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Scientists are looking for small smart robots that can navigate in dynamic and unknown environments such as the aftermath of an earthquake. This challenge inspired Tahmid Latif and Alper Bozkurt from North Carolina State University to turn cockroaches into biobots (biological robots). Their remotely controlled cockroaches could someday serve as a mobile web of sensors that collect and transmit data from hard-to-reach places.

Cockroaches have antennas (called cerci) that can sense tactile input, temperature, and humidity. Latif and Bozkurt created a wireless device that attaches to these antennas and can deliver small electrical pulses that drive the cockroach.

The device consists of: a microprocessor with Zigbee interface [1], electrodes and a battery; the user controls the microprocessor using a Zigbee transceiver. tested They incorporated thein their final device due to ,agreater number of I/O ports

Latif and Bozkurt used Madagascar Hissing cockroach dbecause of its larger size (~50-75mm), slow speed (~3cm/s), long life span (~2 years), and robustness. After anesthetizing the cockroaches by cold-treatment (4C) for 45-60 minutes, they attached one side of each electrode (5cm long stainless steel coated with 250um thick Teflon) to the antennas.

In tests of the device, cockroaches followed an S-shaped trajectory drawn on the laboratory floor and spent 81 sec. with 10% success rate to complete the route. MORE DETAILS HERE!

This system is still too large because… But this finding opens the door to scientists to start using insects as biobots. Someday, armies of cockroaches may be the best hope for rescue for natural disaster survivors.