

Abstract

Modularity exists in biological networks and has various advantages which might also benefit robotics. For example, compared with fully connected networks, modular artificial neural networks may allow robots to adapt to new situations by modifying only part of their neural network without disrupting functionality in other parts of the network. Also, modular networks are sparse, which may allow for the evolution of increasingly large networks in increasingly complex robots. However, it is often not clear where and how modularity should be incorporated into a robot's controller. So, here I show an experiment in which modularity arises in response to evolutionary pressures that act on a simulated robot arm: The neurons in the robot's arm become increasingly interconnected; the neurons in the hand become increasingly interconnected; and the neurons between the arm and hand become increasingly disconnected.