

「 Fighting Covid-19 with digital technology: the power of big data and AI!」

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Apple and Google have just announced their partnership on COVID-19 contact tracing technology and the alerts app was ready on 20 May, 2020. This is an unprecedented move by two U.S. tech giants to step in to fight the crisis. [1, 2]

In the fight against the covid-19, the medical system is the frontline battlefield. However, as the pandemic progresses, the digital science apparently became a new battlefield against this disease. Artificial intelligence (AI) is considered a key driver of the Fourth Industrial Revolution and achieves the prediction through monitoring the feedback of big data. Therefore, for the outbreak of unknown epidemics, the predictive function of AI is of great help in all aspects. Here we summarize some important contributes that can be done by digital technology.

• Caution and Prevention

Accurate forecasting of an pandemic is critical for control and prevention. One good example is reported by 《Wired》 that a Canadian health monitoring platform, BlueDot had sent caution of the outbreak to its customers on December 31, earlier than the warning issued by the US Centers for Disease Control (CDC). BlueDot uses natural-language processing and machine learning techniques to sift through news reports, animal and plant disease networks, and official proclamations in 65 languages. Notably, BlueDot also monitored seemingly unrelated data of air ticket prices which are actually closely related to consumers' worries about the outbreak of disease. BlueDot successfully predicted the next outbreak in 11 cities after Wuhan. [3]

• Medical Assist

Many doctors have found that ground-Glass Opacity (GGO) phenomenon will appear in the lung X-ray computed tomography (CT) of early patients. Therefore, besides COVID-19 tests, it is very suitable for AI to analyzing the CT images to lower the misjudgment and reduce the burden of doctors. AI and big data also play vital roles in medical resource planning, including hospital capacity, medical supply distribution, distinguishing of patients by their medical history etc. Currently, various organizations have been collecting data from multiple sources about this pandemic and developing analytics-powered dashboards to present real-time information to the public. For example, several websites are reporting data about the number of COVID cases, hospitalizations, and death counts in different countries. These public data repositories will allow researchers and policymakers quantify the real-time impact on hospital systems and forecast future utilization levels of hospital resources. [4]

- **Robot**

Today's robust robotics platforms are enabled by huge amounts of data from sensors and guidance from predictive AI algorithms. In this pandemic, robots are perfect for minimizing human interaction with infectious environments. Companies around the world such as Boston Dynamics, Akara Robotics, UBTECH Robotics and CloudMinds have already deployed robots on the front lines of this war to assess patient health, disinfect hospital surfaces, and help health workers with Personal Protective Equipment (PPE). Robot drones are also delivering blood and other lab samples. For example, WakeMed hospitals in North Carolina launched the first drone delivery program approved by the U.S. Federal Aviation Administration with Matternet drones operated by UPS; while Terra Drone from Japan executed similar tasks in the hard-hit Wuhan province of China. [5]

- **Social Assist**

Earlier than Apple and Google's contact tracing app, countries like Singapore, Taiwan, South Korea, and Israel has already used data from citizens' mobile phones to perform contact tracing. These applications have raised some concerns about privacy, but they have been widely viewed as effective and necessary tools in the fight to proactively stop the spread of the virus and saving lives in these countries. The United States and China also have successively developed recognition systems to distinguish human faces covered with masks. Some apps remind you the proper social distance by calculating the number, distance, and density of people (heads). Johns Hopkins University integrates and visualizes all kinds of big data such as global cases, people flow, traffic flow, logistics and so on, and provides epidemic experts with real-time monitoring of changes to effectively analyze and predict the virus transmission path. [3, 4, 5]

- **Academic Research**

DNA (RNA) mapping and 3D structure simulation done by AI accelerate the development of innovative treatments and vaccines. Graphen, Inc. has compiled the COVID-19 virus gene sequences in various countries in the world and established the first gene evolution path analysis website, helping researchers and manufacturers understand the virus evolutionary process. [6]

Here are only limited examples of how people use AI and big data to fight the Covid-19. Digital technology is not perfect. However, it seems that the combination of digital technologies such as AI, big data, 5G with various industries will be a new round of industrial revolution and will comprehensively change the lifestyle of human in the future.

Reference:

1. Apple Newsroom (<https://www.apple.com/>)
2. Leo Kelion, 20 May, "Apple and Google release marks 'watershed moment' for contact-tracing apps", BBC NEWS.
3. Eric Niiler, 25 Jan 2020, "An AI Epidemiologist Sent the First Warnings of the Wuhan Virus", Wired.
4. Soumya Sen, 11 May, "How data, analytics, and technology are helping us fight COVID-19", MINNPOST.
5. Ajit Manocha and Pushkar P. Apte, 12 May, "Fighting the COVID-19 Pandemic with Big Data-AI Enabled Platforms", SEMI Tech Spotlight
6. Graphen - Monitoring COVID-19 <http://www.graphen.ai/covid.html>

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