Active Participatory Social Robot Design Using Mind Perception Attributes

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Goals

- Investigate the robot design features linked to robot mind perception
- Enable broad participation in social robot design
- Promote active participatory design

Approach

- Collect robot designs targeting mind perception attributes for analysis
- Create the Build-A-Bot online design platform
  - Available to anyone via a website
  - Users are prompted with a mind perception attribute
  - Users combine 3D parts in any way they see fit to create a design
- To enable a wide spectrum of users, controls are implemented using icons instead of text
- Data on users' designs are collected for analysis
- Data analysis for design and action patterns using machine learning

Figure 1: The Unity-based Build-A-Bot design platform on a website.

Results and Discussion

Enabling Participatory Design

- Any user is able to participate in the robot design process
- Users actively participate as the robot designer, not as an evaluator
- User interface designed with ease of use as top priority
- A first-time user can design a robot with little to no instruction
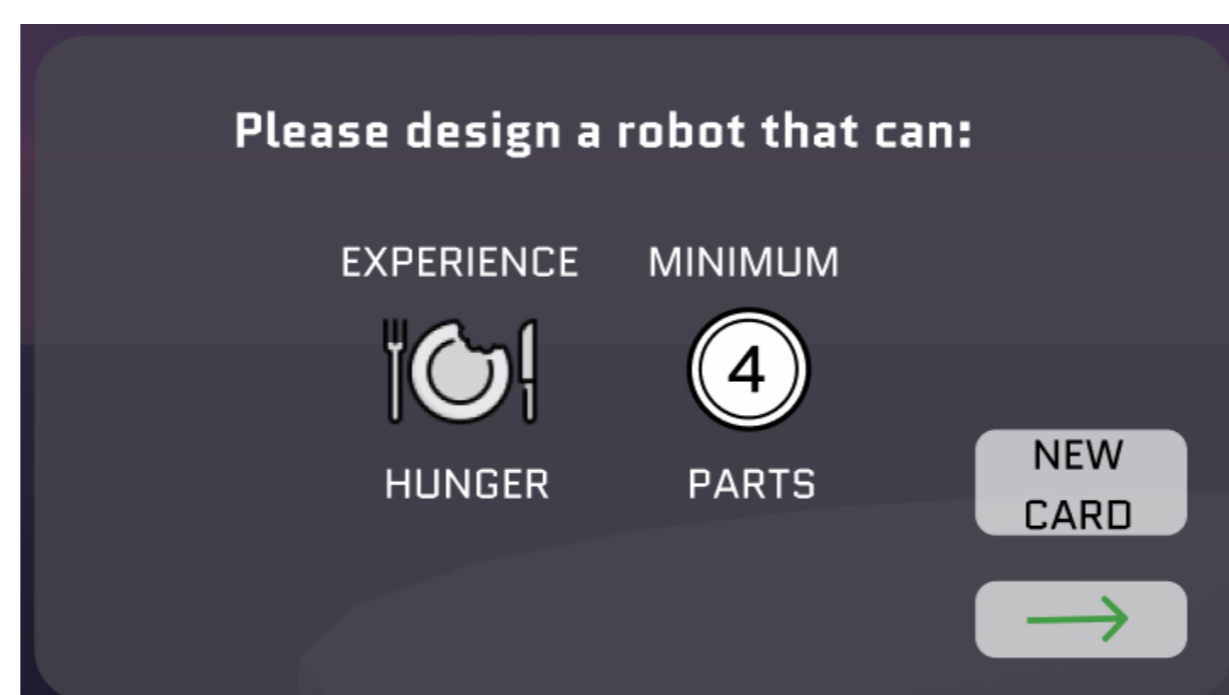- Maximize user design choices
- Minimize user design constraints

Figure 2: An example of the challenge cards shown to users.

Mind Perception Attributes

- Users are given a mind perception attribute to explore with their design
- Mind perception attribute is provided through a "challenge card" (see Fig. 2)
- Example: a robot that could experience hunger might exhibit a large torso or a mouth feature
- Attribute targets will be evaluated against the design to determine what features influence human perception

Current / Future Work

Preliminary Survey Results

- Participants built a robot using the platform with limited instruction
- Results showed no indication that the project's goals could not be achieved
- Currently in data collection phase, beginning to gather robot designs

Future Work

- Primary focus is to identify design features attributed to mind perception
- Achieved by using the data collected and machine learning
- Reinforce our models by measuring neural activity as response to robot design, starting with empathy towards robots

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