Robotic Water Sensors: NUSwan



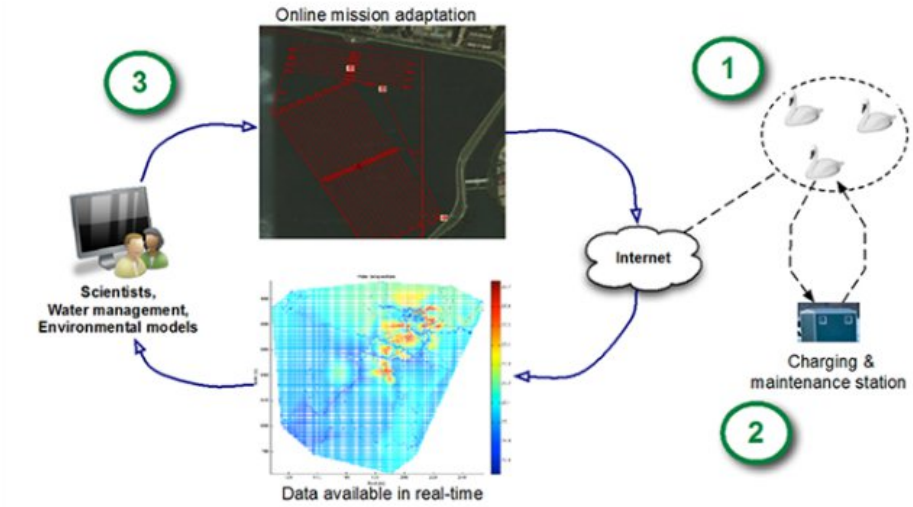
Researchers at the National University of Singapore have come up with a novel and discreet way to monitor water quality, especially in urban areas: robot swans.

The **New Smart Water Assessment Network** (shortened with the university's initials to NUSwan) is an ongoing research project that uses small self-driving watercraft to test a number of standard water quality metrics and watch for pollutants and contaminants. The robots are disguised as white swans, which helps them blend into the environment.

Each bird-bot has a GPS receiver for navigation. That allows the bots to methodically move around a body of water and make sure different areas get tested without unnecessarily duplicating data points, while also letting them return on their own to a charging station — all of which minimizes the time researchers need to spend on direct remote control and maintenance. Data can be collected by Wi-Fi

whenever the bots come in range of the shore.

“It would be expensive to do similar monitoring manually or using AUVs (Autonomous Underwater Vehicles),” one of the researchers, assistant professor Mandar Chitre, **told Channel News Asia**.



In urban reservoirs and lakes that serve as both a water supply and a site for recreational boating and swimming, water quality managers have an increasing need for reliable, real-time data. One concern is algal blooms, sudden growths of single-celled plant species that can be toxic to humans and wildlife. Harmful blooms are thought to be linked with chemicals like phosphorus, which are delivered into bodies of water by runoff from fertilized lawns and farms, sewage, and household waste.

In fact, The NUSwan team is working with other NUS researchers to add a phosphate sensor to their bots — one of many possible extensions and upgrades they hope to develop for the platform. Since algal blooms can develop in as little as a day or two, having a fleet of mobile sensors in the water at all times could make it easier to stay on top of a potential crisis situation like the one **currently predicted for parts of Lake Erie**.

“Scientifically, the NUSwan test drives a new paradigm of freshwater monitoring, one that is persistent and interactive,” Chitre said.

The concept of using robotic vehicles to autonomously monitor the environment is hardly limited to urban water bodies, however. The options for robotic locomotion include everything from aerial drones to **all-terrain tanks** and even **multi-legged “hexapod” bots** that crawl around like spiders. Though there have been a number of environmental monitoring projects that use Internet-connected sensors in fixed locations, the possibilities for mobile sensor networks are only just starting to be explored.

Learn more about NUSwan in the Channel News Asia video below.

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