EXPERIMENT INFORMATION

Thank you for agreeing to take part in this pilot study. Please take your time to read this information, and please do refer back to it if desired while the experiment is in progress.

The aim of the experiment is to assess the effectiveness of an algorithm that learns how to teach while being responsive to the motivation and engagement state of the learner. Your role in this is to supervise the *teacher robot* to enable it to learn an effective teaching strategy.

The setup you will be asked to supervise consists of two robots: a *child robot* and a *teacher robot*. The robot facing you is the *child robot*, which needs to learn about the difference between sad and happy faces by playing a sorting game on the touchscreen. It displays a range of behaviours that indicate its levels of motivation and engagement, including gaze behaviour, speed of categorisation movements, etc.

In order for the *child robot* to learn, it is necessary for its engagement and motivation levels to be sufficiently high (although they will naturally vary over time). The *teacher robot* must therefore provide suitable encouragement and feedback to enable this. If the teacher behaves inappropriately, this will have an adverse effect on the engagement and motivation of the *child robot*. The behaviour of the *child robot* is determined by its engagement and motivation levels.

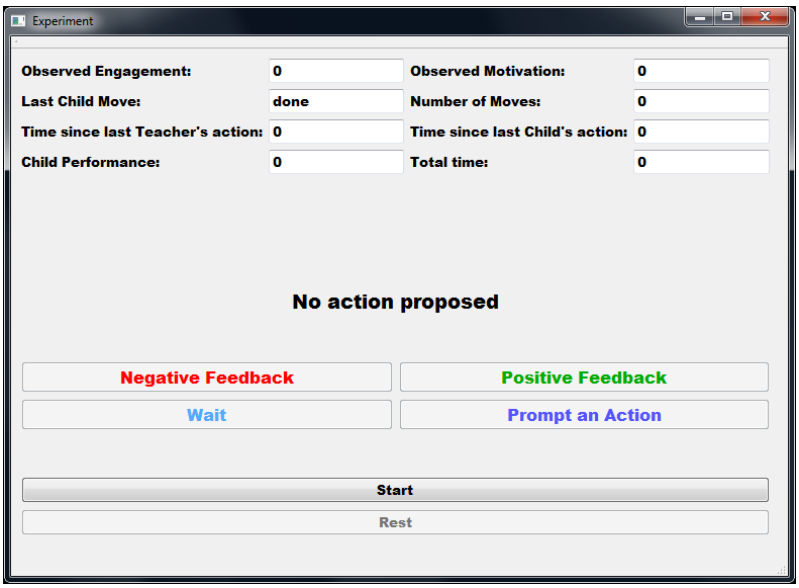
The robot with its back to you is the *teacher robot*. This is the robot you are supervising. Every so often, it suggests an action to take. If this action is inappropriate, then your task is to provide an alternative suitable action to take. The *teacher robot* will learn from this in order to improve its future suggestions.

You will have a range of information available to you to help determine what the ideal *teacher robot* behaviour should be. It is up to you to decide what information you use and how you use it.

On the following page you will find further information on how to supervise the *teacher robot* through the GUI, and some behavioural characteristics of the *child robot*.

You will be asked to supervise two different *teacher robots* in two separate interactions, with the same *child robot* (learning and states reset at the beginning of each interaction). Each interaction will last for 10 minutes, after which the *teacher robot* will end the interaction.

The Supervisor GUI



The GUI provides some overall information on the child's behaviour (last move, time since last move), and an estimate of the *child robot* engagement and motivation states. This is only an estimate based on a subset of characteristics that are mainly updated after each *child robot* move – however, this estimate is used by the *teacher robot* learning algorithm. As a supervisor, you are also able to see the *child robot* behaviour, which is not directly accessible by the *teacher robot* (the engagement determines gaze behaviour and frequency of moves, and the motivation determines speed of movement and the success of moves). The following actions are available:

Wait	Do nothing at the moment
Prompt an Action	Encourage the *child robot* to do an action
Positive Feedback	Congratulate the *child robot* on making a correct classification
Negative Feedback	Feedback (supportive) for an incorrect classification

Every so often, the *teacher robot* will suggest an action to you (in the centre of the GUI). You will have 3 seconds to decide whether it is appropriate. If it is, then no action is required from you: the *teacher robot* will execute the suggested action. If you think there is a better action, then choose one of the four options within the 3 second period.

The *child robot* model

The engagement and motivation levels of the child robot are modified by its own actions, and those of the teacher robot. Generally, prompting an action causes the *child robot* Engagement to increase. The effect of *child robot* classification move and *teacher robot* feedback on the *child robot* Engagement (E) and Motivation (M) is as follows:

	+ive feedback	–ive feedback
Good move	E↑ M↑	E↓ M↓
Bad move	E↑ M↓	E↓ M↑
No move	E↓ M↓	E↓ M↓

One final effect is that the Engagement and Motivation values have a maximum limit: if this is approached, then there is a chance that further actions to increase them will actually result in a sharp decrease.