

# Gait Evolution for Humanoid Robot in a Physically Simulated Environment

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## Abstract :

This article describes a bio-inspired system and the associated series of experiments, for the evolution of walking behavior in a simulated humanoid robot. A previous study has demonstrated the potential of this approach for evolving controllers based on simulated humanoid robots with a restricted range of movements. The development of anthropomorphic bipedal locomotion is addressed by means of artificial evolution using a genetic algorithm. The proposed task is investigated using full rigid-body dynamics simulation of a bipedal robot with 15 degrees of freedom. Stable bipedal gait with a velocity of 0.94 m/s is realized. Locomotion controllers are evolved from scratch, for example neither does the evolved controller have any a priori knowledge on how to walk, nor does it have any information about the kinematics structure of the robot. Instead, locomotion control is achieved based on intensive use of sensory information. In this work, the emergence of non-trivial walking behaviors is entirely due to evolution.

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