Master Thesis Proposal [Updated October 2019]

Project title: Gesture, Sound, and Emotion on a Humanoid Robot
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Background:

Many robots currently in use are limited in the expressive range of their speech and display of emotion. Previous studies have shown that communicative non-verbal behaviors displayed by robotic agents affect human-robot interaction. Gestures and sound design have been used to improve the comprehensibility of these non-verbal communication.

In this project, you are tasked to further investigate how sound design of robotic agents can be used with communicative gestures to improve the perception of emotion, intention, and internal state in robots. The supervisor will brief you on the latest development in the field, and you can decide on an appropriate approach and scenarios based on your expertise and preference. Perhaps Pepper can react to a weather forecast? Or to have it as the embodiment of your social media feed, or maybe as a personal assistant to remind you of your schedule?

One unit of Pepper robot is available. Tools for sound design could be provided if necessary. Depends on the approach, programming skills may or may not be required. Understanding of human perception and experience in Human-Robot Interaction or Human-Computer Interaction are required.

Possible tasks:

1. Design a scenario of interaction with Pepper robot. Design sets of gestures and sound to be used in the scenario to display different emotions, intention, and internal state.
2. Design and run perception test to validate task (1) using a group of subjects and statistical analysis.

References:

Latupeirissa, A. B., Frid, E., & Bresin, R. (2019). Sonic characteristics of robots in films. In Sound and Music Computing Conference (pp. 1-6).

Frid, E., Bresin, R., & Alexanderson, S. (2018). Perception of Mechanical Sounds Inherent to Expressive Gestures of a NAO Robot-Implications for Movement Sonification of Humanoids. In 15th Sound and Music Computing Conference. Limassol, Cyprus.

Salem, M., Eyssel, F., Rohlfing, K., Kopp, S., & Joublin, F. (2013). To err is human (-like): Effects of robot gesture on perceived anthropomorphism and likability. International Journal of Social Robotics, 5(3), 313-323.

Erden, M. S. (2013). Emotional postures for the humanoid-robot NAO. International Journal of Social Robotics, 5(4), 441-456.

Song, S., & Yamada, S. (2017, March). Expressing emotions through color, sound, and vibration with an appearance-constrained social robot. In Proceedings of the 2017 ACM/IEEE International Conference on Human-Robot Interaction (pp. 2-11). ACM.