

## Role of Artificial Intelligence In Detection of COVID-19: A Review

Bhagirathi Halalli<sup>1</sup>, Vinay Kumar V<sup>2</sup>, Prachi Parvatikar<sup>3</sup>

<sup>1,2</sup>(Department of Computer Science, Government First Grade College, Raibag, Karnataka, India)

<sup>3</sup>(Department of Physiology, BLDE (Deemed to be University), Vijayapura, Karnataka, India)

<sup>3</sup>Corresponding Author: [prachisandeepk@gmail.com](mailto:prachisandeepk@gmail.com)

### To Cite this Article

Bhagirathi Halalli, Vinay Kumar V and Prachi Parvatikar, "Role of Artificial Intelligence in Detection of COVID-19: A Review", *Journal of Science and Technology*, Vol. 05, Issue 05, Sep-October 2020, pp237-239

### Article Info

Received: 25-06-2020

Revised: 10-08-2020

Accepted: 14-09-2020

Published: 18-09-2020

**Abstract:** The corona virus is world's pandemic disease originated in China 2019 thus called Corona Virus Disease 2019 (COVID-19). It surprised the world with its rapid spread and had major impact on human life as well as on global market. The fundamental solution to control the rapid spread of disease is social distance and home quarantine, but no one can stay at leisure for longer time. Thus, we have to live with COVID-19 by preventing ourselves. Symptomatic patients were called to test for COVID-19 immediately and will be quarantined. But asymptomatic patients become strange for the society today. To overcome this issue some intelligent system test is essential. Collection of patients sample itself is a risky. Thus, in preliminary step, Artificial Intelligence (AI) plays a vital role for detection of COVID-19. If the process of detection include an Artificial Intelligence it becomes easier for corona warriors to take necessary action on this pandemic and can able to detect disease at the earliest. Thus, in this article we have reviewed role of Artificial Intelligence in detection of COVID -19. The review resulted as there is urgent need of developing AI-based system for early detection, tracking and quantification of corona virus patients to save the world from this pandemic disease.

**Keywords:** Artificial Intelligence, COVID-19, Corona, Computer Diagnosis, Bioinformatics.

## I. Introduction

COVID-19 become a major issue around the world, as on today 29 May 2020, more than 58,08,000 individuals have been tainted with the infection worldwide with the loss of life at 3,60,308. The COVID-19 revealed in India is 1,65,799 and the loss of life remained at 4,706 these figures gave by the Ministry of Health and Family Welfare [1]. Man-made intelligence-based methodology can possibly inspire the cycle of treatment, Early detection and finding of the contamination, Monitoring the treatment, Contact following of the people, Projection of cases and mortality, Development of medications and immunizations, lessening the outstanding task at hand of medical care laborers, Prevention of the infection [2].

The overall methodology of COVID-19 detection is either through natural methodology which incorporates counter acting agent test and antigen test [3]. Further it can likewise distinguish by astute framework-based applications. As the two methodologies works in its own zone yet inaccessibility of clinical testing pack, a clever framework assists with keeping track on patient's history. Let us talk about the two methodologies in detail.

## II. Methodology

### A. Biological Approach for Detection of COVID-19

A new strain of SARS-CoV2 known as COVID-19 that has been responsible for current pandemic disease worldwide originated from Wuhan, China, causing respiratory tract infection [4]. Genetically corona viruses are positive-sense single-stranded RNA viruses about 32 kbp in length and belong to Coronaviridae family. Typically, coronavirus has four subfamilies- alpha-, beta-, gamma- and delta subtypes [5]. Alpha and beta coronaviruses are identified from mammals; gamma and delta from pigs and birds. The size of virus ranges from 60-80 nm with genome size varying between 26 and 32 kb [6].

The first coronavirus was reported in 2002 called Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV), second Middle East Respiratory Syndrome, MERS-CoV, a difficult to transmit but highly lethal virus in 2012 and third SARS-CoV-2 is the cause of the severe respiratory disease COVID-19 [7]. It has high mutation rate and cause infection in respiratory, gastrointestinal, hepatic and neurologic systems. SARS-CoV2 mostly infect animal and humans. In human they cause respiratory infection [8].

It was reported that SARS-CoV-2 showed 90% similarity with SARS-CoV genes. Unlike other RNA viruses coronavirus have genomic plasticity. It contains RNA-dependent RNA polymerases (RdRp) which have high mutation rates, reaching from 1 in 1000 to 1 in 10000 nucleotides 17 during replication [9]. As corona virus has larger size genome it has ability to accommodate gene mutation. Coronavirus transmitted to human through zoonotic mode result in common cold and viral pneumonia, including fever and breathing difficulties. Recent strain of coronavirus i.e. COVID-19 belongs to lineage B (Sarbecovirus) of Betacoronavirus [10]. Phylogenetic analysis of RdRp protein, spike proteins, and full genomes of COVID-19 and other corona viruses showed that COVID-19 is most closely related to two bat SARS-like coronaviruses, bat-SL-CoVZXC21 and bat-SL-CoVZC45, found in Chinese horseshoe bats, *Rhinolophus sinicus* Usually,  $\beta$ -coronaviruses yield a ~800 kDa polypeptide upon transcription of the genome.

The origin of COVID-19 is not yet confirmed some report suggested that it originated independently as a new lineage to infect humans and other suggested that it is recombination of previous strains. COVID-19 strain encodes viral polymerase, RNA synthesis material and two large non-structural polyproteins which are involved in host response modulation [7-9]. The remaining one third portion of genome contains four structural polyproteins viz spike (S), envelope (E), membrane (M) nucleocapsid (N), and the other helper proteins. In host organism viral infection starts with interaction of spike protein with sensitive human cells [11]. After that viral cells adapt human host through encoding genome and help in expression of genes that encodes accessory proteins. Alteration in gene expression is done by various mechanisms such as recombination, gene exchange, gene insertion or deletion [12]. After infecting the host, the viral RNA manifests itself in the cytoplasm of the cell. Genomic RNA is modified through the process of encapsulation and polyadenylation and encodes several structural and non-structural genes [13]. Among them protease which play important role in virus life cycle. It shows chymotrypsin-like activity splits these polyproteins which drives the production of (-) RNA through replication as well as transcription [14]. At the time of replication process the full length (-) RNA copies and transcribed into RNA encoding all structural proteins and a subset of 7-9 sub-genomic RNAs are produced by discontinuous transcription [15].

By the process of exocytosis virions are then released from the infected cell. The released viruses then are capable to infect kidney cells, liver cells, intestines, and T lymphocytes, as well as the lower respiratory tract. This virus can make the antiviral T-cell response irregular due to the stimulation of T-cell apoptosis, thus causing a collapse of the immune system [16].

### ***B. AI Based Approach In Diagnosis of Covid-19***

Artificial intelligence is an evolving technology in all the fields. Especially in fitness care it is taking part in crucial role. Compare to the traditional strategy of diagnosis, AI primarily based method is greater elevated consequences in detection and analysis of fitness troubles [17].

Compared to the standard technique it depends on human workload and AI permits efficient, safe, accurate and speedy options to the problem. Recent AI-empowered purposes in COVID-19 frequently consist of the committee imaging platform, the lung and contamination place segmentation, the scientific assessment and diagnosis, as nicely as the pioneering basic and medical research. Moreover, many business merchandise have been developed, which efficiently combine AI to fight COVID-19 and actually exhibit the functionality of the technology.

AI helps in Early detection and analysis of the infection, Monitoring the treatment, Contact tracing of the individuals, Projection of instances and mortality, Development of pills and vaccines, Reducing the workload of healthcare workers, Prevention of the disorder for COVID-19.

Xueyan Mei [17] has referred to that The RT-PCR virology check (COVID-19 (+) or COVID-19 (-)) was once used as the reference to instruct the models. We developed and evaluated three one of a kind fashions the use of CT pictures and medical information.

First, a deep-learning mannequin the usage of a CNN (model 1) used to be developed to solely use CT pix to predict COVID-19 status. Second, traditional machine-learning techniques (model 2), such as SVM, random woodland and MLP, had been evaluated to predict COVID-19 the usage of solely medical information. Finally, we created a joint CNN mannequin (model 3) combining radiological and scientific data. Every day, WHO and CDC (United States) are receiving massive records of covid-19 instances throughout the world. With modern-day pc

structure and internet, all these facts can be accessed in real-time by means of distinctive institutes to increase an independent or collaborative AI mannequin to cope with more than a few tasks.

Dananjayan et. Al [18] has cited that the unsupervised ML can become aware of its personal sample from the noise (historical and real-time data) instead than the education it on a preselected dataset, consequently giving a wider opportunity and new behaviour. An AI mannequin educated to predict a specific ailment can be retrained on the new records of a new or distinctive ailment and they have stated the following key factors related to AI based totally applications.

AI can be used as an early outbreak warning system, BlueDot, an AI-driven algorithm no longer solely efficaciously detected the outbreak of Zika virus in Florida<sup>4</sup> however additionally noticed COVID19, 9 days before the WHO launched its announcement alerting humans to the emergence of a novel coronavirus.[19] Researchers from the Huazhong University of Science and Technology (HUST) and Tongji Hospital in Wuhan, Hubei have developed an AI diagnostic device (XGBoost laptop learning-based prognostic model) that can rapidly analyse blood samples to predict survival costs of COVID-19 contaminated sufferers and it turns out to be 90% accurate.[20].

### **III. Conclusion**

The COVID-19 is a disease that has spread all over the world. Intelligent medical imaging has played an important role in fighting against COVID-19. In this review article we have discussed how AI provides safe, accurate and efficient diagnostic results in COVID-19. This review summarizes that from all the aspects like clinical, societal, health care, data sharing etc. AI can help in discovering drug; visualize the track of patient history, to identify the infected patients, to monitor social distance public places, to track clinical record of the patient and many more applications. Thus, this review will help researcher to work further in designing and developing AI models for Detection and Diagnosis of pandemic COVID-19.

### **References**

- [1] S. M. Metev and V. P. Veiko, *Laser Assisted Microtechnology*, 2nd ed., R. M. Osgood, Jr., Ed. Berlin, Germany: Springer-Verlag, 1998.
- [2] J. Breckling, Ed., *The Analysis of Directional Time Series: Applications to Wind Speed and Direction*, ser. Lecture Notes in Statistics. Berlin, Germany: Springer, 1989, vol. 61.
- [3] S. Zhang, C. Zhu, J. K. O. Sin, and P. K. T. Mok, "A novel ultrathin elevated channel low-temperature poly-Si TFT," *IEEE Electron Device Lett.*, vol. 20, pp. 569–571, Nov. 1999.
- [4] M. Wegmuller, J. P. von der Weid, P. Oberson, and N. Gisin, "High resolution fiber distributed measurements with coherent OFDR," in *Proc. ECOC '00*, 2000, paper 11.3.4, p. 109.
- [5] R. E. Sorace, V. S. Reinhardt, and S. A. Vaughn, "High-speed digital-to-RF converter," U.S. Patent 5 668 842, Sept. 16, 1997.
- [6] (2002) The IEEE website. [Online]. Available: <http://www.ieee.org/>
- [7] M. Shell. (2002) IEEEtran homepage on CTAN. [Online]. Available: <http://www.ctan.org/tex-archive/macros/latex/contrib/supported/IEEEtran/>
- [8] *FLEXChip Signal Processor (MC68175/D)*, Motorola, 1996.
- [9] "PDCA12-70 data sheet," Opto Speed SA, Mezzovico, Switzerland.
- [10] A. Karnik, "Performance of TCP congestion control with rate feedback: TCP/ABR and rate adaptive TCP/IP," M. Eng. thesis, Indian Institute of Science, Bangalore, India, Jan. 1999.
- [11] J. Padhye, V. Firoiu, and D. Towsley, "A stochastic model of TCP Reno congestion avoidance and control," Univ. of Massachusetts, Amherst, MA, CMPSCI Tech. Rep. 99-02, 1999.
- [12] *Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specification*, IEEE Std. 802.11, 1997.