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One small step for man, one giant leap for robots as machine takes first steps

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Walking robots, like those depicted in Star Wars, have come a step closer to reality with a biped machine that adjusts its gait to climb up slopes without falling over.

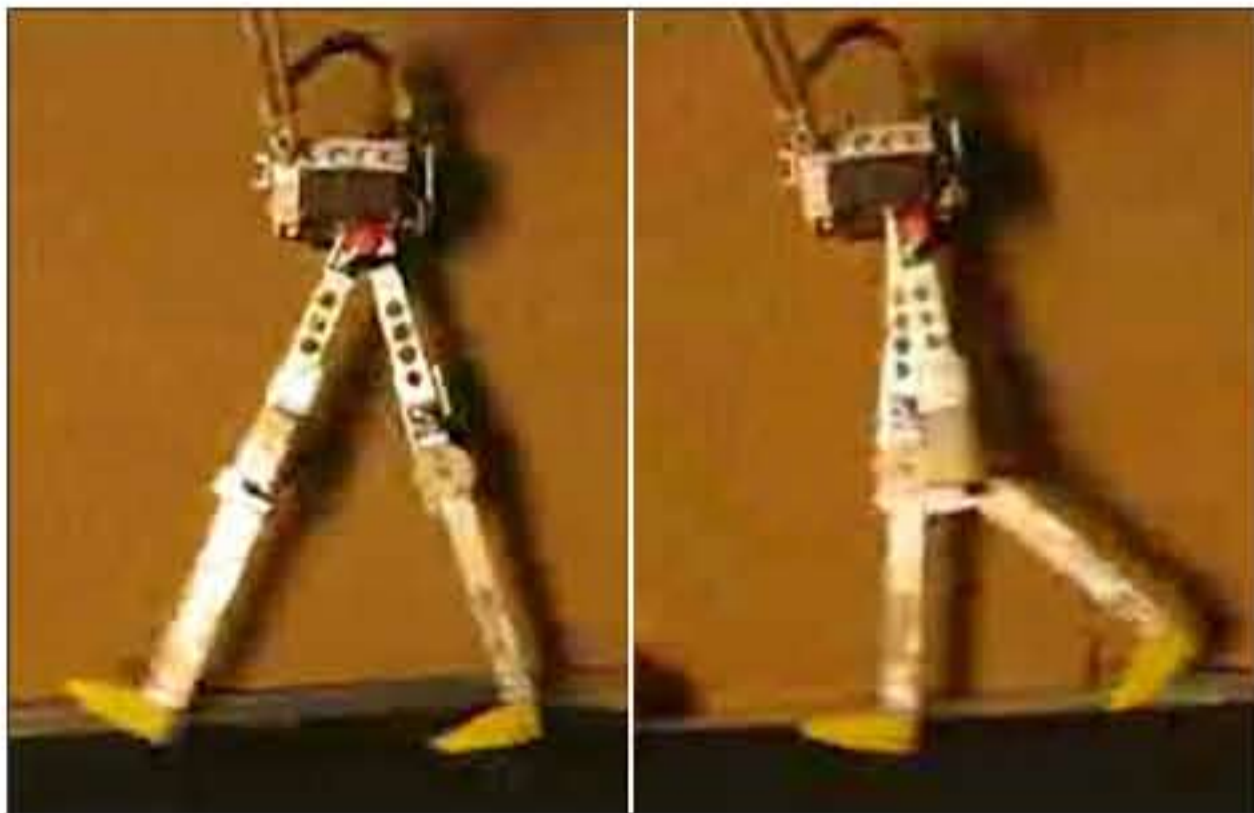
Built by robot engineers in Germany, 'RunBot' has learnt to walk like a human toddler.

On its first two or three attempts at climbing up a ramp, the machine which consists of a pair of legs and a trunk, lost balance and toppled backwards.

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First steps: The robot

But it quickly learnt to correct itself and stay upright by taking shorter steps and leaning forwards.

On reaching another flat surface, the robot adjusted its gait again.

Robots that walk upright in this way abound in science fiction, but present great technical challenges.

Such abilities will be essential if bipedal domestic robots that can help around the house, carry shopping, or care for the elderly, are ever to become a reality.

RunBot already held the record for robot speedwalking, and can bowl along at more than three leg-lengths per second.

The German team upgraded the machine by giving it an infra-red eye and an 'accelerometer sensor' which acts like the balance mechanism in the human inner ear.

Both are linked to an artificial 'brain' or neural network which decides how the robot should respond when it spots a slope ahead and feels its balance slipping.

RunBot has jointed hips and knees, each driven by a servo motor.

Seventy per cent of the robot's weight is concentrated in its trunk while shortening its stride and leaning forward by just the right amount enables the machine to race up slopes without falling.

The brain learns from experience, so the robot's performance improves over time.

Professor Florentin Worgotter and colleagues from the University of Gottingen described RunBot's progress in the online journal PLoS Computational Biology.



They wrote: "This robot can walk with a high speed, self-adapting to minor disturbances, and reacting in a robust way to abruptly induced gait changes.

"At the same time, it can learn walking on different terrains, requiring only a few learning experiences.

"This study shows that the tight coupling of physical with neuronal control, guided by sensory feedback from the walking pattern itself ... may be a way forward to better understand and solve co-ordination problems in other complex motor tasks."

RunBot brought "the goal of fully dynamic and adaptive biped walking in artificial agents a little bit closer," the scientists added.

Femail



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