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Robots that “grow” through the experiences of touching, seeing and feeling

[MAIN BODY]

“Can you hand me the thick book I always use?” In response, the robot says, “No problem. Is this the one you want?” and brings the book. That’s the goal of my research.

Robots aren’t especially good at navigating situations like this

The reason today’s robots cannot carry on a conversation or behave like the one described above is the vagueness of phrases like “the thick book” or “I always use.” Robots cannot figure out exactly what items these words refer to. By their very nature, the microprocessors that make up robot brains are accurate and precise to a fault. Robots in an automobile manufacturing plant are given precise instructions—“the component located 3 meters in front and 5 cm above”—to execute their tasks.

But with growing interaction between people and computers, the precision of these instructions can lead to difficulties. For instance, computers will not work correctly with even the most minor error in command input. People find this inconvenient, because people do make mistakes and human communication doesn’t require such rigor. Mistakes in human communication don’t become major problems because people can sense to a certain degree what others want to say by assessing their circumstances. When someone says, “Bring that to me,” people can determine what the person means by the word “that” based on the circumstances—for example, handing the person an eraser if the person is studying or passing along soy sauce if the person is at a table and eating.

Combining embodiment and interaction

How can a robot gain the flexibility needed for self-assessment of circumstances? I think

“embodiment” and “interaction” are critical issues. “Embodiment” means accumulating experiences through the body, in the same way human children gain experiences by touching, seeing, and feeling as they grow up. If a robot receives an ambiguous instruction, the robot should ask a question to try to understand the instruction instead of just coming to a stop. Based on this concept, I’m trying to administer various experiences to robots—for example, teaching robots to move around inside an unfamiliar environment by avoiding obstacles or separating waste by type.

It will be a while before you have a robot working next to you in ordinary life, but attempts in this direction are underway.

(Interviewed and summarized by Akiko Ikeda)