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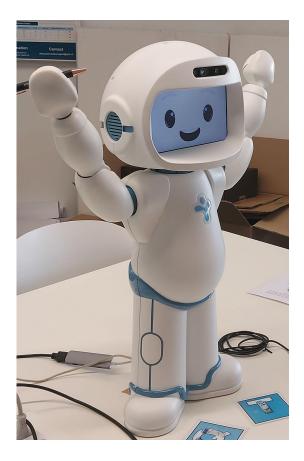Spring Semester 2021   Research Project: QTrobot

Developing a "Natural Interaction Robot Behavior Module" for QTrobot

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MOTIVATION

This project aims at making interactions with QTrobot more natural. During an activity, we want the robot to detect positive, neutral and negative emotional cues from the user and tune its behavior accordingly. Since emotions can be shown very differently from one person to another, the emotional thresholds need to be personalized for every user.

METHODS

We designed an activity made of two parts. First, in the ice-breaking session, the user has a conversation with QTrobot. Some questions are designed to incite a certain emotion. While the user answers this question, the robot analyzes its face. At the end of the discussion, the collected data is used to compute emotional thresholds. These thresholds are then used in a memory game, to detect the emotional states of the player and give appropriate feedback when needed. We analyzed our framework in a user study involving around twenty participants.

RESULTS

We successfully created a framework that can be adapted to other robots and activities. The participants enjoyed their interaction and showed high sympathy for QTrobot. As expected, participants had different emotional values, thus proving the need for personalized thresholds. Furthermore, we can conclude that giving feedback results in the user putting more effort in the activity. Last but not least, we discovered that the face recognition app of the robot has a notorious problem : it works way better for men than for women. This is probably due to a majority of male data points in the building of the algorithm.