New Technology Transmits Data via Visible Light

Researchers are working on a technology that would utilize the LEDs in common light fixtures to transmit data over short distances.

“When LED light fixtures become commonplace, their use as a communications device will also become commonplace,” predicted Shinichiro Haruyama, a Keio University professor, vice president of the Visible Light Communications Consortium (VLCC), and one of the original VLC researchers.

“LEDs are becoming popular,” he explained, “because their light-emitting power is becoming large enough and their lifetime is longer than those of conventional incandescent lamps and fluorescent lights.” Also, he noted, LEDs’ power efficiency is greater than that of incandescent lamps and about same as that of fluorescent lights.

Tracking Troubled Turtles with Wireless Technology

US scientists are attaching small computers to snapping turtles and using their own TurtleNet network technology to track the reptiles’ movements, as part of a project that could enable researchers to help the animals cope with threats to their habitat.

University of Massachusetts Amherst researchers designed this project to help them understand the turtles’ regular movements, which could let them help the reptiles survive encroaching land development and an increase in predators, which threaten some other types of turtles.

For example, the scientists could inform developers where turtles frequently go so that they could avoid building there, explained Mark Corner, a University of Massachusetts assistant professor of computer science. The project would also provide basic biological information about the turtles, he noted.

In general, turtles are subject to swift population declines because they live a long time and reproduce infrequently, noted Michael Jones, a University of Massachusetts PhD candidate in organismic and evolutionary biology.

Therefore, he explained, the researchers decided it would be prudent to research the snapping turtles as part of their larger Diverse Outdoor Mobile Environment (DOME) project.

The scientists use orthodontic cement and duct tape to attach small computers to turtles’ backs and track their movements along western Massachusetts’ Deerfield River.

The machines record information about the animals’ location and the ambient temperature, which identifies when they are sunning themselves and when they are in the water. The computers are powered by the sun, which also recharges the batteries that provide power during the night or in overcast conditions, said Corner.

“The computers are about the size of a roll of coins but weigh less than 100 grams. We are always trying to make them smaller so that they won’t interfere with the turtles’ movements,” he said.

When the turtles pass within 500 meters of one another, their radios exchange information via a disruption-tolerant network, which uses a data-transmission technology that the researchers developed for their DTN. This puts as much data as possible on each animal’s computer.

Each turtle also transmits data when it is within about 500 meters of a centrally located base station. The station then uses cellular technology to send the data to the researchers about 24 kilometers away.

The turtle-mounted computers thus don’t have to make long transmissions, which would require large, heavy batteries that need frequent recharging.

In the future, Jones said, the researchers hope to refine the technology for use with species that have critical conservation needs.