Indian J. Applied & Pure Bio. Vol. 37(1), 47-53 (2022). **ISSN: 0970-2091**
A web of Science Journal

The Emerging Artificial Intelligence, IoT and Machine Learning in Combating the Pandemic COVID-19

[1]B. Kishori, [2]K.R. Padma, [3]K.R. Don and [4]R. Usha

[1]email id: battinikishori@gmail.com
[2]email id: thulasipadi@gmail.com (Corresponding Author)
Mobile No: 8897146167Orcid no:0000-0002-6783-3248
[3]Department of Oral Pathology and Microbiology, Sree Balaji Dental College and Hospital, Bharath Institute of Higher Education and Research (BIHER)
Bharath University, Chennai, Tamil Nadu (India)
email id drkrdon@gmail.com Mobile no: 9443215893 Orcid No: 0000-0003-3110-8076.
[1,2,4]Department of Biotechnology, Sri Padmavati Mahila Visvavidyalayam (Women's) University, Tirupati, AP. (India)
[4]email id: ushatirupathi2020@gmail.com

Abstract

The Covid-19 is informally regarded as coronavirus and at present has become a biggest task as well as concern among all countries globally. The rapid growth of the existing pandemic Covid-19 initiated the employment of AI technology to develop latest methods to mitigate the spread of the malady. The emerging AI built 5G Robots, drones, smartphones has decreased stress among the medical professionals.

An enlightened literature survey for this Scoping review was collected through the Pub Med, IEEE, Wiley-online, Embase databases using keywords such as COVID-19, Artificial Intelligence, 5G Robots, Drones, Smart Phones, Thermal sensors etc., especially for assessing the rapid outbreaks of coronavirus and tackling strategies with help of modern emerging artificial intelligence technology.

Currently our review article provides a broad window of contemplations on the budding novel artificial intelligence and its contributions in mitigation of pandemic Covid-19.

Our paper is organized in a well -planned manner to make the reader understand about covid-19 threat and simultaneous portray the development of AI technology approaches in tackling the current pandemic along with future perspectives.

---

[1]Associate Professor, [2]Assistant Professor, [3]Reader & [4]Professor

The SARSCoV-2 belonging to the family of coronaviridae at present situation is creating anxiety among the whole population. Subsequently, this viral disease is contagious with flu like symptoms comprising of cough, fever, fatigue along with breathlessness. Although, the root of the viral disease is still under dispute. Nevertheless, several literature reports have shown the genome sequence of the corona virus and has determined its origin firstfrom host bats[2,18]. The World Health Organization director-general is Dr.Tedros Adhanom Ghebreyesus, who has confirmed the COVID 19 outburst as a universal pandemic on 11th March, 2020 [WHO][24]. Nevertheless, this upsurging infection created global communal health crisis along with accusatorial collision of global economy. Moreover, Governments of various countries started the utilization of artificial intelligence technology which were developed with machine learning, deep learning and Natural language processing which helped in controlling the transmission of such pandemics. (Shown in figure-1).

At present the globally affected population due to SARS-CoV-2 based on worldometer report as on November 13th 2020 is 53,092,548 confirmed cases[25] with death toll 1,299,409. The major clinical symptoms of this new corona virus is been found to have common flu symptoms along with muscle pain, fatigue, high fever along with breathlessness condition[9]. Hence healthcare workers have tremendously worked day and night to treat infected individuals but due to shortage of proper protective suits created stress among them. To encounter this situation, AI approach has been successful in large fields involving image processing, computer vision, thermal sensors, disinfecting wards with help of robots along with providing food to isolated wards, assisting in surgery, in malls plus majorly in disease diagnosis and discovering modern drugs/vaccines etc.,[12-15].

Therefore, this paper main aim and objective is to provide a concise comprehension to reader about the recent pandemic havoc and how the emerging AI application adopted to mitigate the budding problem and further have endeavoured to portray different AI built models in different areas of science along with future perspectives.

Related Work Frame of Study :

We authors have decided to do literature survey on all articles associated with Artificial Intelligence (AI), Machine learning, Deep learning and role of IoT, Drones Management of Pandemics with help of 5G Robots, AI based approach in drug development and future perspectives of combating against covid-19 [3,4,11,17]. In the (figure-2) we have provided the frame work of study.

Role of AI, IoT and Drones in combating COVID-19 :

Undiplomatically, several millions of populaces are facing incessant menace of infection with the state not likely to get improved in the forthcoming times. Although, throng of latest machinery advancement have evolved to control the intensification of pandemic. However,the upsurging artificial intelligence built devices include digital technologies, IoT, smart phones and oncoming

Figure-1: The Emerging Artificial Intelligence technology built with Machine learning Programs

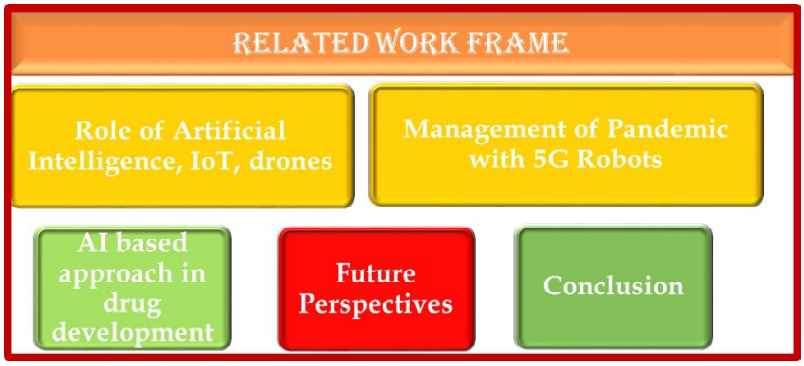

Figure-2: Related design of work-frame

Figure-3: The AI built 5G Robots in different areas of health care

5G networks[6,8,19,21,26]. In this section, we reconnoitre the efficiency of the aforesaid equipments in alleviating the catastrophic influence of the coronavirus pandemic. Moreover, Internet of Medical Things (IoMT), also signified as Internet of Things, a unification of medical devices along with software applications for monitoring patients even from distant location. It has been wide-ranging in medical management services connected to relative healthcare IT systems. Finally, we have portrayed the role of AI and drone applications in different areas of medical care which is shown in (Table-1).

Table-1: Role of AI and drones in different sectors of medical care

S. No	Purpose of AI &drones in different sectors	Description	References
1	The practice of small Unmanned Aerial Vehicles employed for conveyance of blood and pharmaceutical products to hospitals. 	The contemplation of the routine usage of drones fort ransportation of blood samples and to support in delivery of medicine to populations during the pandemic outbursts.	[Ullah 2019 and , Thiels 2015]
2	The application of UAV in disease tracking with help of thermal sensors 	The other significant practice of drones is to detect any anomalous respiratory alterations which provide alert while screening of people infected with COVID-19 plus temperature hike detected with help of in-built sensors.	[Wang 2020]
3	The role of AI in detection of drug 	Complexed artificial intelli-gence-constructed drug discovery channel is significant for production of unique drug compounds.	[Zhavoronkov 2020]
4	The role of AI in identification of diseases with help of CT scanning 	The AI model is employed specifically to check/scan for virus disease and prevent the spread of disease	[Ali 2021, Jin 2020]

Management of pandemic with 5G Robots:

The employments of 5G androids are specifically exercised in medical care and management especially to refrain the transmission of the corona virus. Moreover, these robots are being constructed to support in the prescription of patients along with reducing their anxiety levels of the medical professionals. These are being deployed to disinfect the contaminated rooms/wards with ultraviolet (UV) surface disinfection methods[27]. The multipurpose Robots are largely applied in many areas in healthcare field such as manger robot, in substitute for nurse these 5G robots are practiced in hospitals, provides quick support to people in need of treatment, hence regarded as ambulance robot, few androids are employed in telemedicine section, Robots employed to serve hospital section, supply food to patients and outdoor delivery (Shown in figure-3).

AI based approach in drug development :

Several computational biologist use data analytics, computer simulations to study the interactions of ligand with ACE2 receptors to identify the impact of medications in reducing the disease[7]. Thus, artificial intelligence modelling provides propagative stereochemistry for construction of unique elements that can subside coronavirus[28]. However, the AI is a generative machine learning programs built with genetic algorithms along with language models to explore the molecular structures. Nevertheless, many researchers are synthesising and testing many drug molecules, a proper vaccine is not released yet due to some limitations in trials.

Future perspectives :

The wide spread of SARS-COV2 has made us to rely on AI technologies to encounter the pandemic. The upsurge of AI machinery almost in every field from electronic shopping, online learning platforms, online imbursement, telemedicine facilities and smartphones. The principal artificial intelligence device constructed with machine learning, Internet of Things, image processing, virtual reality, drone technology, robotics and block-chain. At present and in future the universe start employing these innovative technologies in day to day life. Predicting the future with AI helps in mitigation of several endangers.

In our review paper we have portrayed the diverse application as well as role of artificial intelligence in battling against the pandemic. The utilization of AI is cost-effective along with reducing stress levels among the medical care professionals. In-fact, we have shown a broad window of management of pandemic with help of artificial intelligence built devices. However, the AI built models have several purpose such as providing medicines to needy at time, acting as nurse robots in hospitals, disinfecting wards, UAV helps in detections of diseased individuals and development of drugs etc. Hence, in future the AI based tools will be employed wholly in forthcoming times.

Author contributions :

KRP and KRD have contributed to writing, drawing figures and tables in this review

article. KRP finally approved the article. Department of Biotechnology, Sri Padmavati Mahila Visvavidyalayam (Women's) University, Andhra Pradesh, Tirupati-India.

Compliance with Ethics Requirements

NIL

KRP is thankful to the Department of Biotechnology, Sri Padmavati Mahila Visva Vidyalayam (Women's) University, Tirupati-India.

Competing interests :

The authors declare that they have no competing interests.

References :

1. Ali Narin, and ZP. Ceren Kaya (2021) *Pattern Analysis and Applications, 24*(3): 1207-1220.
2. Cascella, M., M. Rajnik, A. Cuomo, S.C. Di Dulebohn, and R. Napoli, (2020) Features, evaluation and treatment coronavirus (covid-19), in: Statpearls [internet], StatPearls Publishing.
3. Chamola, V., V. Hassija, V. Gupta, and M. A. Guizani, (2020) *IEEE Access 8 :* 90225–90265.
4. Chen, D., S. Ji, F. Liu1, Z. Li, and X. A. Zhou, (2020) review of automated diagnosis of covid-19 based on scanning images. arXiv:2006.05245.
5. Chen, J., K. Li, Z. Zhang, K. Li, and P.S. Yu, (2020) A survey on applications of artificial intelligence in fighting against covid-19. arXiv:2007.02202.
6. Deloitte Centre for Health Solutions. (Jul. 2018). MedtechInternet Med. Things. [Online]. Available:https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Life-Sc%iences-Health-Care/gx-lshcmedtech-iomt-brochure.pdf.
7. Ferguson N.M., D. Laydon and G. Nedjati-Gilani, *et al*. (2020) Impact of non-pharmaceutical interventions (NPIs) to reduce COVID-19 mortality and healthcare demand. Imperial AcUk; (March): 3e20. https://doi.org/10.25561/77482.
8. Hassija, V., V. Chamola, V. Saxena, D. Jain, P. Goyal and B. Sikdar, (2019) "A survey on IoT security: Application areas, security threats, and solution architectures,'' *IEEE Access, 7:* pp. 82721–82743, Jul. 2019.
9. Hui D.S., E. IA, T.A. Madani, F. Ntoumi, R. Kock, and O. Dar, *et al*. (2020) *Int J Infect Dis; 91:* 264-6.
10. Jin C., W. Chen, Y. Cao, Z. Xu, X. Zhang, and L. Deng (2020) Development and evaluation of an AI system for COVID-19 diagnosis. p. 1-23.
11. Kumar, A., P.K. Gupta and A.A. Srivastava (2020) *Clinical Research & Reviews 14* (4): 569–573.
12. Lai, C.C., T.P. Shih, W.C. Ko, H.-J. Tang, and P.R. Hsueh, (2020). *Int. J. Antimicrob. Agents 55:* 105924. https://doi.org/ 10.1016/ j.ijantimicag.2020.105924.
13. Lakhani, P., and B. Sundaram, (2017). *Radiology 284:* 574–582. https://doi.org/10.1148/radiol.2017162326.
14. Lee, I., and Y.J. Shin, (2020). *Business Horizons 63:* 157–170. https://doi.org/ 10.1016/j. bushor.2019.10.005.
15. Lei, Y., B. Yang, X. Jiang, and F. Jia, *et al.*, (2020). *Mech. Syst. Signal Process. 138:* 106587. https://doi.org/10.1016/j.ymssp.2019.106587.
16. Leo Kumar, S.P., (2017). *Eng. Appl.*

Artif. Intell. 65: 294–329. https://doi.org/10.1016/j.engappai.2017.08.005.

17. Mohamadou, Y., A. Halidou, and P.T. Kapen (2020) Applied Intelligence 1–13.
18. Razai, M. S., K. Doerholt, S. Ladhani, and P. Oakeshott, Coronavirus disease 2019 (covid-19): a guide for ukgps, BMJ 368.
19. Rouse. M. (2015) What is IoMT (Internet of Medical Things) or Healthcare IoT ?— Definition From WhatIs.com. IoT Agenda, Aug. [Online]. Available: https://internetofthingsagenda.techtarget.com/definition/IoMT-Internet-%of-Medical-Things.
20. Thiels C.A., J.M. Aho, and S.P. Zietlow, *et al*. (2015) *Air Med J., 34*(2): 104–8.
21. Ting, D.S.W., L. Carin, V. Dzau and T. Y. Wong (2020) ''Digital technology and COVID-19,'' Nature Med., *26*(4): 459–461, Apr. 2020.
22. Ullah H., N.G. Nair, and A. Moore, *et al*. (2019) *IEEE Access; 7:* 37251–37268.
23. Wang Y., M. Hu, Q. Li, X.P. Zhang, G Zhai, and N. Yao (2020) Abnormal respiratory patterns classifier may contribute to large-scale screening of people infected with COVID-19 in an accurate and unobtrusive manner. 2020. http://arxiv.org/abs/ 2002. 05534.
24. WHO. (2020) Archived: WHO timeline—COVID-19. https://www. who.int/news-room/detail/08-04-2020-who-timeline—covid19, 2020.
25. Worldometer reports on Covid-19 pandemic globally (2020). Available fromhttps://www.worldometers.info/coronavirus/#countries/.[Last accessed on 2020 November 13th].
26. World Health Organization. (Apr. 2020). Digital Technology For Covid-19 Response. [Online]. Available: https://www.who.int/newsroom/detail/03-04-2020-digital-technology-for-%covid-19-response.
27. Yang, G. Z., B. J. Nelson, R.R. Murphy, H. Choset, H. Christensen, S.H. Collins, P. Dario, K. Goldberg, K. Ikuta, and N. Jacobstein, (2020) ''Combating COVID-19— The role of robotics in managing public health and infectious diseases,'' Sci. Robot., *5*(40): Mar. 2020, Art. no. eabb5589, doi: 10.1126/scirobotics.abb5589.
28. Zhavoronkov A., V. Aladinskiy, and A. Zhebrak, *et al*. (2020) Potential COVID-2019 3C-like protease inhibitors designed using generative deep learning approaches, vol. *2:* 2020. https://doi.org/10.26434/chemrxiv.11829102.v2.
29. Zhavoronkov, A., V. Aladinskiy, A. Zhebrak, B. Zagribelnyy, V. Terentiev, D.S. Bezrukov and Y. Yan, (2020). Potential COVID-2019 3C-like protease inhibitors designed using generative deep learning approaches. *ChemRxiv Preprint*, https://doi.org/10.26434/chemrxiv.11829102.v2.