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Commentary

Emerging Trends in Bio-Inspired Robotics

Michael Richardson*

Department of Bioinformatics, University of Toronto, Toronto, Canada

DESCRIPTION

Biologically-Inspired A body of work at the connection of biology and robotics includes robotics. In order to avoid ambiguity, this article will refer to this broad intersection as "bio robotics," reserving the terms "biologically-inspired robotics" (sometimes called "biomimetic") for work whose primary focus is the application of biological concepts to solve technological problems, and "bio robotic modeling" for work whose primary focus is the use of robots as a modeling tool to solve biological questions.

A key component of series on computational intelligence, biologically inspired intelligence technique, is essential for robotics. Using neural network techniques with biological inspiration, the autonomous robot and vehicle industry will continue to have a significant impact on our economy and society. It is addressed that multiple robots work together to efficiently accomplish a shared coverage goal, which can increase work capacity, share the coverage tasks, and shorten completion time by using a biologically inspired intelligence technique. The coverage task must frequently be completed in real-world applications without any prior knowledge of the environment. A team of robots will be guided by a bio-inspired neural network that is built to model a dynamic environment. Shunting neural equations are used to describe how each neuron in a topologically organized neural network behaves. The other moving robots are seen as obstacles by each mobile robot. The neural network's dynamic activity landscape and the previous robot position are used to generate each path independently. Computing complexity is low for the suggested model algorithm. Four simulation studies are used to support the viability.

Cooperative coverage by a system of multiple robots is now becoming more and more significant. Multiple robots working together to cover an area can increase efficiency and speed up the completion of tasks. These robots might divide up the coverage tasks, shortening the time it takes to finish the task. Robotic coverage can also increase reliability and robustness because even if one robot fails, the others will still complete the missions. For instance, the use of cooperative multi robots improves coverage reliability, a crucial factor in de-mining applications. In some cleaning situations, there is a time limit on how long the workspace can be cleaned. Consequently, it requires several robots to cooperate with one another.

Biomimetic robot design

The investigation of soft morphing, fabric structure-based deformation control, and soft-jumping methods exploiting magnetic yield points. The rounded ankle structure created using soft morphing and an energy storage and release mechanism allow the soft jumping mechanism to transfer energy more effectively and steadily. For a snake robot, a driving assistant mechanism is suggested that aids locomotion without the use of additional driving algorithms and sensors. The driving assistant mechanism can speed up movement and prevent roll-down on a slope.

Mechanical system design from bio-inspiration

Based on the morphological concept of the lever mechanism in the Salvia pratensis flower, a design technique for a multifunctional lever that is inspired by nature is given. Three distinct functional needs are met by four partial shapes. The lever contour's final design is produced and tested by visual measurement procedures.

Correspondence to: Michael Richardson, Department of Bioinformatics, University of Toronto, Toronto, Canada, E-mail: michaeel.richardscon@uni.edu.ca

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