Existence of Robotics and ArtificialIntelligence for COVID-19

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ABSTRACT

*The emergence of new technologiesis very helpful for the medical industry to monitor and control the spreading of virus named COVID-19. There are various industry 4.0 technologies like AI, Internet of Things, 3-D printing, Big data, autonomous robots, bio sensors and many more which are very supportive during this pandemic. Amongst of these technologies, Artificial Intelligence & Robotics are these two technologies which can easily track the spreading of corona-virus. It recognizes the high-risk patients suffering from COVID-19 and tried to control this infection. These are also useful in prediction of mortality risk based on the analysis of previous data of patients.*With the help of these converging technologies it is quite possible to fight with this pandemic. Digital innovations are anticipated to transform healthcare and change the way patients are cared for forever. Robotics and Artificial intelligence are worked like human intelligence. These technologies carried out a way to fight with coronavirus at different platforms. *This paper aims at how the emerging & new technologies help in fighting & controlling this epidemic disease named COVID-19(corona virus) which is spreading throughout the world.*

KEYWORDS: *Artificial Intelligence; robots; technology; COVID-19, robotics*

INTRODUCTION

Artificial intelligence & Robotics plays an important role in this pandemic Covid-19. It is a strongest tool which is used in assessing risk of infection and population screening against COVID-19 pandemic. Artificial intelligence is an application which can command computers to use big data for acknowledging, describing and predicting the pattern similar to machine learning, natural language processing and computer vision. In today's scenario, this technology is restricted to use because of lack of data. Sometimes the data available is very distorted and outlier. These technologies help us to control this virus in many ways such as medical help, population screening and awareness about effects of virus on human beings. It can detect & remove wrong information related to COVID-19 on social platforms. By using these technologies, many healthcare organizationsmanufacture various healthcare equipment. Robots play crucial role in in this COVID-19 Pandemic and they can also help for years to come. Robots provides contact free alternatives due to highly infectious nature of corona virus. There are many more AI based applications which are very useful in this pandemic period such as a deep learning model named COVID-Net used to detect positive cases of COVID-19 from chest X-rays, Google's DeepMind is used to help the scientist in predicting the protein structure of corona-virus. AI based computer vision camera used to scan crowd, Flu Sense used to forecast seasonal flu,XGBoost machine learning-based prognostic model used to predicted

the survival rate of COVID-19 patients & many more.

Work carried out by Robots during COVID-19

Robots plays an effective role during COVID-19. Robots are also a game-changer in pandemics by doing decontamination of hospitals and public spaces to delivery services. There are different types of robots which plays major role during this pandemic.

Image:Tommy, a robot nurse

A robot helping medical teams treat patients suffering from COVID-19 is pictured at a patient's room, in the Circolo hospital, in

Varese, Italy on April 1, 2020. Credit: Flavio Lo Scalzo/Reuters

These types of robots are used for measuring oxygen capacity and blood pressure for patients those who are in ICU. Based on these

two parameters, it provides a critical picture of patient's health condition. Most importantly, Tommy and his high-tech teammates helps the doctors and nurses to

avoid direct contact with patients and by this they help in reducing the risk of infection.

Ultraviolet Disinfection Robots

Photo: UVD Robots Hundreds of these ultraviolet disinfection robots are being shipped to China to help fight the coronavirus outbreak.

UVD Robots is a Danish company robot which are able to disinfect patient rooms and operation theatres in hospitals. These robots have a mobile array of strong short wavelengthultraviolet-C (UVC) lights that release adequate energyto scrap the DNA or RNA of any microorganisms. "The initial volume is in the hundreds of robots; the first ones went to Wuhan where the situation is the most severe," Nielsen told *IEEE Spectrum*. Some robots are used to watch for violations due to stay at home restrictions. These are just a few ways that robots have

been used to continuing, public works, daily work and life, from health care in and out of hospitals, supporting public safety, automation of testing during the COVID-19 pandemic.

LITERATURE REVIEW

MohdJavaidetal. (2020) conducted a study on the role of industry 4.0 technologies in

fighting COVID-19. The researchers found that there are various applications of industry

4.0 technologies which were useful in controlling & diagnosing coronavirus. The industry 4.0 technologies included artificial Intelligence, Internet of things, Big data, cloud

computing, 3-D scanning, virtual reality, autonomous robot, 3-D printing, holography and bio sensor. These technologies provide support to various manufacturing industries and other related areas in this crisis of coronavirus. It has the ability to carried out digital solutions to our daily lives during the time of COVID-19.

Nicola Mellusoetal. (2020) has taken their views about lights and shadows of covid-19, technology and industry 4.0. The study discussed and analysed about the influence of digital technologies in the field of industries and social welfare. The researcher used" Medium" a blogging platform which provides a structure for paper analysis and has taken data from January1st 2020 to 17 April 2020. The analysis of study carried out that 26.788 articles related to COVID-19, of which 453 containing at least one digital technology. The curve drawn from related articles have exponential growth.

Sera Whitelaw, Mamas A Mamas, Eric Topol, Harriette G C Van Spall (2020) has given viewpoint on Applications of digital technology in COVID-19 pandemic planning and response. The researchers

structured a framework for adoption of these digital technology applications in pandemic management and response and highlighted that in which ways the adoption of these technologies for pandemic planning, testing, contact tracing, quarantine, health care and surveillance by the successful countries. The adoption of digital technology by successful countries into pandemic policy and response have greater influence in decreasing the effects of COVID-19 and mortality rates. SathianDananjayan& Gerard Marshall Raj (2020) presented a report on role of Artificial Intelligence during a COVID-19 pandemic. According to researchers, when compared with previous pandemic artificial intelligence technology is highly appreciable and used as a tool during the period of COVID-19 pandemic. It is the complementary of human intelligence. The Artificial Intelligence technology-based applications included COVID-Net, Google's DeepMind, FluSense, BlueDot,XGBoost machine learning-based prognostic model etc. played an important and major role in this crisis.

Nasir Saeed etal. (2020) presented the study about role of wireless communications from different-different aspects in this pandemic time. Firstly, researchers studied about how wireless communication technologies are helpful to fight with this pandemic, including monitoring and awaking about the virus spread, allowing healthcare automation, and permitting virtual education and conferencing. They also revealed the importance of digital technology and carried out possible solutions to control this disease with the help of digital & wireless technology. They also discussed about the limitations of using wireless technologies including miscommunication, privacy & security. After that they discussed about the role of wireless technologies in the field of automation of industries, e-commerce, supporting occupations and world's economy which are

at higher risk. Finally, they concluded that how the developing technologies are very

helpful during the pandemic and in the post-pandemic era.

OBJECTIVES

1. Review about the importance of emerging technologies during COVID-19.

2To study about the role of Artificial Intelligence and robotics in this pandemic time (COVID-19).

RESEARCH METHODOLOGY

The quick literature review is done on the database of Science Direct, Scopus, Emerald, Elsevier and Google Scholar, white papers, reports and blogs by using the keyword of robots or robotics, COVID-19 or Coronavirus, emerging technology and Artificial Intelligence or AI. By Collecting the current information regarding robotics and Artificial Intelligence for COVID-19, the researcher analyzed that how these technologies find out the possible ways to monitor & control this disease.

ROBOTS, THE APPLICATION OF AI AROUND THE WORLD

"As roboticists at Texas A&M University and the Center for Robot-Assisted Search and Rescue, we examined over 120 press and social media reports from China, the U.S. and 19 other countries about how robots are being used during the COVID-19 pandemic. We found that ground and aerial robots are playing a notable role in almost every aspect of managing the crisis". (R. Murphy, V. Gandudi, Texas A&M; J. Adams)Virtual supporters have played a valued potential role in supporting doctors and nurses who are working in hospitals because of COVID-19 formonitoring the patients in well planned manner. They also support in hospitals to deliver food, medicine and other supplies to patients. Artificial Intelligence (AI) technologies like Natural Language Processing (NLP) can help researchers tackle COVID-19 by munching large amounts of data that would be not possible for humans to process.

Reported Use of Robots (Ground, Aerial) Worldwide for COVID-19 as of 20 April 2020

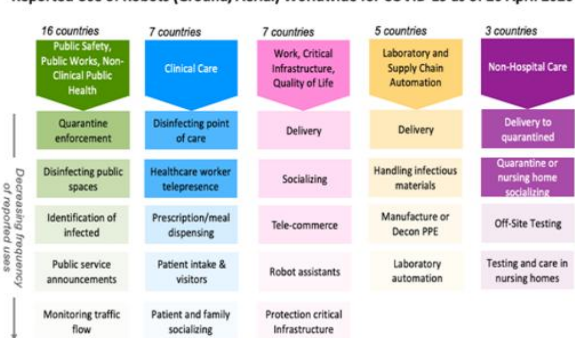| 16 countries Public Safety, Public Works, Non-Clinical Public Health	7 countries Clinical Care	7 countries Work, Critical Infrastructure, Quality of Life	5 countries Laboratory and Supply Chain Automation	3 countries Non-Hospital Care
Quarantine enforcement	Disinfecting point of care	Delivery	Delivery	Delivery to quarantined
Disinfecting public spaces	Healthcare worker telepresence	Socializing	Handling infectious materials	Quarantine or nursing home socializing
Identification of infected	Prescription/meal dispensing	Tele-commerce	Manufacture or Decon PPE	Off-Site Testing
Public service announcements	Patient intake & visitors	Robot assistants	Laboratory automation	Testing and care in nursing homes
Monitoring traffic flow	Patient and family socializing	Protection critical Infrastructure		

Image: R. Murphy, V. Gandudi, Texas A&M; J. Adams, Center for Robot-Assisted Search and Rescue

In hospitals, the robots are used by doctors, nurses, receptionists and family members in real time interaction with patient by maintaining a safe and secure distance. They are also used for other

purposes like to check disinfecting rooms, delivering meals and medicines prescribed by doctors and nurses, transporting infectious samples to laboratories for testing & handling extra hidden work related to patient. They also doing works for public safety like spraying disinfectant throughout public places, identifying infected citizens, broadcasting public service messages about virus and enforce to maintain social distancing restrictions.

CONCLUSION

The usage of artificial technology & task delivered by robots during COVID-19 pandemic is very amazing & outstanding. No doubt every disaster is different but technologies do not replace human beings. According to Dr. Bonelli, "It's not a way to substitute the human factor, which is constantly something that [patients] rely on

and we know how important it is for them". But we cannot obsolete these technologies. Many healthcare organizations have greater need for proper suggestions and decision making to handle this virus.AI & robots is capable imitator like human intelligence. It can provide a way to fight with coronavirus at different scales such as development of drug and vaccine, following the current and future patients, significantly applicable to tracking data of confirmed, recovered and death cases, prevention strategies, drug and vaccine development, proper medical treatment schedules and prevention strategies. The conclusion of the study is that each and every technology has their own functionalities and features but Artificial Intelligence and robotics are these two emerging technologies which plays a vital role in this pandemic.

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