Project Title:

Investigating Emotion Mirroring in Human-Robot Interaction: The Role of Gestural and Tonal Cues

Objective: To explore whether humans mirror the emotional expressions of a humanoid robot, Pepper, during a conversation, and to assess the impact of gestural and tonal cues on this mirroring effect.

Hypotheses:

- H0 (Null Hypothesis): The degree of emotion mirroring by participants is not significantly affected by whether they are interacting with Pepper with gestural and tonal cues or Pepper without these cues.
- H1 (Alternative Hypothesis): The degree of emotion mirroring by participants is significantly affected by whether they are interacting with Pepper with gestural and tonal cues or Pepper without these cues.

Methodology:

Participants: Recruit a group of volunteers willing to engage in a conversation with Pepper.
Experimental Design: Create two conditions for the conversation:

- Condition 1: Pepper with gestural and joyful tonal cues.
- Condition 2: Pepper without gestural and tonal cues (monotone tone).

Procedure:

- Randomly assign participants to one of the two conditions. (or within subjects)
- Record the conversations using video for later analysis of facial expressions, gestures, and vocal tone.
- Administer a forced-choice survey after each interaction to assess the accuracy of Pepper's emotion inference technology.
- Administer a questionnaire to assess participants' perceptions of the interaction and their emotional states.

Data Analysis:

- Use facial expression and gesture analysis software to quantify the degree of emotion mirroring.
- Compare the level of emotion mirroring between the two conditions.

- Evaluate the accuracy of Pepper's emotion recognition system based on the forced-choice survey results.
- Analyze questionnaire responses to understand participants' subjective experiences.

Expected Outcomes:

The study aims to provide insights into the role of gestural and tonal cues in emotion mirroring during human-robot interactions. It will contribute to the understanding of how humans respond emotionally to robots and inform the design of emotionally intelligent robots for various applications.

Ethical Considerations: Ensure ethical approval and informed consent, maintain participant confidentiality, and address any potential biases or limitations in the experimental design.