

## ROBOTS VS CORONAVIRUS

*Ziuziun P.R.*

*Belarusian State University of Informatics and Radioelectronics, Minsk, Republic of Belarus*

*Andreeva O. V. – Senior lecturer*

**Annotation.** Due to the world pandemic, plenty of doctors and other medical workers became infected. They don't cope with COVID-19 and modern technologies came to the rescue. Everyone knows about Coronavirus, but not everyone understands who helps paramedics to fight with this great disease. In my report I want to show people the role of robots in this difficult "fighting" with COVID-19 or, more simply, how technologies are helping to cope with the pandemic?

**Keywords.** Robots, Coronavirus, COVID-19, China, gadget, invention, pandemic, medical.

Since the beginning of the epidemic COVID-19, a large number of doctors and nurses have become infected and died. To fight against Covid-19 it was decided to introduce modern developments. The pandemic and general isolation gave a chance to the development of new technologies and gadgets, which seemed to be a matter of the distant future. During the coronavirus pandemic, human contacts are limited - robots come to the rescue. They help in the prevention and diagnosis of COVID-19, and the care and treatment of infected patients. Food delivery drones, medical robots and health monitoring sensors are increasingly being used in China, Europe and the United States [1].

The first robots fighting against coronavirus were used by Asian countries, where the epidemic began earlier, such as China, South Korea and Thailand. They are still being tested, it takes more time for mass distribution. In Thailand robotic nurses have been installed in three hospitals. They can care for patients with confirmed infection and those who are suspected of having it. Droids monitor primary symptoms and measure temperature to prevent medics from doing this [2]. A robot that takes a swab from the throat is being tested in China. This invention directs an endoscope, reads a picture and collects biomaterial, and then sends it to laboratories for research. Devices that measure temperature are now being tested in many countries, including Western ones. Such devices can be installed in crowded places: shopping malls, cinemas, restaurants, and so on [3].

Since February in Wuhan, China, which has become a hotbed of the spread of coronavirus, robots were used to disinfect hospitals and streets. They were created by "TMiRob", a Shanghai-based company. The robots are painted in "hospital" white color, in the upper part there are sprays for a solution of hydrogen peroxide, and ultraviolet lamps are mounted in the body. Ultraviolet radiation is known to be sterilizing because it damages the genetic material of viruses and destroys them.

Smart cars are equipped with sensors that allow them to navigate in space, avoid obstacles and efficiently disinfect almost every centimeter of the room. The devices are used in operating rooms, intensive care units and isolation wards. This frees up medical personnel and avoids contamination of people. Such robots work without breaks. Similar machines are used in hospitals in Italy [4].

Gyeonggi-do Infectious Disease Control Agency of South Korea is implementing indoor air and surface disinfection systems based on Hanwha HCR robots. The robot manipulator operates an ultraviolet lamp attached to it, which sequentially and continuously processes the entire room, leaving no chance for infection to survive on surfaces and in the air.

The latest invention in robotics for diagnosing coronavirus infection is a throat swab robot. The development will help reduce the risk of contracting the new coronavirus among healthcare workers. The robot was assembled by scientists from the Guangzhou Institute of Respiratory

Health and engineers from the Shenyang Institute of Automation at the Chinese Academy of Sciences. It consists of a mechanical arm from Universal Robots, a binocular endoscope, wireless transmission equipment and an interactive terminal.

A mechanical hand guides an endoscope into the throat, which shows a high-resolution 3D anatomical picture. The robot remotely receives commands in real time and quickly and accurately takes a swab from the throat [1].

The Dutch company Olmia Robotics develops robot scenarios and implements them in various fields. In this example, the Hanwha HCR collaborative robot sterilizes the handle of a shopping cart by carefully spraying a disinfectant spray over its entire area and making it safe for shoppers [5].

The American company Xenex Disinfection Services also sends its virus-destroying robots to hospitals for use during the epidemic. Westin Houston Medical Center is already using Xenex LightStrike robots, which use ultraviolet light to disinfect rooms and common areas from the coronavirus. The company says each of its robots can disinfect dozens of rooms a day. It supplies hospitals with these devices, along with disinfection protocols, such as rules for using robots in ambulances or near them if there is a suspicion that coronavirus patients have been there.

Xenex says there are thousands of robots in operation now and the company is ramping up production in the United States. Its orders jumped 400% in the first quarter of this year compared to all of 2019. Most of these orders came from overseas - from Italy, Japan, Singapore, Thailand and South Korea.

In one of the hospitals in the Chinese city of Guangzhou, a couple of robots deliver medicines and food to patients with COVID-19, as well as collect their bedding and medical waste. Thus, the medical facility plans to reduce the burden on paramedics and reduce the risk of getting infection.

Robots are well-suited for delivering everything they need to isolated patients - they avoid obstacles, open doors themselves, and even take an elevator. They can also read cards, plan the best routes and create a database of all patients.

Among the robots that have been modified specifically to combat coronaviruses there are a humanoid apparatus called the Cloud Ginger (aka XR-1) and a Smart Transportation Robot, which can transport food and medicine to patients without personal contact between medical workers and patients. In turn, bored quarantined patients found humanoid robots like Cloud Ginger very helpful, offering useful information and much-needed interaction and entertainment.

Specialists from the engineering and medical faculties of Chulalongkorn University in Bangkok have built several robots that, using fifth-generation mobile networks, can provide high-definition video communication between the patient and the doctor. This helps to minimize contact of healthy people with infected people.[1]

Science and technology do not stand at one place and are constantly developing. The beneficial and progressive impact of technology on medicine is invaluable: highly informative imaging studies, minimally invasive surgery, and much more. Maybe, information technology will play a key role in the development of a vaccine or medicine for COVID-19. However, at this point, it is important to comply with coronavirus prevention measures and use personal protective equipment to prevent the further spread of the viral disease [4].

### References

1. *Роботы против коронавируса: как технологии помогают справиться с пандемией: [Electronic resource]. – URL: <https://www.ridus.ru/news/322462>*
2. *How Asia, the US, and Europe are using robots to replace and help humans fight coronavirus by delivering groceries, sanitizing hospitals, and monitoring patients: [Electronic resource]. – URL: <https://www.businessinsider.com/robots-fighting-coron>.*
3. *Coronavirus: China's tech fights back: [Electronic resource]. – URL: <https://www.bbc.com/news/technology-51717164>.*
4. *Как цифровизация помогает бороться с COVID-19: Деловой климат: Экономика: Lenta.ru: [Electronic resource]. – URL: <https://lenta.ru/articles/2020/06/04/robots/#>:*
5. *Коллаборативные роботы Hanwha и их применение в борьбе с коронавирусом / Блог компании Top 3D Shop / Хабр: [Electronic resource]. – URL: <https://habr.com/ru/company/top3dshop/blog/496504/>.*