Robotics enter the COVID-19 fight

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A decontamination robot funded by the Office of Naval Research (ONR) and designed by several local universities was recently tested in Richmond Va. The robot—initially designed for shipboard firefighting and maintenance tasks—has now been enlisted in the fight against COVID-19.

The robot has four wheels and a mechanical arm that uses short-wave ultraviolet (UVC) light to decontaminate surfaces. Its current version requires humans to oversee and "drive" the robot, but the hope is the robot will become fully autonomous.

"The value of robots to deploy UVC lamps for decontamination is that you can reduce exposure of humans to the UVC light, and the robot can reposition the lamps over surfaces you wish to decontaminate, using its arms," said Dr. Thomas McKenna, a program officer in ONR's Warfighter Performance Department. "When the robot was designed, there was no COVID, but the combination of mobility and manipulation are a good match to this task."

ONR has sponsored fundamental research in human—robot interaction and humanoid robots for more than 20 years. This research is occurring at several universities, small companies and at the U.S. Naval Research Laboratory (NRL). ONR has provided research as well as; programmatic direction and resources. NRL has a lab that is advancing state-of-the-art robotics and human interaction with robots.

The ONR robotics program is focusing on removing humans from dangerous situations. Additionally, the program wants robots to perform routine tasks, in order to free up Sailors and Marines to concentrate on their primary responsibilities and training.

The ONR program in humanoid robots has focused mainly on shipboard damage control, including firefighting and shipboard maintenance.

"The robots that were developed at Virginia Tech and now at the University of Virginia were designed for shipboard firefighting and maintenance tasks," said McKenna.

"When COVID-19 emerged, I asked the NRL Artificial Intelligence (AI)

lab to track how robots were being used around the world to help fight the disease, including their use in hospitals and for decontamination."

McKenna added that Dr. Tomonari Furukawa, a professor at the University of Virginia, "recognized how he could improve robot decontamination by the use of the manipulators on his mobile robots, to adaptively position UVC lamps to illuminate surfaces like table-tops and chairs."

The robots in this recent demonstration were teleoperated by students.

"The robot can already disinfect by teleoperation—in August, we tested and successfully demonstrated disinfection of a room of COVID-19 at a testing center while teleoperating from a different building," said Furukawa. "We are currently developing the ability to build a 3-D map showing disinfected surfaces and possibly infected surfaces, with which we can next introduce autonomous disinfection. Full completion will need much more work, but we are planning to complete the first installation of the mapping capability by the end of this year."

Mobile robotics is still in an early stage, experts say, and more research is needed to make the robots more agile and more autonomous.

"I was pleased at the control and mobility that was shown in the demo," said McKenna. "Of course, one would have to validate that the viral load was actually reduced on the exposed surfaces, and that was not a part of this demo. The mobility capabilities demonstrated are very promising as we move further in the development stage."

Provided by Office of Naval Research

https://techxplore.com/news/2020-10-robotics-covid-.html