

Survey on Social Distancing and Monitoring Robot for Queue Management

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Abstract - During this COVID-19 crisis, disease and crisis management are in danger. Currently, it is not feasible to observe and monitor social distancing between individuals in every queue. For example, Ticket counters, Public Offices, Malls, Schools, Theatres, etc. we usually see long queues day-to-day. Also one of the symptoms of COVID-19 include fever. Furthermore, frequent handwashing is advised. Therefore, a key defense against COVID-19 transmission has been to keep social distance between humans. A social distancing and monitoring robot are proposed to check social distancing in queues.

Key Words: COVID-19, Pandemic, Social Distancing, Automatic hand sanitization, Contactless temperature measurement.

1. INTRODUCTION

The World Health Organization (WHO) declared COVID-19 a pandemic on March 11, 2020 in response to more than 1, 00,000 confirmed cases in more than 100 countries and the ongoing threat of further spread. Coronavirus Disease (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus. COVID-19 is a worldwide epidemic that has afflicted the majority of the world's population. The virus was found in China and then spread throughout the United States, wreaking havoc. Brazil, Russia, the United Kingdom, Spain, India, Italy, and France are among the countries hardest hit by the pandemic. Despite the fact that it is impossible to stop it, it is courteous to do so.

So far, we've discovered that social separation is a crucial tool in preventing the virus from spreading. Most people refer to it as "social distancing," but it's better to think of it as "physical distancing." People who are afflicted with the virus are less likely to spread it if they keep their distance from others. When someone breathes, talks, coughs, or sneezes, tiny droplets are released into the air, which spread the virus. These droplets can go into people's eyes, noses, and mouths, or they can breathe them in. When there is a distance of at least 6 feet between persons, the droplets are more likely to fall to the ground rather than onto the person.

In the absence of medical treatments, social separation is being used around the world to prevent the spread of COVID-19. But social distancing alone will not protect you

from the virus; it must be used in conjunction with hand sanitization and temperature monitoring. As a result, we're looking at the prospect of constructing a social distancing and monitoring robot system with contact-free temperature checks and automatic hand sanitization that will protect individuals. The main goal of this study is to assess how different approaches function in terms of social distancing, temperature sensing, and hand sanitization.

We expect that this discovery will help researchers progress the fields of social distancing and monitoring, contactless temperature sensing, and contactless hand sanitization. The remainder of the paper is formatted as follows, the literature on social distancing robot, contactless sanitization, and contactless temperature measurement methods is discussed in section 2. The discussion and conclusion are included in section 3 and 4.

2. LITERATURE REVIEW

In [1] The Chinese authorities blamed the 2019-nCoV for an ongoing outbreak of novel coronavirus pneumonia (NCP), a lower respiratory tract condition. The World Health Organization eventually recommended COVID-19 as a name for the illness. Meanwhile, the International Committee on Virus Taxonomy called 2019-nCoV SARS-CoV-2. More than 80,000 confirmed cases, including more than 2,700 deaths, had been reported worldwide as of February 24, 2020, affecting at least 37 nations. On January 2020, the WHO labelled this an international fitness emergency.

In [2] The COVID-19 pandemic is a coronavirus epidemic that began in the city of Wuhan, China, has spread fast to several countries, with several cases documented worldwide. In India, 56,342 positive cases had been reported as of May 8th, 2020. With a population of over 1.34 billion people, India is the world's second-largest country in terms of population, but it is having trouble limiting the spread of coronavirus 2, which causes severe acute respiratory syndrome, among its citizens. India's Ministry of Health and Family Welfare has raised awareness about the new epidemic and taken the required precautions to stop COVID-19 from spreading.

In [3] Emory S. Bogardus popularized the concept of social distancing in the United States around a century ago.

"There are social distances both between different groups of individuals and between persons," he said, adding that "Primary relevance" of these distances is to retain one's position (Bogardus, 1926). However, methods from the Middle Ages encouraged social distance as a public health tool during pandemics. According to Lipton and Steinhauer, social separation became an element of US federal policy roughly ten years ago. During the 2009 H1N1 influenza outbreak in that country, it was utilized in small doses. Social distancing was initially implemented in the United States during the current COVID19 pandemic (Lipton and Steinhauer, 2020).

In [4] Tushar Nagrare developed a strategy in which the robot would be made up of a four-wheel design system that will follow the queue and keep an eye out for social distance breaches. This robot will utilize infrared sensors to travel alongside the queue and detect human violations. A mobile robot system that identifies violations of social distancing rules, navigates autonomously toward groups of non-compliant people, and encourages them to keep at least 6 feet of distance.

In [5] Aditi Vijay presented a new method of observing two people who do not follow social distancing standards, by mechanically observing the two-meter separation between them in a queue. They created a robot with a required social distance to measure the social distance of the queue. The robot is made up of a four-wheeled design system that is utilized to operate the robotic vehicle. It employs the tail tracking principle to continuously queue and track social distance violations. They use Raspberry Pi as the microcontroller. To estimate the distance between two humans, the robotic vehicle uses an ultrasonic sensor. The robot sounds an alarm when the distance between individuals is less than two meters.

In [6] Sona Joy presented a pandemic-control strategy based on the Internet of Things. It helps to control the transmission of Covid by keeping track of the distance between disease-spreading individuals. The robotic car monitor the queue for violations of social distancing. The model includes a Raspberry Pi 3+, an IR sensor, and an SRO4 ultrasonic sensor. It calculates the distance between two people in a queue. If two people are detected to be within 3 feet of each other, the robot immediately sounds a buzzer with the message "maintain distance" to notify them to the infraction. It also takes images of the offences and sends them to the appropriate authorities via a smartphone app.

In [7] Adarsh Sathyamoorthy proposed a method using an autonomous mobile robot and CCTV cameras, a way to automatically discover pairs of humans in a crowded situation that are not maintaining social distance, i.e. around 2 meters of space between them. The robot is outfitted with an RGB-D camera and a 2-D lidar to detect social distancing breaches within their sensing range and navigate to the breach's site.

In [8] Hand washing is important for individual cleanliness, according to John M. Boyce, M.D. and Hand washing with soap and water has long been considered a measure of personal hygiene. Hand cleansing with a germicide specialist is thought to have originated in the mid-nineteenth century. A French medication specialist demonstrated in 1822 that arrangements including lime or soft drink chlorides could remove the bad odors associated with human bodies and that such arrangements might be used as disinfectants and sterilizers. This medication specialist stated in a report published in 1825 that doctors and other persons visiting patients.

In [9] Akshay Sharma presented an automatic hand sanitizer dispensing system that is a noncontact, alcohol-based hand sanitizer dispenser that may be used in various places such as hospitals, offices, schools etc. Alcohol is essentially a solvent, and in comparison to soap or solid soap, it is a very effective disinfection that does not require water to remove. In this, an ultrasonic sensor is used in conjunction with an Arduino Uno microcontroller to sense distance. When the sensor detects a hand less than 7cm away from the sensor, the pump sprays a few drops of hand sanitizer on the hands.

In [10] According to Rakshith L, Automatic Sanitizer is required since squeezing the sanitizer container spout is unsanitary. A contactless sanitizer with an embedded Ultrasonic sensor has been proposed, which detects hands when placed beneath the device and dispenses the fluid sanitizer. In addition, the sanitizer dispenser provides the necessary amount of spillage and quickly prepares for the next action.

In [11] Akshay Sharma presented an automatic hand Md. Abdullah Al Mamun concluded that the most crucial thing is to keep track of your body temperature while maintaining social distance. They have designed a contactless thermometer that uses an Arduino unoR3 as the main control device and an MLX90614 as the infrared thermometer sensor. This technique will check that a person's body temperature is within WHO guidelines. This can be used to inspect people in public places such as colleges, schools, offices, retail malls, and so on.

In [12] Shashank Raut believes to protect yourself from the coronavirus, it is recommended that cleaning one's hands on a regular basis and keeping track of one's body temperature. This research focuses on non-contact temperature measurement and contactless sanitization. Two systems communicate with each other at the same time in this proposed method. A contactless temperature sensor is first, followed by a contactless hand sanitizer. The Arduino is connected to the ultrasonic sensor, which detects objects within its range. When the ultrasonic sensor detects the hand, the spray pump is activated, spraying sanitizer onto the palm through a tiny pipe. The contactless temperature check and automatic sanitization concept work well and offers individual protection.

3. DISCUSSION

One strategy for reducing the transmission of an infectious disease, such as Covid-19 is to use social distance and isolation. As crucial as social separation is, there are specific situations where people can disobey the laws of social distancing, allowing the virus to spread quickly. For example, ticket counter queues, bank queues and so on, and it's tough to keep track of whether or not they're adhering to social distancing standards. The review paper show that by utilizing technology, it is possible to continuously monitor temperature, contactless sanitization and maintain social distance, which will not only restrict viral spread but also relieve load on the hospital system.

4. CONCLUSION

To prevent the transmission of covid-19, protective measures such as social distancing are recommended. Considering a review of several papers, we have seen that it provides different approaches to maintain social distance in the queues. This paper also discusses techniques to prevent and limit the spread of a highly contagious disease by using an automatic hand sanitizer and contactless temperature measurement. We hope that this work will considerably improve everyone's safety.

ACKNOWLEDGEMENT

It is an honor and a joy to be able to give this report on "Social distancing and monitoring robot for queue management" under the expert guidance of DR. Jyoti Dange. Prof. Mahalaxmi Palinje has been a consistent source of support and facilities for us. We also want to extend our heartfelt gratitude to all of the Electronic and Telecommunications Department faculty members for their invaluable assistance and cooperation in bringing this to fruition.

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