper shows suitable illustrative gestures to accompany speech.

7. After the conversation is complete, Pepper bids farewell in a socially appropriate manner.
8. Pepper is capable of filtering abusive language and refraining politely from engaging in such exchange.
9. Optionally, Pepper accepts speech input.
10. Name your agent and create a marketing slogan for it.

Project Timeline

23.05.2024: Project release

05.06.2024: Checkpoint 1: Upload a short proposal (1 to 2 pages) that includes the design of your software architecture and the design of your Bayesian network for preference-based elective selection.

26.06.2024: Checkpoint 2: Upload a video showing individual components in action (e.g. face detection, greeting, simple dialog flow with gestures, farewell, Bayesian model)

11.07.2024: Final project demonstration (a working prototype, max. 5-slide presentation explaining technical design and challenges). Each group gets max. 20 minutes (including set-up, demonstration, presentation, Q&A). Upload all materials in LEA the night before.

Evaluation Criteria

- No. of demonstrated multi-modal social interaction capabilities
- Project proposal
- Bayesian network design
- RASA dialog agent design
- Visualization of software architecture
- Object-oriented design
- Documentation of code
- Performance in Q&A

Submission:

- Submit the requested documents for each project milestone in LEA.
- Late submissions will not be accepted.