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The way toddlers waddle can teach robot footballers how to play



Robot footballers are famously bad – but they could improve if they follow what toddlers do

Description:Anadolu Agency/Getty

By Edd Gent

Tottering toddlers make surprisingly good coaches for robot football players. A team trained to mimic how infants walk comprehensively beat others trained on geometric walking patterns.

Children learning to walk look clumsy, but their meandering, start-stop stumbling exposes them to a wide variety of walking behaviour. Developmental psychologists from New York University wanted to investigate whether this variability aids learning or is an unhelpful side-effect, but that's hard to test because long-term observation of everyday walking behaviour is difficult and time-consuming.

So they teamed up with roboticists at the University of Texas at Austin to train virtual robots to walk like infants. They recorded walking paths of 90 babies at play and used the data to create an

hour-long training course in a 3D simulator with the humanoid bots rewarded or penalised depending on how well they followed it.

They were then pitted against robot teams trained on simpler straight, square and circular courses in a simulation of the RoboCup – an annual robot football tournament.

Each team played each other 1,000 times and the infant-trained team won convincingly, with 2,888 wins, 1,037 draws and just 75 losses. While it's hard to draw conclusions about children's development from simulations, the researchers say it suggests toddlers' rambling paths help them learn.

Baby steps

Most infant walking research uses laboratory tests that don't capture the variability children experience in real life, says co-lead author Justine Hoch of New York University. "We kind of forget that what we've been studying isn't the way babies actually learn," she adds. Simulation lets them reproduce more natural behaviour, she says, as well as isolate and test specific aspects of walking.

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The other co-lead author, Ori Ossmy, also at New York University, hopes the research will also provide pointers for roboticists. Actual infant walking paths may not make the best training data, he says, but further work could tease out the underlying features making them so useful for learning.

University of Washington child development specialist Andrew Meltzoff, who also works with roboticists, says the paper is a great example of why developmental and computer scientists should work together more.

"Evolution has built a very powerful learning machine," he says. "In their first two years babies solve many of the problems roboticists are spending hundreds of millions of dollars trying to solve."

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