**Addition Details Requested in regards to questions answered "yes"**

1) Informal participants will be all those who enter the space the Roomba is in, and that the experimenter observes interacting with the robot. As the robot is operating in a public space, there is a high possibility that those unaware of the study will enter the area of observation. We will take due diligence and post posters and fliers in the experiment area. If a person in the space becomes aware of the experiment and wishes to not have any details of their actions included in the study, there will be the on-site researcher observing and running the experiment. The researcher will always abide to requests made by persons who opt-out of casual observation.

5) Informed participants who use the robot's web interface to send a colour choice to the robot will receive a "cookie" from the robot's web server. This cookie contains a randomly generated ID string to identify the user's machine to track number of uses. This ID number will not be traceable to the user's computer, and the cookie will be set to expire automatically in two weeks since the user's last use of the robot's web interface. After the user's computer automatically deletes this cookie, there will be no trace on the user's computer of them using the robot's web interface that will link them to the ID we recorded

10) As outlined in 1), informal participants may enter the space and be observed interacting with the robot by the researcher. Though all efforts will be made to not include persons unable to legally give consent, it is possible that the researcher is unable to recognize this and make casual observations. These observations, however, will not contain any descriptive or identifying information. Only notes about interaction with the robot will be kept. Informed consent will still be required for use of the robot's web interface and participation in the study's questionnaire.

**1. Summary of Project**

In this project we create and study a robotic group “mood ring,” where a robot in a room uses colour to artistically represent the mood of the people in the room. People report their mood (colour) to the robot, and the robot mixes the room’s votes to display the final colour configuration. We use an iRobot Roomba vacuum robot, which is a small and harmless domestic-product round disc-shaped machine that lays close to the floor, and attach a ring of coloured lights to the robot such that it can illuminate the floor around it. This work builds directly on studies in the field of Human Robot Interaction (HRI) which show that people tend to zoomorphise and anthropomorphise (attaching animalistic or human characteristics to non-living objects, respectively) robots they see and interact with. Additionally, our system builds from psychology literature which illustrates how colour forms an important aspect of people’s emotional responses to interaction with technologies.

**Purpose:**

In this project, we explore how robots can use colour as part of their communication repertoire, and, how a group can collectively use a robot to *ambiently display* their mood to the room. Key questions of this research are: how do people (those who report colour) feel about broadcasting their mood through a robot? Does the colour displayed by the robot affect how people perceive the environment? How do people perceive the robot, for example, do they perceive the colour as the robot’s emotion, the room’s, or neither? And perhaps even, how does the ability to affect the robot, and thus by proxy, the environment, impact a patron’s sense and *ownership* of the space?

Ultimately, our results could be used to design robotic interfaces in everyday environments that help people connect socially through the robot, or be used to design robots that make their environments feel (to people) more relaxed, livelier, happier, etc.

**Procedure:**

The iRobot Roomba will be placed in a public coffee shop and will clean the floor while it displays colours on the floor completely around its periphery (the robot is a small circle). Many patrons of the coffee shop will not interact directly with the Roomba and will only observe or notice it while they use the coffee shop as usual. Patrons will, however, have the option of reporting a color to the robot that they wish it to display. They will be able to access a simple color-selection website from their mobile phone or laptop where they will be able to select a color which represents their current “mood.” The robot will then aggregate all patrons’ votes to display colours around itself, changing in real time as new votes are received. Thus the robot broadcasts the current “mood” of the room, via color, as a kind of robotic mood ring.

We will collect data through several methods. Primarily, we will log data from participants who use our on-line color-reporting tool. We will track multiple uses (within a day, over several days) from a single device to learn how people use the system. Repeat users will be offered the chance (voluntarily) to complete an extended paper questionnaire after their third use. This questionnaire is completely voluntary and will not collect personal, identifiable information. We will track repeat users by giving their devices an Internet cookie (a set of name-value pairs that is presented to the website automatically upon access). The cookie will be set to automatically expire from two weeks after the user’s last use (in case they come back during another day on the experiment), or they can manually delete them. Data will be stored on a web server located in Dr. Young’s office and all data will be kept anonymous.

We will additionally collect data through an extended paper questionnaire and unstructured interviews as follows: participants may voluntarily approach the experimenter to complete the questionnaire and unstructured interview, as advertised through the in-shop posters and the on-line system. These participants will be presented with the informed consent form prior to completing the survey.

Participants will be compensated with food and coffee gift certificates for the establishment. Participants will receive a free $2 off coffee / snack voucher (via the website) upon first entry to the system or questionnaire answer, and then will receive on a tiered basis for repeat uses (i.e., another one on 3rd use, then on 7th use, etc.), with a maximum of one reward in 2 hours (to prevent abuse of the reward system).

In addition to the posters and fliers displayed around the coffee shop, participants who use the on-line system will be presented with the same informed consent sheet digitally and, on first use, will be required to read and click “I understand and agree” before continuing – this is modelled after standard PC disclaimer and license agreement systems.

After the study, we will ask for volunteers from the employees of the establishment who watched the patrons interact with the robot to participate in semi-structured interviews. We have also attached a sample interview. The questions will be asked, but if the volunteer has interesting views, a topic might be investigated in more detail, depending on the volunteer's response. The researcher conducting the interview will take notes to analyze at a later date. All data will be kept anonymous and will be destroyed after the study is completed.

**2. Research Instruments:**

Primary participants will access a web page to send their choice of colour to change the Roomba. This web page will consist simply of a palette of 36 static colours and the instructions at the top: “Please select a color which best represents your current mood.” (Note: first-time users will first be presented with the informed consent document). Upon selecting a colour participants will be prompted for confirmation of their choice and agreement to send this data to the robot.

Repeat users will be presented with the attached questionnaire file.

**3. Study Subjects:**

Informal participants will be all those who enter the space the Roomba is in, and that the experimenter observes interacting with the robot. Access to the web page and answering the questionnaire is completely voluntary: we will recruit questionnaire participants by giving a prompt on the website, to those who have already logged in, to get a questionnaire from the on site researcher. Those using the web page will be informed of the study via the web page itself and those who complete the questionnaire will be asked to first sign a consent form

**4. Informed Consent**

As detailed above, all participants who explicitly participate (online or via paper questionnaires) will complete informed consent forms before partaking in the experiment. We will take due diligence to inform casual patrons through posters and fliers.

**5. Deception**

The study will not involve deception

**6. Feedback/Debriefing**

The informed consent form will explain the purpose of the study clearly to the participants. The questionnaire will also have a free form question for comments or other suggestions from the participants. Posters on site will explain the study and its purpose to those interested, and any questions or concerns had by a person in the space can direct them to a researcher who will be on site to monitor equipment. There will be no need for debriefing since the study purpose will be explained clearly up-front in the poster materials.

**7.Risks and Benefits**

There are no known risks associated with participating in the study. There are no personal benefits to participants apart from the study incentives detailed above. The benefits to the researcher from the study will be data that can be used to see how the ambient display of colour affected the environment.

**8.Anonymity and Confidentiality**

The cookie given to the devices used for colour input will include a unique non-identifying ID number which will automatically be forgotten by the system two weeks after the study. No names or other identifying information will be collected during the study, other than their signatures on the consent form which will not be associated with the data. All questionnaires will be stored in a locked filing cabinet in Dr. Young’s office and be destroyed as soon as the data analysis and publication are complete. Only researchers associated with the project will be allowed to access the questionnaires.

**9.Compensation**

Participants will be compensated with $2 coupons given for use of the web interface (on their first, third, and seventh use, with only one coupon allowed per 2 hours) and 5$ coupons for filling out a survey. The coupons will be redeemable for food at the establishment that allow us to perform the study on their premises, as outlined in the Procedure section

**10.Dissemination**

We intend to publish the results in a Human Robot Interaction conference in a paper tailored to that conference. Proceedings of academic conferences will be typically available to anyone for a fee, and the paper itself will be discussed with other academics at the conference. Once published, results of the study will be made available to the public for free at <http://home.cs.umanitoba.ca/~young/>. This information is provided to the participants in the consent form. No identifying or confidential information of the participants will be included in this study.