ROBOTICS

AntBot makes its own way home

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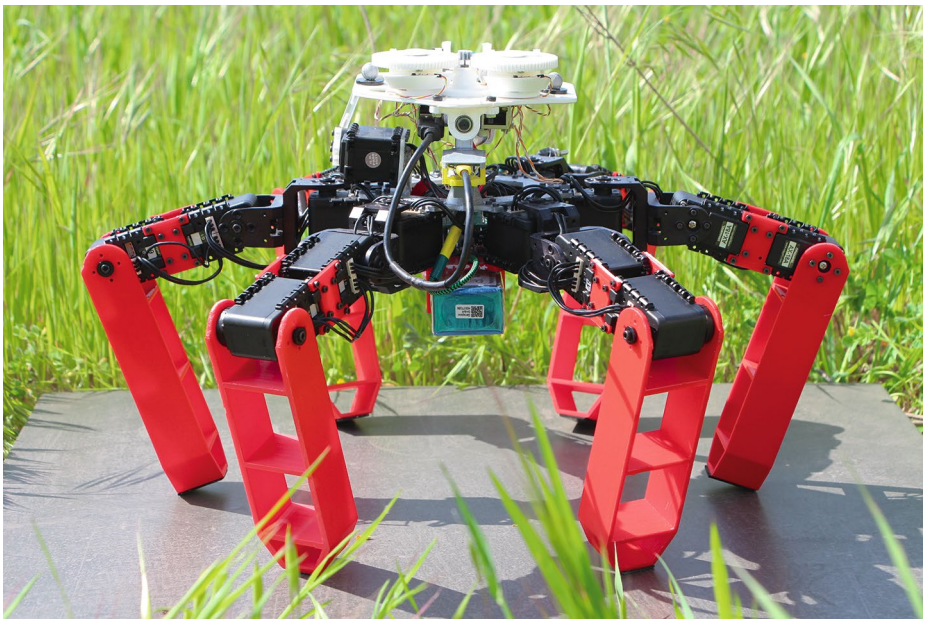

Credit: Julien Dupeyroux — ISM/AMU/CNRS

The accurate and reliable tracking of the motion of a robot is an important step in the development of an autonomous system. Existing navigation approaches typically rely on the use of the Global Positioning System (GPS), but its accuracy is limited. Alternatively, visual and inertial information can be used to track surroundings. However, visual-based methods, such as light detection and ranging (LIDAR), require a heavy computing workload, whereas inertial measurement units, which consist of accelerometer and magnetometer components, may be affected by electromagnetic interference. Stéphane Viollet and colleagues at Aix-Marseille Université have now demonstrated a hexapod robot — known as AntBot — that is inspired by the behaviour of desert ants and has a navigation system based on just a few sensors.

To estimate its orientation, the AntBot is equipped with a celestial compass that is sensitive to ultraviolet light and can extract patterns of polarized skylight. It is also equipped with an optic flow sensor that can extract information about the distance travelled by comparing the detection of a moving edge from two different pixels. In addition, the robot can estimate the distance travelled by counting its steps using its motor signal. By combining these processes, the researchers developed five navigation modes for the AntBot, and tested the modes with a series of homing tasks under real-life conditions, both indoors and outdoors.

Viollet and colleagues found that the AntBot can navigate back to a starting point after a random trajectory with an error of 0.47%, and the homing success of the experiments is not affected by changing sky conditions.

Christiana Varnava

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