Thomas Ramge

Postdigital

Using AI to Fight Coronavirus, Foster Wealth and Fuel Democracy

MURMANN

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fight Foster Wealth Democracy

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I miss
my
pre-internet
brain.

Douglas
Coupland

Inhalt

preface:
ai in corona-times

On January 9, 2020, the World Health Organization (WHO) issued a warning to the world: In China's Hubei province, an unusually large number of patients were being hospitalized with persistent pneumonia. There were many indications they had been infected by a new virus. It was possible that the virus had spread from animal hosts to human beings at a fish and poultry market in Wuhan, the provincial capital. In the United States, the Centers for Disease Control and Prevention (CDC) had published its own outbreak warning three days earlier. The WHO and CDC warnings were based primarily on public information from Chinese health authorities. BlueDot, a Canadian start-up that uses artificial intelligence to detect infectious diseases, had picked up traces of the epidemic significantly earlier than the health officials in Geneva and Atlanta: on New Year's Eve 2019.

Around the clock and worldwide, the algorithm of BlueDot's epidemiological early warning system aggregates data from regional news reports, official statements, and health databases as well as forums for plant and animal health. For a fee, BlueDot reports to its customers (including many health ministries in the western world) where new hotbeds for illness are emerging. Using data based on airline ticket sales, the

system also predicts where a disease will spread in the near future. After learning from this data, the system pointed to new outbreaks in Bangkok, Seoul, Taipei and Tokyo. In hindsight, this proved to be 100 percent correct.

ai and the coronavirus graph

In the last few months, we've all learned a lot more about epidemics than we ever wanted to know. Even as medical laypeople, we now know that every day counts when it comes to stopping a dangerous virus like Covid-19. The earlier doctors and medical authorities can identify the first cases of infection, quarantine them and stop the chain of infection, the fewer people will die. As the disease spreads internationally from country to country, every day counts to prevent the increase in new infections from curving ominously upward with seeming inevitability and then growing exponentially as it develops the enormous destructive force that we now see almost everywhere in the world. If only medical authorities, politicians and ultimately every one of us had heeded the warnings of BlueDot's AI, drawn the right conclusions and acted accordingly. Hindsight gives us all 20/20 vision.

really? of course, things are always more complicated

Not even four weeks into the new year, *Wired*, the quasi-official journal of the American tech scene, covered BlueDot and its alarming report. On social media, the report went viral even faster than Covid-19 in the real world. In numerous subsequent articles, the story of virus tracking with pattern recognition using machine learning was used as a prime

example of how artificial intelligence could be used as a miracle weapon against the global scourges of our time—if we would only use them intelligently. In March 2020, as the medical systems of Italy and Spain were on the verge of collapse and the number of cases in the USA was skyrocketing, we were bombarded almost daily by new reports of how we could more quickly get a handle on the coronavirus pandemic by using data and machine learning.

AI would help us develop medications to treat the disease more quickly, so they said, and develop a vaccine to get the world back to normal operations as soon as possible. There were announcements from China and Israel that AI systems were able to scan lung x-rays from Covid-19 patients and reliably predict how severe the symptoms would become. We were told how users could voluntarily install the smartphone app «TraceTogether» from Singapore that would sound the alarm via Bluetooth if someone nearby was infected. Then there were the German, Austrian and British apps—all of them fully compliant with European data protection laws, of course—that would determine if a user was at risk of infection based only on the location history stored on the user's own smartphone. We saw videos of robots disinfecting public buildings or bringing food to the sickbeds of the infected.

And then naturally there were the many stories—mostly reported in western media with some degree of ambivalence—about the use of AI in «medical surveillance systems.» China was now mobilizing its vast surveillance apparatus to fight the virus. Authorities installed surveillance cameras to watch the front doors of people under quarantine. On social media, people were encouraged to report any suspected violations. Based primarily on a user's movement profile, contact tracing apps like Alipay Health Code calculated a scoring value in order to color-code each user as green, yellow or red. Se-

curity guards then blocked smartphone owners in the yellow or red groups from entering stores, public buildings and sometimes even the apartment complexes where they lived. As the lockdowns were gradually loosened, drones flew through the streets to remind people of the requirement to wear face masks. Anyone without one was targeted by the drones' high-resolution cameras and identified through facial recognition (which was somewhat ironic, considering the prior ban on face masks imposed by the surveillance state).

Democratic countries in Asia, including South Korea, Taiwan and Singapore, also traced chains of infection by using smartphone movement profiles and aggregated them with data from surveillance cameras and digital payments. They monitored compliance with quarantine restrictions by using «electronic fences» and distributed trackable digital armbands. Those who were infected were required to wear the armbands at all times under threat of severe punishment. It's likely that Israel also had recourse to cell phone movement data collected by its intelligence services.

security versus freedom versus health

As could be expected, Chinese propaganda praised the maximally invasive use of digital surveillance technology as a highly efficient weapon for maintaining public health. Around the world, countries borrowed elements of the Chinese system. Autocracies like Russia and Saudi Arabia adopted China's approach with the visible attitude of «surveillance is always a good thing anyways.» But in liberal democracies, the old question of security versus freedom is back on the agenda. How many limits on basic civil rights, closely monitored with digital tools, do we have to accept as the price for some

additional health protections in the age of the coronavirus? Even once this pandemic has passed and we've switched from crisis mode to uncovering what went wrong, there won't be any easy answers to this question. We'll only be able to assess with difficulty what steps and which technologies contributed to keeping the virus sufficiently in check for the world to at least partially regain its balance. Even people who until recently advocated for privacy and data protection without compromise are starting to have second thoughts about their dogmatic stance in the face of a world under lockdown. If we dismiss all considerations except those of the data scientists, the verdict is clear: the more complete our digital model of the world, the better algorithms will be able to determine the appropriate measures to combat an epidemic. A medical surveillance app whose use is required of everyone is potentially more valuable for data scientists than an app that a few people download voluntarily. But anonymized and pseudonymized iPhone, Android and Facebook data can still be helpful.

I completed the first draft of the manuscript of this book in January 2020. When I sent the file to the publisher, I had heard of the first cases in Wuhan, but I wasn't worried that a pandemic could wreak havoc on my own life in Berlin. That my office at the Weizenbaum Institute would be closed, or that we would stare coldly at anyone who got too close when we ventured out shopping for food. That I would be plagued by concern for my parents, who rely on receiving visits twice a day from a nurse—now wearing a protective mask, but how well do the masks work? And by concern for my son, who's now learning math through an eLearning app and can't see his friends.

Three months ago, I didn't suspect that a virus pandemic was about to become a gigantic real-life laboratory for the central questions of this book:

- How can we use the new abundance of information for informed decision-making so that artificial intelligence can be used to enhance human intelligence?
- To which questions are data-rich analytics and AI systems floundering for an answer through a lack of sufficient (or sufficiently relevant) data?
- How can people use artificial intelligence to take advantage of other people economically, manipulate them or oppress them?
- Are populists, autocrats and dictators using AI systems more shrewdly than leaders of democratic parties, and is that why liberal democracies are beginning to wander down slippery slopes?
- What might a future look like where AI systems and an abundance of data improve health and education, strengthen democratic discourse and participation, and increase prosperity for everyone in a way that promotes ecologically, economically and socially sustainable development?

Or boiled down to a single question: How can human beings use artificial intelligence intelligently?

what evidence does your health app really have?

We'll be dealing with the social and economic consequences of the coronavirus catastrophe for a long time. The debate will lead to some difficult discussions about whose decisions and actions were correct or incorrect, and what information lay behind those choices. Recriminations at international level have already begun and we can observe their destructive force, especially for the relationship between China and the

USA, precisely at a time when international cooperation has never been more necessary. Meanwhile, Europe is failing miserably to close ranks in solidarity at a time of crisis. Cuba hit on the idea of sending doctors and medical personnel to Italy before Germany did. It wasn't the Netherlands that sent ventilators when Italy's need was greatest, but Russia. The coming years will be spent cleaning up the economic rubble left in the wake of the pandemic. Hopefully it won't lead to the ultimate collapse of the European Union.

We should take pains to avoid hasty judgments, but in turn we should be quicker to turn new evidence and learning into more intelligent behavior. When it comes to the intelligent use of data, statistics and systems that learn from data, there are already many things we can take to heart in future crises. From a technical standpoint, it's impressive that a system like BlueDot can correctly interpret social data, in this case probably consisting of local news stories. But what matters most is whether we take the signals from our early warning systems seriously. Weeks before the end of 2019, doctors in Wuhan were sounding the alarm, foremost among them the tragic hero Li Wengliang. In January 2020, the Chinese authorities forced him to «cease spreading unsubstantiated and illegal rumors.» On February 7, he died of a coronavirus infection.

During the crisis, the world gorged on presentations of infection data as infographics from Johns Hopkins University's Center for Systems Science and Engineering. But, at the same time, in the vortex of the virological maelstrom, we also learned that even in the age of Big Data, we live in squalid poverty when it comes to data concerning many essential questions. Especially in the first few months of the crisis, Covid-19 was a worst-case scenario for data-based decision-making. The virus's unusually long incubation period led to

infected people going about their daily lives and infecting many others as they did so. The symptoms of coronavirus are too ambiguous and too many infections remain asymptomatic for the majority of cases to be caught with a simple diagnostic test.

The stoplight colors of the health apps were in many senses fake statistics, more pseudo-evidence than actual evidence for making informed decisions. Those who had actually tested positive for Covid-19 might be showing «red,» but if China's stoplight system was really taken seriously, everyone else would have to be classified as «yellow.» Smartphone GPS data is only accurate to around two meters, and it doesn't include altitude. It can't be used to determine whether people are maintaining a safe distance or whether they live on top of each other on different floors of a high-rise building. The pronouncements of the Chinese authorities on the efficiency of the Social Tracking System, the medical version of China's Social Scoring System, should be treated with a corresponding level of caution.

Covid-19 tests were developed in record time, but even record time left health authorities in many countries flying blind without verified infection data. Through April, the availability of tests was also too low for any country to implement a statistically representative testing program. That would have required a sufficient number of random samples across the population, including antibody tests for those who were already immune. But widespread testing and random sampling would have been the only way for scientists, doctors and politicians to gain a true overview of the health status of their country. The key lesson here is: Knowing what you don't know is useful evidence. In future crises, those who determine health policy will hopefully recognize earlier what information the data scientists need to feed into their models and what

steps can be taken to obtain the necessary data faster. That may also mean prioritizing statistical testing at the cost of quarantining more suspected cases, for a longer duration.

For testing—and for the feverish development of medications and vaccines as well, today and in the foreseeable future—one thing is clear: What makes a difference isn't the supposed miracle weapon of AI, but the knowledge and skill of pharmacologists. Machine learning has an important supporting role to play in this, for example in searching for previously identified substances with antiviral properties. Experts sometimes focus too narrowly on the usual suspects. Searching intelligently, with the intelligent use of filters, can lead them to new ideas. Modeling enzyme reactions with computer simulations can save a little development time here and there. But the battle against Covid-19 and its successors won't be decided in an artificial neural network, it'll be in a Petri dish.

data scarcity in the age of abundant data

At the end of March 2020, I spoke to several AI researchers, computer scientists and data scientists with particular expertise in medical and life sciences. All of them were palpably frustrated that their discipline unable to contribute as much to solving the coronavirus crisis as they would have hoped and expected. They all felt that, while they had helpful models and algorithms, they lacked the necessary data. Maybe this self-awareness on the part of helpful and thoughtful scientists facing the extreme situation of a viral pandemic will also be useful in future.

As the discourse of digitalization has developed over the last 25 years, and with accelerating pace during the last five years

of AI hype, we've all too infrequently paused to critically consider how much digital technology is truly beneficial, who it benefits or where it might be causing more harm than good. This book is my search from a dialectical perspective into how we can bring together the best parts of analog culture and digital innovation. Drawing on the work of the Italian philosopher Giorgio Agamben on the positive and negative effects of «coexistence with computers,» I refer to this synthesis of analog and digital as «postdigital.» The term refers to the ability to move beyond the promises of digital salvation from Silicon Valley start-ups and Chinese technocrats. Being postdigital requires a high level of digital competence and digital sovereignty. We will put intelligent machines to use where and when they truly benefit us. And we will shut the systems down when other people try to use them to manipulate us.

Covid-19 has taught us that IT solutions might be able to assist us in the struggle against the virus. But practising social distancing was the best solution that we had available, and it may have saved millions of lives worldwide. Social distancing to flatten the infection curve (in makeshift form) became necessary because most nations have yet to master the bread-and-butter task of combating epidemics.

China's digital dictatorship may have prevented the absolute worst outcome within its own borders by taking radical steps in Hubei somewhat belatedly. But the role model for the future of fighting epidemics is democratic Taiwan. The country had learned its lessons from the SARS epidemic of 2003. As early as December 31, 2019, doctors were monitoring passengers arriving from Wuhan for flu symptoms before they were allowed to leave the airport. Beginning on January 5, 2020, there was a targeted search for anyone who had had contact with people who had been in Wuhan in the preceding weeks.

The citizens of Taiwan provided exemplary support to the medical authorities. Masks were worn, not hoarded. Social distancing was a matter of course. Unlike the young people of Miami, London or Berlin, no one thought of holding a corona party. The same kind of contact tracing apps described above were also used in Taiwan. Maybe they even helped: the evidence is still out. With enough evidence, we'll eventually be able to draw the right conclusions and use digital technology more intelligently as extra support for traditional methods of hygienic epidemic control.

The Taiwanese broke the chain of infection before a reliable test for Covid-19 existed, even though around a million Taiwanese citizens regularly commute to the Chinese mainland and around three million Chinese citizens travel to Taiwan each year. South Korea and Japan also acted earlier and more decisively than Western Europeans and Americans at a point when fewer data were available. They were successful. We weren't. To rub salt to the wound, of course, it's not as if we weren't given plenty of warning.

Epidemiologists (and Bill Gates) have reminded us repeatedly in the last few years of the dangers of precisely the sort of pandemic that we are now experiencing in 2020. They told us again and again: The question wasn't whether a new virus would make the leap to infecting human beings from a bat, an armadillo or some other animal. The only question was when. Our ability to deal with risk completely failed.

system resilience

In upcoming months and years, we'll need to talk about resilience. How can we make sure that the next crisis doesn't hit us so hard? That we're better prepared than we were this time for known risks, and react earlier and more intelligently to the initial impact and prevent destructive chain reactions in time? How can we reduce the amount of subsequent damage to our economic system and social fabric?

First, there will be many companies in the next few years who hope to sell us their technological resilience solutions. Many of these special offers will have the label «Artificial Intelligence» applied to them, often linked to the promise of better forecasts for better decision-making. We'll have to carefully examine which of them truly add value. An AI early warning system is of little use if we can't assess its reliability. Around ten years ago, Google Flu Trends caused a stir by using search queries to predict flu outbreaks better than the CDC's epidemiologists. Flu Trends became the poster child of the first wave of Big Data. But it failed miserably at predicting the dangerous swine flu caused by the new H1N1 virus. Google soon modified the project, and later discontinued it altogether.

And second, even in the West, many people will accept China's narrative that authoritarian systems, with their unlimited possibilities for taking drastic measures or imposing control, are better prepared for crises. These two supposed sources of resiliency complement each other almost perfectly. The digital dictatorship has everything under control. The more data, the more surveillance, the firmer its control. With the fear of the next crisis always in mind, and the consequences of the coronavirus pandemic still before our eyes, many people