China’s COVID-19 Response Battle Tested Its AI Ecosystem

Capt Richard Uber, Ph.D., USAF

China’s COVID-19-driven emergency rollout of new technologies pressure tested a variety of artificial intelligence (AI) applications. Autonomous vehicles supported various national efforts. Military-grade thermal imaging cameras in public spaces detected fevers. Geolocation tools in health monitoring apps provided real-time notifications to people who might have been close to confirmed cases. This large-scale, rapid deployment provides a glimpse into the capacity of China’s digital authoritarianism—and demonstrates the whole-of-nation effort China would be capable of if ramping up its data enterprise to support a military mobilization.

China’s War Against the Virus

After locking down Wuhan¹ and all of Hubei Province, the Chinese Communist Party’s rhetoric turned to unifying the nation against the virus. As stated in an online commentary, “China has fortified a nationwide defense against novel coronavirus.” ² Simultaneously, China circulated its first nationwide calls for high-tech solutions. A January 26 article in the People’s Liberation Army Daily said the tech industry would play a pivotal role, specifically through emergency R&D in disease transmission, rapid testing, corrective treatments, and vaccine development. ³ Furthermore, the central government announced initiatives aimed at unifying efforts of all AI-related professional associations, researchers, and enterprises.⁴
New Technologies Put to the Test

Contact Tracing
ANT Financial (formerly Alipay), in coordination with Alibaba, developed and deployed a system for preventing and controlling the epidemic that gives users of an app a red, yellow, or green QR code rating their risk for the coronavirus. The prototype app was deployed February 11 in Zhejiang Province. The initial response was so positive (with 100 million online hits the first day) that the PRC decided to roll out a nationwide platform within one week.\(^5\) The program works by sharing geolocation data from users’ phones with a government database. Cross-listing travel history of known cases with user data, the government can determine whether users have been in close contact with the virus. A stoplight QR code (Figure 1) is displayed within users’ Alipay or WeChat apps, and guards at checkpoints require people to show their code to gain entry to public spaces or transit.\(^6\)

The Alipay QR code color system has the following three options:

- Green: No known risk—proceed.
- Yellow: Elevated risk—stay at home for one week.
- Red: High risk—quarantine for two weeks.

Temperature Sensing
Hospitals across China adopted AI-enhanced fever-screening procedures, and the government deployed temperature sensors to monitor travelers and check for signs of infection. Remote temperature screening tools have been in use for several years at airports. However, the nationwide epidemic called for deployment and operation on an unprecedented scale. According to one report, remote infrared temperature sensors from military technology used in satellites were adapted to read human body temperatures. These systems deliver readings accurate within 0.1 degrees Celsius from up to 100 meters away.\(^7\)

Autonomous Systems
Autonomous robots also played a major role in the coronavirus response. Hospitals and other facilities used robots to clean and disinfect common areas, thereby reducing the risk of person-to-person transmission. Authorities used drones to monitor public spaces and disinfect large areas. Baidu, with partners including Neolix (新石器), IDRIVERPLUS (智行者), Apollo Minibus (阿波龙), Bai Xixiu (白犀休), Qingdao Wuniu Intelligent Technology Co., Ltd. (青岛悟牛科技), AgileX (松灵机器人), and Agribot (博田), contributed over 100 self-driving cars using Baidu’s Apollo system to support tasks including disinfecting, logistics, transportation, and distribution of materials.\(^8,\)\(^9\)
Claiming Victory

In an apparent victory lap, a spokesperson from the Ministry of Industry and Information Technology said AI played an effective role in fighting the epidemic, with the largest contributions in testing, consultation, and medicine research and development. Scientific professional associations also played a key role, connecting solution developers from industry with government planners. For example, in the city of Jinan in Shandong Province, the newly formed Jinan Artificial Intelligence Industry Innovation and Development Alliance (established September 2019) responded with 231 solutions addressing specific needs related to the epidemic.

Implications for the Future

This national crisis exemplified exactly how AI is a different type of enabling technology. Tech giants like Alibaba and Baidu led projects with consortia partners and government sponsors. Smaller (micro, small, and medium) firms (both software and hardware providers) funneled their efforts through regional AI professional associations, as seen in Jinan. This organizational strategy is probably how China will respond to large-scale problems in the future.

Unlike traditional engineering projects, which require a long design and development process and an established industrial base, AI algorithms, hosted on cloud servers, can be developed quickly and made available for use with the click of a button. Rather than starting up a major industrial product chain, manpower and computational resources may immediately be reoriented to support new priorities.

Examining the mobilization in response to the coronavirus, the rapid response from the tech sector is particularly impressive. Alipay’s close contact app moved from design, to beta test, to national implementation in under a month.

Professional associations demonstrated their value as focal points for industry efforts. These go-between bodies may be critical nodes in future large-scale mobilization efforts. In a military conflict, governments and forces encounter new problems at every junction. Defense assets will be busy operating systems that have already been developed and deployed. It will be up to the private sector to develop innovative solutions to newly identified challenges. The coronavirus stress tested the major muscle movements required to bring new technology to the front lines quickly. This is a testament both to the strength of China’s AI ecosystem and the influence of the central government. If China were to face a similar large-scale crisis, as might be seen in a military conflict with a near-peer competitor, the private sector response would probably be even more rapid and coordinated.

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Endnotes


3 Xinhua News Beijing, “坚定信心打赢疫情防控阻击战 (Absolute Resolve To Win the War Against the Outbreak),” PLA Daily, January 26, 2020, http://www.81.cn/jfjbmap/content/2020-01/26/content_252905.htm.


12 Yu, Minxing, “发热门诊、AI测温、机器人巡逻...人工智能成山东战疫生力军 (Fever Consultation, AI Temperature Checks, Robot Patrols...AI Becomes a Force in the Battle Against Epidemic in Shandong).”