# Art-based Approaches as a Metaphor to Support

Exploring People's Emotions Around Robots

Robot design has been stuck in the metaphor of a anthropomorphic and utilitarian robot. This metaphor leaves out the social and emotional contexts in which these technologies will exist. In this pictorial, we use **art as a metaphor to explore people's emotional context around robots and their perceived future relationships with these technologies**.
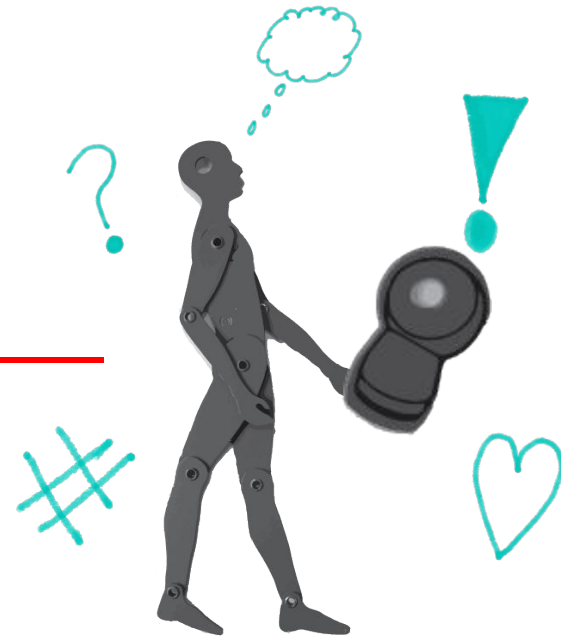
Anastasia K. Ostrowski[1], Erin Partridge[2], Cynthia Breazeal[1], & Hae Won Park[1]

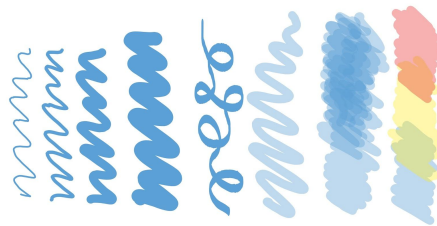[1]MIT Media Lab; [2]Elder Care Alliance

CA8 chose to create their image considering health as the primary robot function. The image was created through 4 steps: (1) figure placement, (2) icon placement, (3) mark making, and (4) image naming. These steps are explained more in detail here.

1. figure placement

Participants were invited to position a 2D figure that represented themselves and the social robot in the context of the image. The figure was then scanned into the digital image. Participants could scale the figure larger or smaller using their fingers. CA8 positioned the human figure [a] standing up with their arms outreached and scaled the human figure smaller. The robot figure [b] was scaled larger and positioned far away from the human figure, facing the opposite direction.

4. image naming

Finally, participants were given the opportunity to name their image, either typing or writing the name with their finger. CA8 chose to name their room the "Fitness" room. after naming the room and using the text tool, CA8 decided to do more mark making using the typing tool because *"What i didn't see was mental health."* CA8 decided to type, changed color and font and added "MEDITATE" and placed it over the human head and made the type bold. They then typed "Mindful awareness", adjusted the font size, placed it over the human figure body.

This is my _____ Fitness _____ room.

ENERGY LEVEL (MOVEMENT) WEIGHT COLLECTING DATA HEALTHY FUN PERSONALITY SOCIAL DIMENSION

ENERGY LEVEL (VOICE) ENERGY LEVEL MEDITATE mindful Awareness NEWS NEWS/INFO ALERTS

AUTONOMOUS AND CHALLENGING BEHAVIOR

APPEARANCE AND CHARACTER LOYALIST CHALLENGER TOOL MOTION

SOUND VISION BODY PARTS SECURITY IOT EASY TO USE ABC FACIAL EXPRESSIONS ENGAGE

2. icon placement

Participants had a choice of 110 icons that they could incorporate into their image. The icons ranged from user interactions to security & privacy to social characteristics. If participants had questions about the icons, the researcher would provide standard definitions and participants could also modify the definition to fit their own conceptualization of the topic. As with the figures, icons could be scaled larger or smaller using two fingers. When placing the icons into the image, CA8 asked *"Is this okay?"* for how they were adding in the icons. CA8 also added in icons two times in the session (see timeline above). Icons were scaled and there was no overlapping icons in CA8's image.
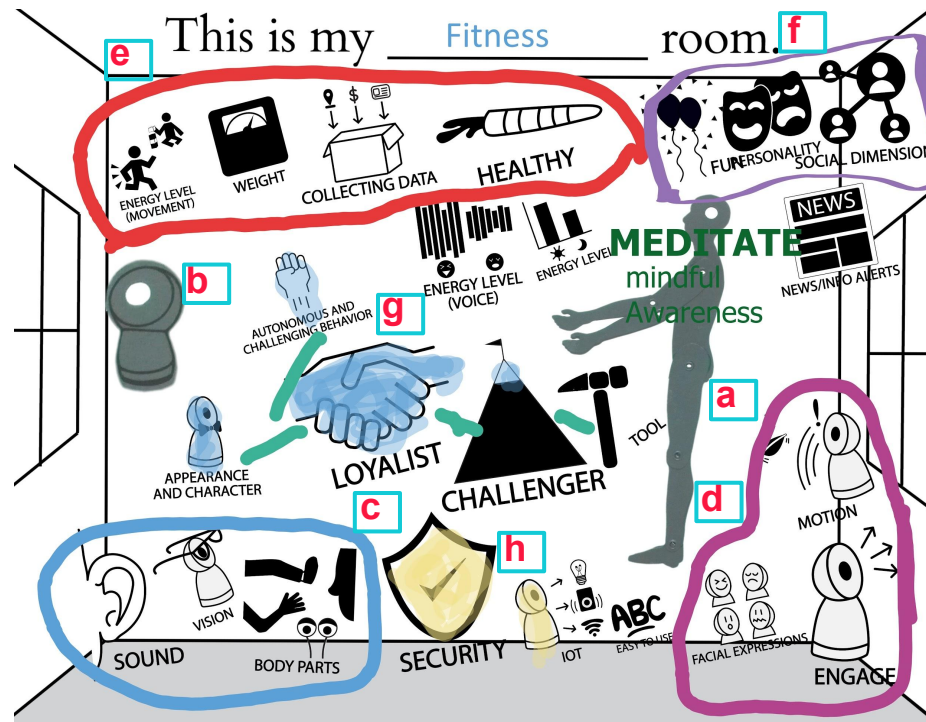
3. mark making

The third step is mark making. Participants can make 3 different kinds of marks: opaque, calligraphic, and translucent. For each of these marks, the thickness can be varied and there are various effects of overlapping marks. The varying marks and overlapping can be seen in the image on the right.

CA8 used mark making in three ways: (1) coloring icons to signify meaning, (2) connecting icons together using lines, and (3) organizing icons and using lines to demarcate a group. CA8 explained the **BLUE** encircled icons [c] signified help with diagnosing health and reading; the **PINK** encircled icons [d] signified the robot itself engaging in interaction; the **RED** encircled icons [e] signified data around diet and weight; and the **PURPLE** encircled icons [f] sharing with others. CA8 also shaded in icons in the mark making process. The blue shaded icons [g] were colored to demonstrate that those traits were important for a robot to bring to each interaction and the yellow shaded icons [h] were colored to demonstrate the concern for security and need for sharing data for improvement in the robot.
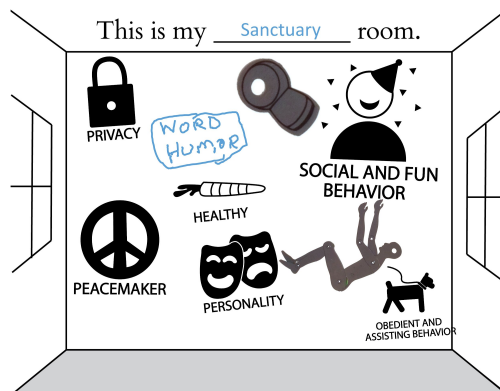
"you're talking to someone who's given this all a lot of thought over decades...I would suggest that it takes practice to really express in this new medium, how one can present, for example, the bridges necessary to emotions, the bridges necessary to trust. And it is limited to whether you're an artist, and your own thinking. We talked about the word worldview. Well, it's more than worldview that we need to apply these days, since we are concerned with planet earth, and life on planet earth, there's no reflection, necessarily when you think world view, that it means inter global connections." - **p22;** a peace advocate, lifelong creative player, and Holocaust survivor

Emotion was ever-present in sessions with participants revealing a vividness beyond participants' answers. Participants' emotions were embodied in three contexts: (1) the past, (2) the present, and (3) the future.

This is my _____ room.

SOUND

MULTIFUNCTIONAL

HELPER

TRUST

WORLD VIEWS

LEARNING ABOUT YOU

REVIEW COMMUNICATION

"Peacemaker, I like that. I'm big on the peace side." - p29

This is my __Sanctuary__ room.

PRIVACY

WORD HUMOR

SOCIAL AND FUN BEHAVIOR

HEALTHY

PEACEMAKER

PERSONALITY

OBEDIENT AND ASSISTING BEHAVIOR

"I believe that peace, imperfect peace, is better than no peace at all...And war is awful. We need to promote peace as much as possible...I won't go into politics, but as a veteran, I'm troubled by PTSD...The peace side, it's a symbol for me. It's a symbol of peace...Sorry to get emotional...But it really hit a nerve, yeah. In my man cave I have lots of peace symbols. They give me comfort...My grandchildren understand them...And they like peace so much too. I gave them. When they were small I gave them peace symbols..." - **p29;** a veteran

"The red, well, that didn't have a...I don't want to say that. It reminds me of the war. And the blood and so many guys who got killed. I guess that's probably some memory that I don't want to forget it. A lot of people say 'forget that' I mean, that happened. I just hope that doesn't happen to my grandkids. I've got one grandson who is 9 years old, I hope he never sees that. But you never know, there's so many crazy countries and somebody always wants to fight." - **CA9;** a veteran

This is my __thinking__ room.

MOTION

EMOTION

APPEARANCE AND CHARACTER

SYNCHRONOUS COMMUNICATION

ENTHUSIAST

This is my *emotion* room.

PERSONALIZATION SENSE

EMOTION

FEEL (TACTILE)
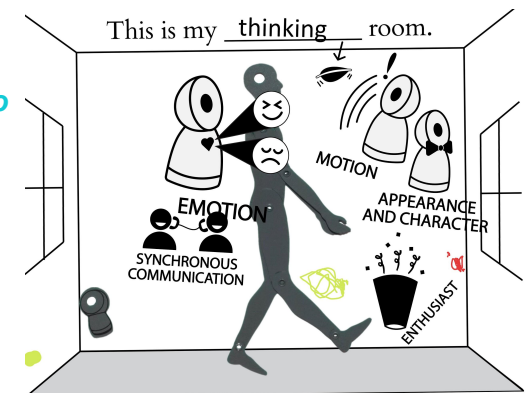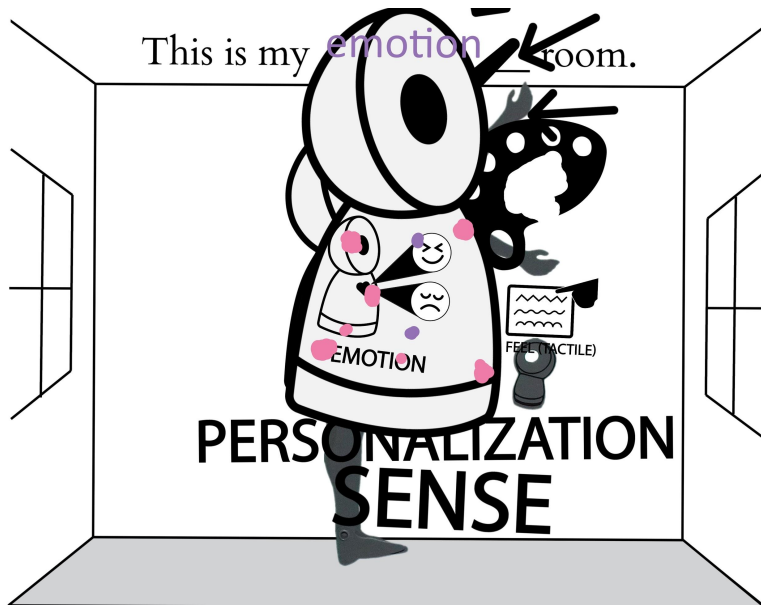
When asked what would we encounter if we went into their emotion room, *"It's either I'm joyful or depressed"*

"His face is so big...it is sensitive and is like analyzing anything that it sees. It wants to determine whether the person is happy or sad." **- CA3;** retired physician

When asked if there was anything else CA1 wanted to add, CA1 said *"Can I go there now?"*

"The engage one is because I need to be more engaged instead of by myself so much" **CA1, an artist, placed the** *engage* **icon right over the back of the figure. They said they chose the** *enthusiast* **icon because they** *"needs someone to make me more enthusiastic about things."* **and that they chose the** *motherly and protective* **icon because they need to feel like someone is more protective of them.**

This is my _____ CALM _____ room.

ENTHUSIAST

ENGAGE

MOTHERLY AND PROTECTIVE BEHAVIOR

This is my ___Family Room___ room.

Why they chose to focus on memory, *"My husband has Alzheimer's and it's been very difficult and trying for me dealing with him..I've been going through this whole process with him,* **I become acutely aware of my own limitations and my own memory,** *and I get very nervous thinking that the same thing could happen to me that's happening to him now.* **I don't know if this can really help me with my memory, but maybe it would be a boost."** *- p25;* **aspiring meditator**

This is my Life Enhancer room.

Why room is titled "Life Enhancer": *"It would enhance my life if I weren't ...The one thing that concerns me a lot now is my memory and getting very frustrated because I forget things and I make mistakes with things. Therefore I spend more time on these kind of everyday thing which I don't have a lot of patience with. I sit down to write an email and takes me much longer because I hit wrong keys and I don't know whether that's totally a memory thing, that also has to do with visual-spatial and manual dexterity and all those things get affected as you get older. But the number of times that it have to check my calendar every day is crazy. And then I forget to check it sometimes...Because it is ... I feel my life is quite good but I do find a lot of... I think one of the things, if I could say* **the one thing that I find hard about getting older is having to pay so much attention to myself and my body and what's going on. I mean in order to keep things running smoothly. And I'd much rather be out thinking about other things.** *But in order to just keep going in a relatively efficient way requires a lot of upkeep and thought and attention." - p23;* **retired geriatric neuropsychologist; community leader**

"If we had a more nurturing environment, people who observed folks of their peers who have particular needs could you know maybe not take it on their self which is depressing because it becomes all encompassing but they could talk to some of their friends and say just give an extra kind word to this person" **"Let's say there are periods when you're depressed and there are periods when you're not depressed at all...if I knew all the things I could do easily...in my room to help me feel more positive and minimize the things that make me feel negative that would be good** *...I think [a robot] could pick up from what you're doing and your facial expression and they could tease you! Or react to it: 'well if you're not going to play with me, I'm just going to go away!'" - CA5;* **community leader**

∞ emotion

THE FUTURE

"It could be very comfortable knowing this robot could help out with emergencies. That's why I have a bunch of these things. **And there's got to be trust so it doesn't like spread all over the place all the time.** *If you're an executor of deep trust, that kind of thing. There's just so much going on. Everything you do gets spread out, everyone knows where you are." - p13;* **volunteer with older adults**

This is my ___Problematic___ room.

This is my happy multitasking room.

Using art-based methods as metaphors enable people to explore their thoughts, feelings, opinions, and emotions around social robots more deeply, as seen from the images that people create in these contexts. By leveraging art-based metaphors in robot design, we can expand the metaphor of robots from utilitarian and anthropomorphic to socially and emotionally minded technologies as created by those that will incorporate the technology into our lives. **This metaphor allows us to design robots not *for* people but *with* people, as they *leverage their lived experiences in robot design*.**
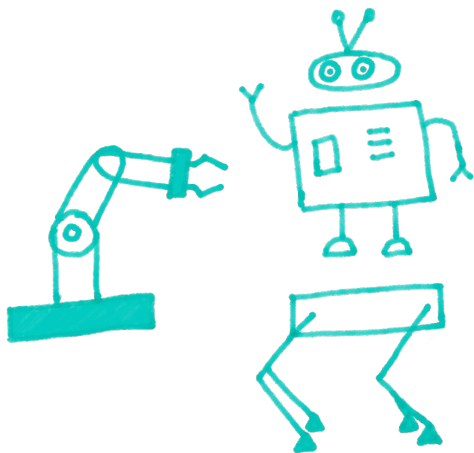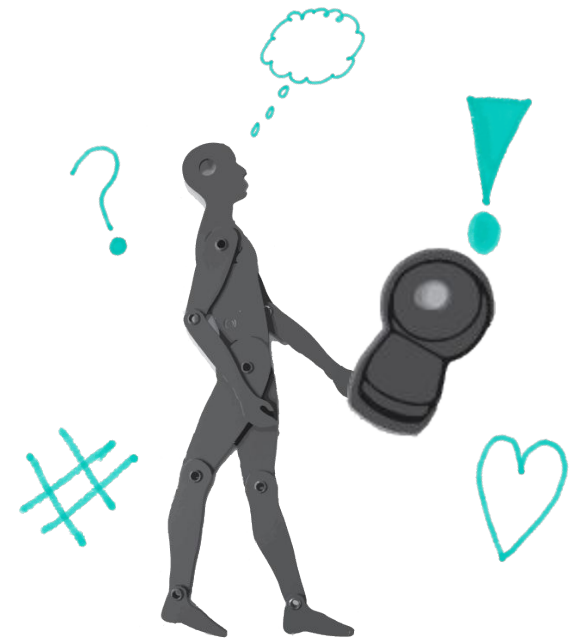
Art-based Approaches to Support the Metaphor of

Robot Design Minding the Socio-Emotional Context