Kids and robots learn to write together (w/ Video)

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Who is the teacher: the student or the machine? By showing a robot how to write letters, children improve their writing skills and gain self--confidence. This system, called CoWriter, was developed by EPFL researchers.

A little girl lines up plastic letters fitted with QR codes in front of a little humanoid robot. The robot struggles to reproduce them on a tablet – especially the loop of the letter p. The girl kindly steps in to help, writing out the word to show the robot how to do it. She puts in effort to teach the robot... without realizing that in reality she is the one who is improving her writing skills. Yesterday, EPFL researchers presented their new teaching tool, called CoWriter, at the "Conference on Human--Robot Interaction (HRI)", an important event in the field of interactive robotics, held in Portland, USA.

The program is based on learning by teaching, a recognized principle in pedagogy. When children experience difficulties in writing, they can easily lose confidence, begin to shut down, or even gradually lose interest in the learning process. Eventually, their entire education can be affected. When students put themselves in the place of a teacher and pass on what they know to their peers, they can regain their self--esteem and motivation. The researchers' idea was to make a robot play the role of the peer who needs to be taught. "Essentially, the goal is to provide a tool for teachers that is given a new role in the classroom, that of a student who knows even less than the slowest student in the class," explains Séverin Lemaignan, one of the authors of the study.

Hardly readable letters

Scientists developed progressive writing algorithms and implemented them on an existing robot model -- a 58 cm tall humanoid, designed to be likeable and interact with humans. With these algorithms, the machine can clumsily draw words on demand, and then gradually improve. To do this, it uses a vast database of handwriting examples, which allows it to reproduce common errors made by young children while learning. It is also possible to program the robot so that it addresses the particular difficulties of a student, for example, by drawing a P that is barely readable and improving its form over time.

New studies

The CoWriter system, still in the prototype stage, has already been used in primary school lessons with about seventy students ranging from six to eight years old, and then individually with a six year old child for one hour per week over the course of one month. So far the system has been very well received.

These experiments have mainly allowed testing the system from a technical point of view and to verify that the algorithms meet the children's long--term demands and that they lead to the desired outcome. In the coming months the researchers will conduct further studies to quantify the benefits of such a program: its effectiveness on the learning process and student progress, its ease of use for teachers and its applicability in more specialized fields such as speech therapy.

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