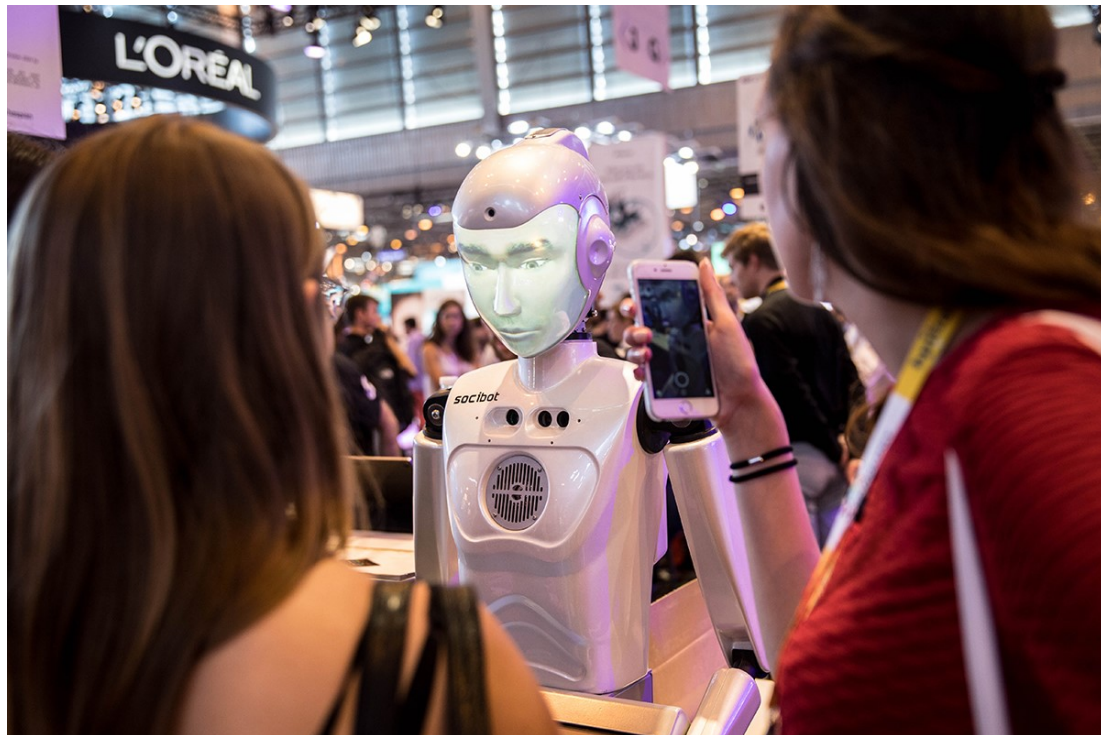


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We can program robots not to get all up in our personal space



Polite robots keep out of our way
Christophe Morin/IP3/Getty Images

By Aylin Woodward

FOR robots to coexist amicably with us, they need to learn about personal space. A software upgrade could help droids navigate crowded places like malls without jostling people around them.

Harmish Khambhaita and Rachid Alami at the University of Toulouse in France wanted to programme a robot to mimic human manners like stepping around one another, yielding to groups and respecting personal space. “The robot has to reason what the human would like to do and react,” says Khambhaita.

This may seem akin to what driverless cars do, but humans are tougher to predict than traffic. “We know where the roads are going and what the crossing points

are,” he says. “Indoors, the paths are not predefined. Anybody can move anywhere.”

In order to apply its etiquette lessons, the bot first needed a navigation upgrade. Robots normally get around using a two-step process, with the robot trying to predict where other objects will be, then planning how to move. If something moves unexpectedly between the steps, the software can freeze up.

“The robot mimics our manners – it has to reason what a human would like to do, and react”

To fix this, the team wrote new software combining the steps, so the robot constantly adjusts its planned path (arxiv.org/abs/1708.01267). Two laser scanners let their robot detect objects such as furniture, and a motion capture system tracked human positions using markers stitched into helmets that volunteers wore. Every tenth of a second the robot scanned for changes, then updated its predictions and trajectory, all while remaining fastidiously polite.

The team tested their robot in a 15-by-20-metre hallway with rooms on both sides. It was able to avoid bumping into people when someone was walking towards it, and when two people were passing on either side. It also yielded to a person emerging from a doorway.

Robots learn to give humans personal space



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