LIFE
(SCIENCES)
AFTER
COVID-19

A Digital Canary in the Coal Mine for New COVID Variants

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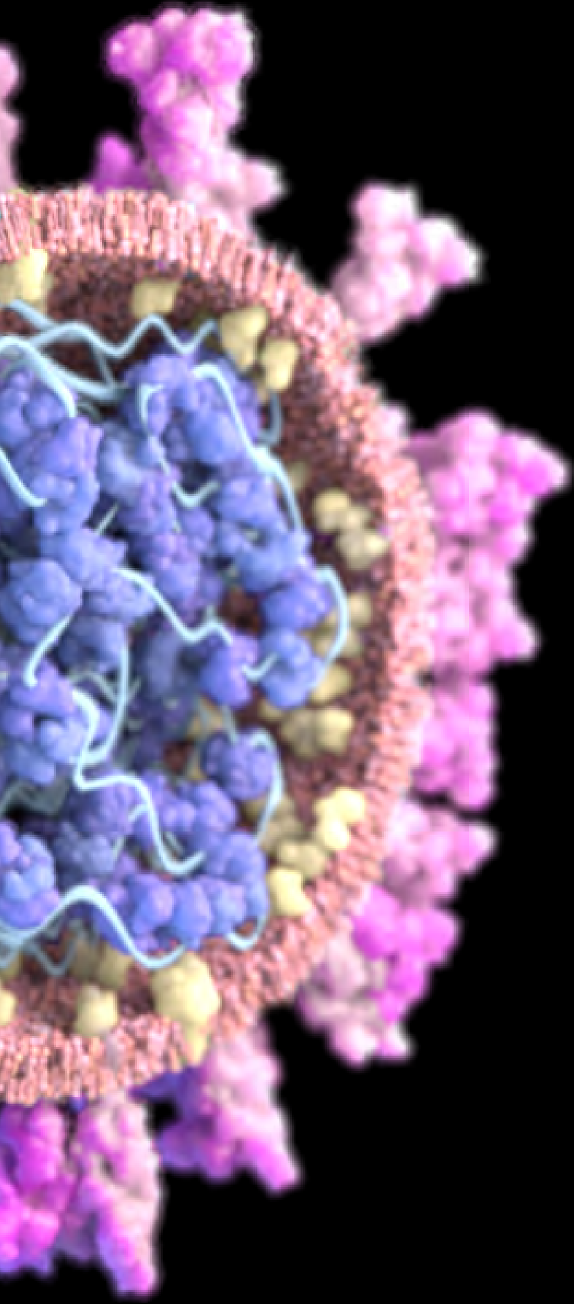
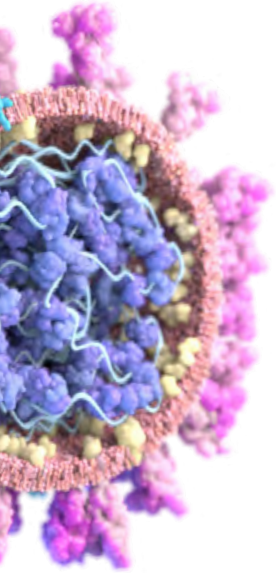


The piece you're about to read is from Klick Health's Life (Sciences) After COVID-19 series, a collection of expert perspectives designed to inform and inspire the life sciences community for the coming changes and opportunities we anticipate as a result of this global health crisis.

We invite you to engage with a multitude of these viewpoints by seeking out other pieces from this series, including *Safe Today, Sick Tomorrow?* and *Can COVID-19 Design a Better World for People Living with Chronic Conditions?* at **covid19.klick.com**.

Every time the coronavirus replicates, humanity is unwillingly buying a ticket in a fateful lottery.

With each replication, there is a tiny chance of a mutation, and with each mutation, there is a tiny chance that the mutant will be more deadly or more transmissible than its parent. Humanity has drawn losing tickets in this lottery with new and more threatening variants from Britain, Brazil, and South Africa. Since the process of mutation is unending, for all we know, another new variant might be arising right now who knows where. All of the current crop of new variants have now made their way to the United States, and there is little doubt that any future variants would quickly do the same, potentially imperilling our recovery.

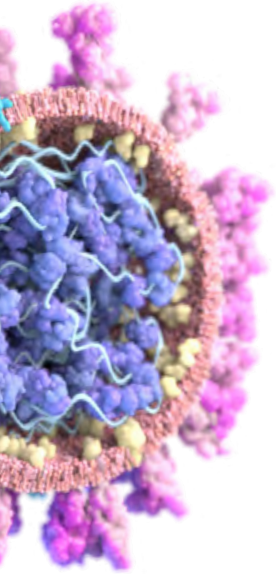


That's why it's vital to decrease the number of tickets humanity buys in this lottery by vaccinating as many people around the world as quickly as humanly possible to reduce the amount of circulating virus. It's just as important to be able to detect new variants and their consequences as quickly as possible so they can be identified and contained.

The world has mobilized doctors and nurses, scientists, and researchers into the fight against COVID. **Now is the moment for social media and machine learning to join the fight.**

The current U.S. system for tracking virus variants relies on a network of labs to sequence the genetic code of virus samples from testing sites around the country. This network is indispensable in detecting gene variants. Although the throughput of the network has improved markedly in recent years, it can still only analyze thousands of sequences a day, while there are billions of viruses in circulation.

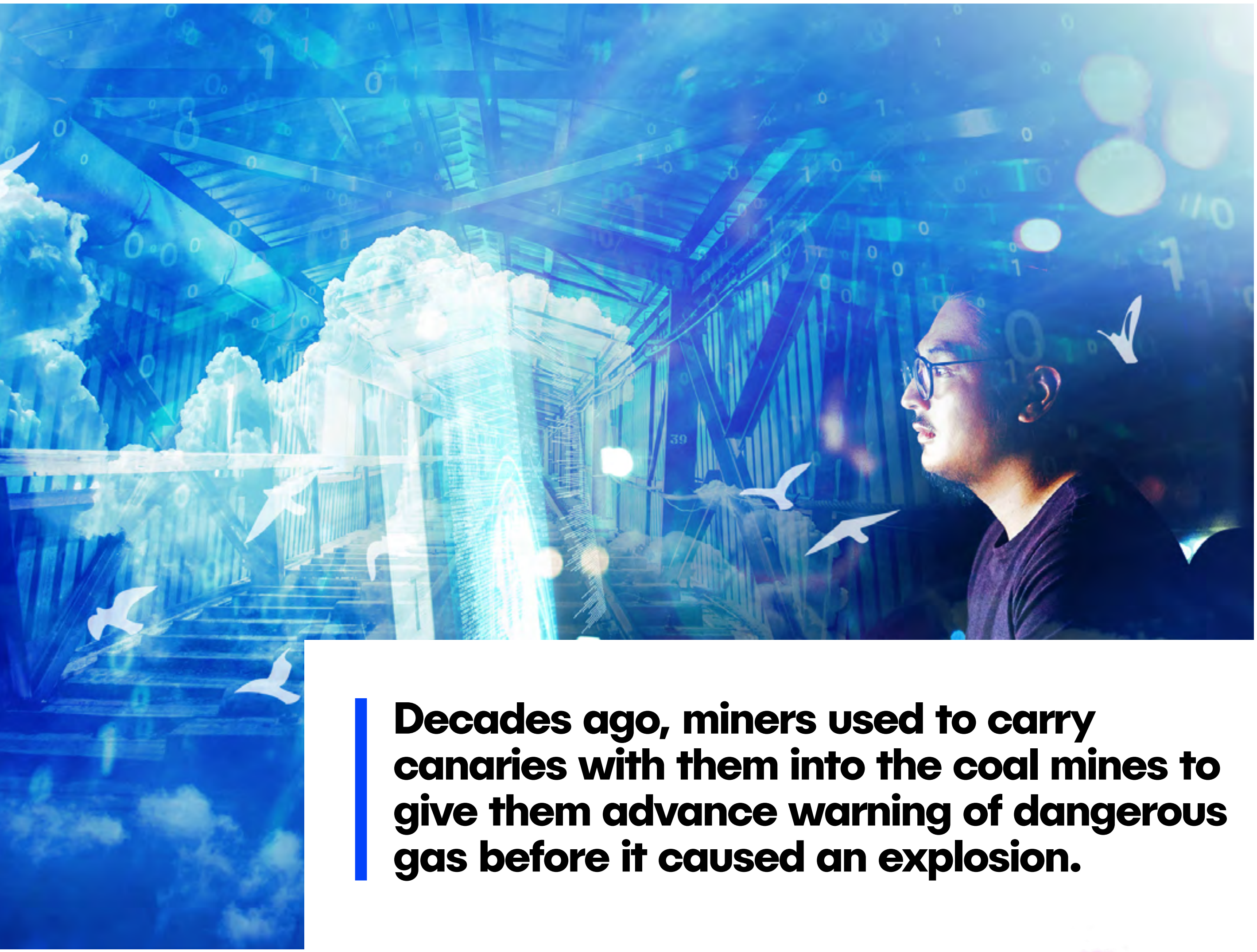
Getting the genetic code of a new variant is crucial, but that's only part of the story. It's just as important to understand quickly whether any new variant is more dangerous or produces different symptoms than the original. If a new variant is harmless (as most are), then precious public health resources need not be wasted in tracking down its effects, so those resources can be reserved for investigating more dangerous variants.



Imagine if the existing genetic sequencing network that can analyze thousands of data points a day were supplemented by a social media "sequencing" network that can analyze billions of data points a day—and that this network could detect not just the sequence of new variants but their medical consequences in near real time. That network would depend not on genetic sequencing nor laborious public health investigations, but on something that billions of people already do—indeed, something that they can barely stop themselves from doing—communicating on social media.

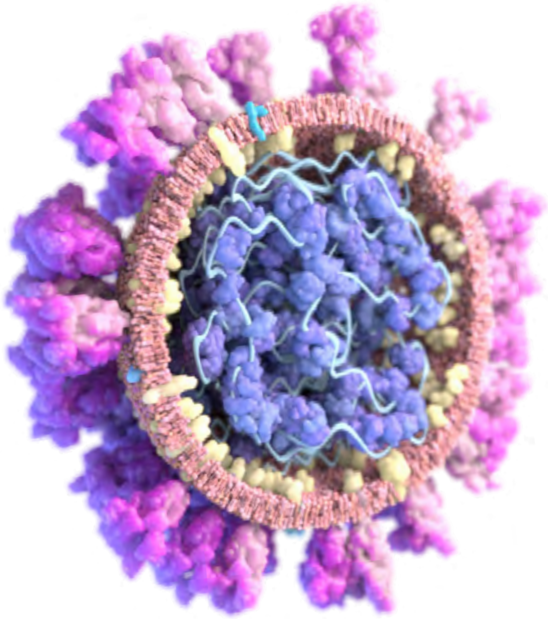
Achieving this vision may now be possible through new applications of machine learning for social media analysis. To help understand the pandemic, our team analyzed social media conversations for previously unsuspected aspects of the COVID-19 pandemic, using a unique machine learning algorithm to detect patterns from the data. Looking retrospectively at social media conversations from the early days of the pandemic, we found several symptoms correlated with COVID-19 infections that had not at the time been described in the medical literature, including the now-famous loss of taste and smell.

Our peer-reviewed study found that machine learning was able to find these symptoms and correlate them to COVID-19 so quickly because people often talk about how they feel on social media earlier and more extensively than they talk to their doctors. Social media chatter occurring right now surely contains priceless information about the spread of new virus variants, if only the needle of valuable information could be found amid the haystack of social media noise. With machine learning, it can be.



Decades ago, miners used to carry canaries with them into the coal mines to give them advance warning of dangerous gas before it caused an explosion.

When the canaries stopped singing, the miners knew it was time to get out fast. When analyzed with machine learning, social media could be a digital canary in the coal mine for COVID-19 mutations, by supplementing genetic analysis and public health investigation with rapid, ultra-high throughput analysis of social media data to develop a faster and more accurate picture of the impact and spread of new variants.



In a pandemic, saving time means saving lives. Public health agencies should deploy these new tools of social media analysis to buy precious time as we fight back against the coronavirus and all its variants—current and future.

David Bowen, Ph.D.

Head of Policy & Advocacy

David is a specialist in policy and public health with over 20 years of experience leading change in health and health policy in government, at foundations, and in the private sector.

As policy director for the US Senate health committee, David had a key role in writing major US health laws, including the Affordable Care Act.

> *David provides insights and strategies for clients based on deep understanding of the public policy context that shapes health and healthcare.*

David is an elected member of the National Academy of Social Insurance and serves on the North America board of Medicines for Malaria Venture.

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Alfred is a senior leader with over 15 years of experience in using data within the healthcare and life sciences industries. He currently leads Klick's Applied Science practice.

Alfred leads a team of multidisciplinary scientists dedicated to work in the healthcare and life sciences industries.

> ***His team brings together behavioral science, medical science, data science, and both hardware and software prototyping to create novel solutions to problems affecting the improvement of human health.***

Alfred holds master's degrees in physics and astronomy, and is a published contributor to high-performance computer simulations in astrophysics. He is a frequent contributor to industry publications on topics such as artificial intelligence, machine learning, and data science. He is also a Certified Information Systems Security Professional.

While change can create challenges, it also opens the door to new opportunities. Join us as we explore the many imaginable paths to post-pandemic growth. We welcome you to start a dialogue with the authors of this piece:

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