Georgia Tech Digital Lounge

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Is My Robot Happy to See Me?

Atlanta (October 19, 2009) —People are social creatures. Robots … not so much. When we think of robots, we think of cold, metallic computers without emotion. If science fiction has taught us anything, though, it's that we crave emotion, even in our robots - think C-3PO or Star Trek's Data. So it stands to reason that if robots are ever going to become a fixture in our society, even becoming integrated into our households, we need to be able to read their faces. But how good are we at reading robot faces?

Scientists at Georgia Tech decided to test our ability to interpret a robot's "emotion" by reading its expression to see if there were any differences between the ages. They found that older adults showed some unexpected differences in the way they read a robot's face from the way younger adults performed. The findings will be presented at the upcoming Human Factors and Ergonomics Society 53rd Annual Meeting, Grand Hyatt, San Antonio, Texas on Thursday, October 22.

"Home-based assistive robots have the potential to help older adults age in place. They have the potential to keep older adults independent longer, reduce healthcare needs and provide everyday assistance," said Jenay Beer, graduate student in Georgia Tech's School of Psychology.

Beer, along with Wendy Rogers and Arthur Fisk, professors of Engineering Psychology at Georgia Tech and directors of the Human Factors and Aging Laboratory, used a virtual version of the iCat, called appropriately enough the virtual iCat, to test the difference among adults between the ages of 65 and 75 and 18 to 27. They had the virtual iCat exhibit seven emotions at various levels of intensity: happiness, sadness, anger, fear, surprise, disgust and neutral. They tested how well each participant could read the emotions of the virtual iCat.

Existing research on how well adults can recognize emotions on human faces has found that older adults are less accurate in recognizing anger, fear and sadness. But the robotic study found that older adults were less accurate in recognizing anger and fear, as expected, but had difficulty recognizing happiness, not sadness. In fact, they most often confused the happy expression with the neutral expression of the robot.

Beer reasoned that the similar success both younger and older adults had in recognizing sadness could be due to the difference in the way a human actually expresses an emotion and the way it's exaggerated in art.

"It may be due to the 'cartoon' look of the iCat, with the mouth turned down being very prominent," she said.

As for why the older adults had trouble recognizing the happy robot compared with their success in recognizing happy people, Beer suspected that the robot just didn't do a good enough job of expressing its emotion.
"It may be that older adults were not as cognizant of the facial features differentiating happy from neutral," she explained.

Researchers also found that neither the young nor old could easily distinguish the emotion disgust on the virtual iCat. Beer explained that this could be due to the difficulty in programming a robot to show this emotion.

"When humans express disgust, the nose is wrinkled and the lips are drawn back, creating creases on

PHOTOS

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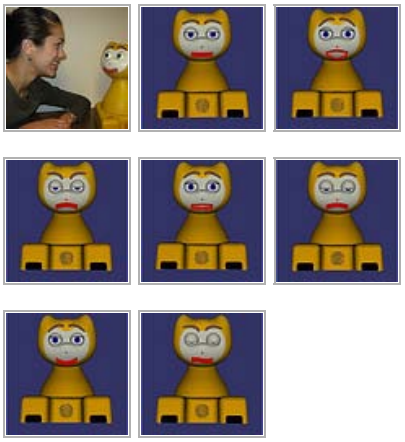

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each side of the mouth," said Beer. "Manipulating these wrinkles is difficult for a robot made with a plastic face."

Beer is continuing her work by studying whether other virtual versions of robots show the same differences when compared to the virtual iCat and the human face. What seems clear already, though, is if robots are going to be accepted by older adults in any social situations, they need to be designed with emotion displays that are easy to recognize, with some of them potentially being exaggerated to overcome any trouble older adults may have in reading that emotion among human faces.

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