Pandemic Management via Technology: A Review

Dr. Gagandeep Kaur

University Institute of Computing (UIC), Chandigarh University, Mohali 140413, Punjab India

gagan.k2011@gmail.com

Abstract -- **The COVID-19 epidemic affected us since late 2019. It posed a serious threat to the health and safety of everyone including public, medical personnel, and the entire medical system. Use of robots was to improve treatment of patients and lessen burden on medical facilities. This paper presents study conducted thorough literature review, covering over 280 papers with an emphasis on use of robots during epidemic. The current state of robotic technologies is evaluated followed by the determination of the technology readiness level of the representative work.**

Pandemic management lessons were learnt during COVID-19. Many countries identified as having successfully stemmed the spread of the epidemic by employing modern technologies, such as robotic cleaners and facial recognition systems, to conduct the contact map and take appropriate actions.

Keywords: Pandemic, Robotics, Artificial intelligence, Covid-19

I. INTRODUCTION

COVID-19 spread over the planet since late 2019. It posed serious problems for practically every country on the planet. Various measures, including robotics, were suggested to aid in the treatment and containment of the pandemic.

Applications for deployment of robots included: Ambulance, receptionist, spraying/disinfecting nursing, telemedicine, Serving, cleaning, , surgical, radiologist, rehabilitation, food, and outside delivery. Researchers studied robot uses in settings, such as hospitals, neighborhoods, airports, transportation, recreation, hotels, restaurants, tourist attractions, and picturesque places. Those assessments gave a summary of robotic accomplishments. Yet there is dearth of detailed investigations. The literature survey aims to analyze such achievements so far.

II METHODOLOGY

The work presented here tries to answer the following two Research Questions:

(i)   From the perspective of robotic technologies, identify research contributions to combat the pandemic.

(ii)   What are the promising enabling technologies that will aid and steer future robotics research during and after the pandemic?

Search criteria solely focused on robotic technologies in pandemic.

Screening for inclusion: The collected items are examined regarding their applicability to robotics according to preset rules.

Extracting data: The information gathered is based on the above-mentioned study questions. What, how, when, who, and where important information is acquired.

Data analysis and synthesis: Finally, the included research are summarized, aggregated, organized, and contrasted in a meaningful way and future research trends are identified.

III. INFECTIOUS DISEASE ROBOTS

Surgical robots were allowed in the US in 2000, giving rise to use of robots in contagious situations. The robot performs automated laparoscopy and laparoscopic surgery for increased safety and fewer difficulties. Prostate cancer, endometrial cancer, rectal cancer, and related surgeries like prostatectomy and hysterectomy are all highlighted because of their unique character.

IV. COVID-19 ROBOTS

Since COVID-19 is highly contagious robots which are immune to infection and easy to disinfect are recommended to play a critical part in the pandemic's fight. During a pandemic, robots are commonly suggested to be used in a variety of scenarios to assist prevent infection via disinfecting, monitoring, delivering, meal preparation, and tele-presence. It is also advised that robots make intelligent decisions based on demographic data that may be analysed using AI. Telemedicine was advocated to reduce infected person contact. During a pandemic, more research resources are devoted to robotic applications. Machine Learning (ML) algorithms and Artificial Intelligence (AI) technologies have been mentioned to improve robotic applications

Intelligent robots for emergency prevention and control in difficult scenarios emerged as a result of the development of robots and AI technologies, and they played stellar role in illness prevention and control, diagnosis, treatment, and nursing. Investigations done to find efficiency of strategies aimed at

stopping people from travelling to their nations, particularly those from countries where the COVID-19 pandemic has been verified. In response, a strategy model is built that employs robots to identify COVID-19-positive patients. Combining robot identification with migration restriction is one of the best practices.

V. EXAMINATION ROBOT

The robot is capable of mass screening to rapidly confirm the COVID-19 cases. A semi-automatic oropharyngeal swab robot was developed to take swabs test with the patients. A remote camera is equipped on the swab robot, which helps the medical staff to perform the sampling with a clear vision but without close contact with the patient. The results of the collections are satisfying with success rate of 95%.

VI. CONCLUSION

The current study reviewed role of modern technology in management of Pandemic that engulfed the planet earth in late 2019. External help provided during the COVED-19 epidemic crisis had a moderating influence on SMEs' performance and survival.

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Dr. Gagandeep Kaur obtained Postgraduate Diploma in Computer applications in 2002, MCA from Guru Nanak Dev University, Amritsar in 2005 and PhD degree from Maharaja Agrasen Himalayan Garhwal University in January 2023. Currently, she is working as an Assistant Professor in University Institute of Computing, Chandigarh University, Mohali, Punjab, India since March 2022.

She has abiding passion for teaching and research. Earlier, she served as Assistant Professor, Department of Computer Science and Applications, SRM University, Sonipat, Haryana, India during September 2019 to March 2022. Prior to that she worked as Assistant Professor at Institute of Management Education, Sahibabad, Ghaziabad, India during August 2010 to August 2019. Guided undergraduate and postgraduate students for Thesis.

She is a member of the International Association of Engineers (IAENG). She published two patents, two papers in Scopus indexed journals and over 15 publications in proceedings of international conferences.Possesses technical skills in C, C++, Python, DBMS, Data Structures and basic concepts of Kotlin.