



## Covid-19 and Health Care's Digital Technology Revolution

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Received: 12 Mar 2021

Revised: 15 Mar 2021

Accepted: 18 Mar 2021

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### ABSTRACT

COVID-19's affliction has spared none regardless of country, economy, rich or poor, child or old age, salaried or entrepreneur, celebrity or common man, actor or politician, Policeman or thief, Teacher or student, Doctor or Patient. With the nature of high transmissibility and absence of effective vaccine, COVID-19 is now a global pandemic. In the twenty first century, the world has witnessed the most dreadful virus in the form of newly discovered virus called as Severe Acute Respiratory Syndrome Coronavirus 2, (SARS-CoV-2) which causes a respiratory illness disease called as Coronavirus disease 2019 (COVID-19). This COVID-19 has brought the healthcare industry in the complete spotlight probably for the first time in the history of mankind. Physical distancing, Environmental hygiene, isolation and quarantine, personal hygiene has become household terms due to the outbreak of the novel coronavirus COVID-19. The novel coronavirus has posed an unparalleled experience and challenging future by impacting more and more people around the world. Globally, from small clinics to large hospital chains are struggling to manage the COVID-19 patient population and non-COVID persons are restricted to stay in their homes. Undoubtedly, COVID-19 has impacted various sectors of the global economy including the healthcare industry. Undeniably, COVID-19 has created the necessity for the establishment of collaborative, robust digital healthcare systems with improved efficiency and this can be achieved with the help of latest technologies like Artificial Intelligence, Blockchain, Robots, Machine learning, Augmented Reality, Virtual Reality, Cloud Computing, telemedicine to secure medical data and to provide efficient, scalable healthcare solutions during uncertain times like COVID-19 Pandemic. This research paper discusses different digital technological applications adopted by healthcare tech companies with respect to COVID-19 pandemic management and response for pandemic surveillance, testing, contact tracing and effective healthcare delivery.

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**Keywords:** COVID-19 Pandemic, SARS-CoV-2, Telemedicine, Digital Healthcare, Artificial Intelligence (AI), Machine learning (ML), Blockchain, Robots

## INTRODUCTION

The COVID-19 Pandemic is devastating economies and livelihoods of people all over the world. Undeniably, it has created one of the unparalleled public health challenges in the last century by creating an acute strain on healthcare resources all over the world. Physical distancing and wearing mask will continue for a longer period of time to control the disease to save the lives of people. Healthcare tech companies in collaboration with healthcare providers are giving their best efforts to develop new means to control the pandemic. Globally, various Governments are taking coordinated efforts to contain and mitigate the COVID-19 and have achieved varied success rates. Moreover, successful strategies adopted by Government of various countries are shared among other countries related to effective surveillance, testing and contact tracing to contain and mitigate the COVID-19. Since humans are restricted within their homes due to COVI-19, digital tech companies in collaboration with healthcare providers are taking various necessary steps to effectively contain and mitigate COVID-19 by adopting latest technologies like Artificial Intelligence (AI), Machine Learning (ML), Blockchain, Telemedicine, Robots, Cloud Computing etc., In the ensuing paragraphs, various applications of digital technology in healthcare sector in response to COVID -19 Pandemic are discussed.

### Redbird Company- Accra, Ghana

Each country all over the world is presently battling with the shortages of testing the COVID-19 virus that further adds to the difficulty of fighting this deadly COVID-19 disease. In Ghana, Redbird company has already been working to reduce the burden on hospitals with the help of technology to help pharmacies in order to diagnose and monitor chronic diseases by the way of saving user information on an app. The company has recently added a new feature which will help people to diagnose whether they have COVID-19 or not. The users of this app will be able to input symptoms into the app and they can keep track of their movements to identify whether they have been in contact with a confirmed COVID-19 case. Every person will be able to self-report presence of symptoms or absence of symptoms that is tagged to his/her phone number and location. This will certainly help the healthcare providers to easily map potential areas that need to be given attention and can follow-up with the high-risk patients. Meanwhile, coronavirus spreading in the workplace can also be very well prevented with the usage of this app by various companies in Ghana.

### ZipLine – California, United States

It is a known fact that collection and delivery of COVID-19 test samples from the patients at rural health facilities and delivering them to the medical labs situated in the two large cities namely Accra and Kumasi located in Ghana by road transport practically will take long hours or sometimes even days. Adequate amount of samples from the hospitals need to be collected by the delivery truck before returning to the laboratory facilities and this may compromise the capability to respond rapidly. In addition to that, there is a possibility of the collected samples getting damaged during the transit especially when the cold chain is interrupted. Zipline, a California based drone-delivery start-up with the help of technology uses its drones to collect blood samples from rural health facilities in Ghana to deliver the same to the medical laboratories located in Accra and Kumasi. Healthcare providers will be able to order blood, vaccines and other medical supplies by SMS. A package of samples will be placed in a parachute in the belly of the drone located in one of the distribution centers of Zipline and once the drone reaches its particular destination, the healthcare provider will collect the required supplies from the dropped parachute and on an average it takes only 30-60 minutes.



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The Canadian biotech company AbCellera is in the process of new antibody drug discovery advancements with the intersection of biology, technology, and Artificial Intelligence. Eli Lilly has partnered with Abcellera to co-develop antibodies for the treatment and prevention of COVID-19. Within 7 days from receiving a blood sample from a U.S. patient who was infected with COVID-19 and recovered from the disease, AbCellera was able to screen more than five million immune cells to identify the ones that produced antibodies to neutralize the virus and help that patient recover. AbCellera has developed its antibody identification technology in the form of a “lab on a chip” which is of the size of a credit card. It is used to consecutively test multiple antibody-producing cells at a time with the help of advanced sensors and machine learning. Potential targets are identified by the company tests with the help of hundreds of thousands of cells and then it can be narrowed down to more precise mechanisms that actually disrupt a virus’ capability to infect a host. Partnering with Eli Lilly, AbCellera has examined the potential number of targets from 500 to 20. AbCellera Company’s technology has already been validated by DARPA. Other partners now include pharmaceutical companies like Novartis, Gilead and Pfizer.

**Scandit - Zurich, Switzerland**

Scandit, is a Zurich based Enterprise barcode scanner company which offers a platform that combines technologies like machine learning and computer vision with augmented reality (AR), text recognition (OCR), barcode scanning, object recognition which is suitably designed for any camera operated smart device(s) like drones, smartphones, robots etc., There is an increase in the need for mobile computer vision on personal smart devices as the world all over is witnessing social distancing due to COVID-19 Pandemic. Thus, the company’s technology will be more useful in the healthcare sector to scan medication, supplies, samples and even patient ids. For example, Augmented Reality (AR) and Mobile Scanner can scan a patient’s wristband that will help the healthcare providers to access a patient’s medical records and administration of medicines. Blood samples can be tracked real-time using Scandit powered mobile application and barcodes can be traced back to their origin thus helping to achieve an accurate chain-of-custody. In addition, blood bags with numerous barcodes can be scanned easily at a time rather than to scan each barcode discretely so that lot of time can be saved thus increasing efficiency.

**Future Directions**

Discovering highly effective vaccines is a long-term means of fighting the pandemic; it also demands large scale production and distribution apart from public acceptance. Further, there is no guarantee that a COVID-19 vaccine will protect the human beings from all types of virus that may emerge in future. May be, who knows, like the flu, yearly vaccinations will be administered in order to prevent the resurgence of COVID-19. Though, it is vital to continue developing various methods “Point-of-Care” diagnostics where patients need to visit health care centers or a centralized location to get treatment to fight COVID-19, adequate attention need to be given to continue to develop “Point-of-Need” diagnostics that can be used wherever the patient is located. When the restrictions on the lockdowns are relaxed in a phased manner or fully removed to revive the global economy and business, the employers may want their employees to undergo diagnostic tests either at their residence or in the workplace. Therefore, necessary steps need to be collectively taken by Health Organizations like World Health Organization (WHO), Centers for Disease Control and Prevention (CDC) and similar organizations/bodies, Government(s) of various countries, Health Care Policy makers, Pharmaceutical companies, Healthcare providers, Healthcare Experts, Hospitals, Healthcare Tech companies to discover affordable, portable, wide scale “Point-of-Need” COVID-19diagnostic so that human beings will be able to administer COVID-19 test themselves.

**CONCLUSION**

There is no second thought that the adoption of digital technology in various sectors due to COVID-19 pandemic has moved ahead of the curve during lockdown periods. Undeniably, COVID-19 pandemic is acting as catalyst for the rapid adoption of many sectors including healthcare sector. Adoption of technologies like Artificial Intelligence,

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Blockchain, Robots, Machine learning, Augmented Reality, Virtual Reality, Cloud Computing, telemedicine in the healthcare sector has certainly helped the healthcare providers and healthcare tech companies to expedite the testing of patients, surveillance, contact tracing etc., and will continue to do so in future too. Provision of Telemedicine, usage of robots for various medical facilities, remote monitoring have certainly helped both the healthcare providers and the patients to achieve a robust and an efficient health care delivery more effectively. Indisputably, COVID-19 Pandemic has accelerated not only the innovation but also the adoption of the latest digital technologies at a rapid pace to contain and mitigate COVID-19 Pandemic all over the world. Thus, healthcare providers and healthcare tech companies probably are placed in a relatively better position and far more confident to effectively manage and cure various other diseases including pandemic thus changing the landscape of healthcare delivery.

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Table :1 COVID-19 Vaccine Status Tracker – Data as on September 13, 2020		
Source: Insights- inshorts		
Country	Vaccine	Status
United Kindgom	ChAdOx1nCoV-19 (Oxford – Astrazeneca)	Phase 3
United States	mRNA-1273 (Moderna)	Phase 3
United States	BNT162b2 (Pfizer/BioNTech)	Phase 3
China	CoronaVac (Sinovac)	Phase 3
Russia	Sputnik V (Gamaleya)	Final approval
India	ZyCov-D (Zydus Cadila)	Phase 2
India	Covaxin (Bharat Biotech)	Phase 2
170+ Vaccine Candidates in pre-clinical or clinical trials & 35 Vaccines in clinical trials		





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Novartis and Pfizer.

