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Robo-pigeon flying under preprogram-control outdoors

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Robo-animal is a new branch in specialized robot, which treats a living animal itself as the mobile robot platform and controls its movement by neuro-modulation. Robo-pigeon has been investigated in recent years because of its ideal mobility and bearing capacity, but so far it has only been studied under laboratory conditions. Investigation under natural condition outdoors is still lacking. To develop a controllable robo-pigeon flying outdoors, here we have proposed an onboard preprogram approach to design a carriable control module and proposed a hierarchy stimulation algorithm to ensure the effectiveness of control signals of deep brain stimulation (DBS). The control module, in dimension of 34 mm×24 mm×20 mm and in mass of 16.8 g, could generate control signals automatically according to the local position and timing of the integrated global position system (GPS). The stimulation algorithm was hierarchized into three levels, single-, periodic- and multi periodic-stimuli. Two robo-pigeons were tested outdoors in the range of 30 km around the pigeon loft. On the level of multi periodic-stimuli, both robo-pigeons were controlled well. Orbiting flight was properly elicited at the preprogrammed GPS region. The first controllable flight in outdoor robo-pigeons will open the door to exciting new applications of specialized robot such as forestry survey.

Recent Publications

1.Ortega-Jimenez V M, Badger M, Wang H and Dudley R (2016) Into rude air: hummingbird flight performance in variable aerial environments. *Phil. Trans. R. Soc*. B; 371: 20150387.

2.Cai L, Dai Z, Wang W, Wang H and Tang Y (2015) Modulating Motor Behaviors by Electrical Stimulation of Specific Nuclei in Pigeons. *Journal of Bionic Engineering*; 12: 555-564.

Biography

Hao Wang is Associate professor at Nanjing University of Aeronautics & Astronautics, China. Hao Wang has his expertise in animal flight, bio-inspired robotics and robo-animals.

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