MIT builds swimming, oil-eating robots

Nanotechnology used in autonomous robots that could work in swarms to clean up oil spills

By Sharon Gaudin
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Computerworld - MIT researchers have used nanotechnology to develop a robot that can autonomously navigate across the surface of the ocean to clean up an oil spill.

Scientists envision using a fleet of the devices, dubbed a Seaswarm, to clean up oil spills more efficiently and at less cost than current methods, according to the university. Researchers report that a fleet of 5,000 Seaswarm robots would be able to clean a spill the size of the recent one in the Gulf of Mexico in a single month.

"We hope that giant oil spills such as the Deepwater Horizon incident will not occur in the future, however, small oil leaks happen constantly in offshore drilling," said researcher Carlo Ratti, in a statement. "The brief we gave ourselves was to design a simple, inexpensive cleaning system to address this problem.... Unlike traditional skimmers, Seaswarm is based on a system of small, autonomous units that behave like a swarm and 'digest' the oil locally while working around the clock without human intervention."

MIT's Seaswarm robot for cleaning oil spills. (Photo courtesy of MIT.)

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A team of MIT scientists developed a prototype of the robot and will show it at an international festival in Italy this weekend. The festival is focused on how nanotechnology will change lives by 2050.

The 16-foot-long, 7-foot-wide robot is designed to use a conveyor belt covered with a thin nanowire mesh that absorbs oil. The nano mesh, which was developed at MIT, repels water while absorbing 20 times its own weight in oil. According to the university, the oil can be removed from inside the robot and burned. Then the mesh can be reused.

Engaging in swarm behavior, the units will use wireless communication and GPS technology to move across an area of ocean without bunching up or leaving some areas uncleaned, MIT said. Upon detecting the edge of a spill, the robots will begin moving inward, communicating with one another to ensure that they spread out evenly across the spill.

"We envisioned something that would move as a rolling carpet along the water and seamlessly absorb a surface spill," said MIT researcher Assaf Biderman. "This led to the design of a novel marine vehicle -- a simple and lightweight conveyor belt that rolls on the surface of the ocean, adjusting to the waves."

The robots also power themselves using two square meters of solar panels.

MIT, which noted that the robots should be able to work continuously for weeks, reported that during the cleanup of the Gulf of Mexico oil spill, more than 800 skimmers were deployed but only 3% of the surface oil was collected.

Last October, MIT scientists were working to develop a robot, called the Affective Intelligent Driving Agent (AIDA), which would sit inside motor vehicles. The system was designed to change the way people interact with their vehicles, helping them to avoid traffic jams and find the cheapest gas along their route.

And last year, an MIT spin-off, Boston Dynamics, said it had started work on a four-wheeled robot that will be able to jump over obstacles and aid military troops in combat. Called the Precision Urban Hopper, the machine is being built for Sandia National Laboratories.

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