



Using robots to help fight infectious diseases

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ABSTRACT

As the coronavirus emergency exploded into a full-blown pandemic in early 2020, forcing countless businesses to shutter, robot-making companies found themselves in an unusual situation.

We cover both the advantages and the challenges for each robot, finding that robotics systems are overall apt solutions for dealing with many of the problems brought on by COVID-19, SARS-CoV-2, Ebola virus, including: diagnosis, screening, disinfection, surgery, telehealth, care, logistics, manufacturing.

Keywords:

COVID-19, SARS-CoV-2, robots, Ebola virus, drones, Public health, healthcare, medtech robots, sensors, UV robots.

How roboticists could potentially be useful during an outbreak, epidemic, or pandemic?

Introduction

From a technical perspective, people have started deploying robots to deal with the current difficulties brought by COVID-19, such as, stopping this highly contagious virus from further spreading, improving efficiency within specific industries, and continuing necessary social function.

It is widely confirmed that diagnosis and screening are critical for containing the spread of the pandemic. Therefore, increasing the testing accuracy and capacity has become an essential public health challenge.

In the world of healthcare, medtech robots are being necessary:

- It's managing laboratory specimens
- assisting with surgery, rehabilitation
- Physiotherapy Entertainment.
- Increasingly (particularly during the pandemic),
- Using robots to help fight infections

- They can offer increased productivity, efficiency, quality and consistency in certain setting
- Unlike humans, robots don't get bored.
- a humanoid robot developed by Diligent Robotics fetches supplies and brings them to patients' rooms
- a robot can drive down the hallways, enforcing face-mask and social-distancing rules and spraying disinfectant.
- Robots enabling doctor to check on their patients around the clock while minimizing exposure and conserving protective equipment. They can repeat the same process continuously.
- They can be very accurate to identify the perfect target spot inside the person's throat.
- Robots can work in environments that are unsafe for humans and reducing the

risk that they'll contract the pathogen they're fighting against.

- They don't have physical or environmental needs in the same way humans do.
- Some robots have sensors and actuators which are more capable than humans.
- Robots can't replace real human interaction, of course, but they can help people feel more connected at a time when meetings and other social activities are mostly on hold.
- Patients walking into the facility get their temperature checked by the robots, which are equipped with thermal cameras atop their heads
- Drones can be used for deliveries. Masks, gowns, gloves, critical materials, transport test samples, and distribute drugs and vaccines.
- Commercial UV robots are well-defined products with full sensing capabilities to understand their working environment, able to detect people, automatic recharge capabilities and perform pre-programmed routes for 24/7 service

Challenges

- Privacy incursion is always a serious issue for electronic devices, including robots working closely with the human. As the information technology being rapidly developed, electronic devices including social and care robots are trying to obtain personal information about users to be shared between commonly used tools and robots. For example, robots in use need to record a users' voice, face, and body images that can be divulged if they are not appropriately secured.
- Another challenge people can easily ignore is the potential virus transmission via shared robots with frequent physical human-robot interaction.
- Someone may also argue that robots can easily replace human labor in the elderly care field, causing the loss of

experience capacity of human caregivers after the pandemic is over.

- In some places, robots are replacing human jobs, which can create economic problems.
- On the whole, robots can only do what they are told to do, meaning they can't improvise (although AI and machine learning is changing this).
- Current robotics technology means that most machines are less dexterous than humans and can't compete with a human's ability to understand what they can see. Although experts are working on developing robots that can better sense the world.
- Robots with practical applications are generally expensive in terms of the initial cost, maintenance, the need for extra components and the need to be programmed to do the task.

Those are some very fundamental lessons. And one of the first ones is, quit trying to get robots to replace people. Robots should not (and cannot) be taking the place of skilled workers like doctors or nurses or EMTs, and they should also not be used in situations where human empathy is important, because patients don't want that. Instead, robots should be used to protect these human workers, and to assist them by minimizing the time that they waste on unskilled tasks.

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