Master Thesis Proposal [Updated October 2019]

Project Title: Pepper Robot Sonic Dress – A Garment for Augmenting Robot Expressive Capabilities
Supervisors: Adrian B. Latupeirissa
Examiner: Roberto Bresin

Background:

Robots are limited in the expressive range of their movement, sonic output, and display of emotion. Communication channels between human and robot are dictated by the number of sensors and output available in the robot. We are looking at exploring a possible improvement by adding these communication channels on an existing robot.

In this particular project, you will work with Pepper robot. Movement of the robot is limited, it only has 20 DoF (degrees of freedom) compared to 244 DoF in human. The sound of Pepper comes from speakers positioned in the ears, and the robot listens to the environment through microphones positioned on the top of the head. It has limited facial expression, with only LEDs on the eyes and no moving facial features.

The sonic dress is an exploration in improving the experience of interacting with a robot. It is meant to augment the robot movement, emotion, and intention. The form of a clothing object is chosen for the ease of prototyping (you can use existing object such as hoodie or vest), as well as touching the subject of robot anthropomorphism.

This is a very practical project. You will learn how to design and implement an interactive artefact in Human-Robot Interaction. Understanding of HRI/HCI and knowledge in physical interaction prototyping are required. Prototyping tools and materials are provided. A Pepper robot is also available.

Tasks:
- Design and implement a clothing object for Pepper robot embedded with electronics (for example: hoodie with multiple speakers)
- Design and implement communication strategies for Pepper robot, to be augmented by the Sonic Dress

References:

Tsaknaki, Vasiliki, and Ludvig Elblaus. "A Wearable Nebula Material Investigations of Implicit Interaction." *Proceedings of the Thirteenth International Conference on Tangible, Embedded, and Embodied Interaction*. ACM, 2019.