AI in life sciences: Faster cures for viral disease

The COVID-19 pandemic reaffirms why AI is essential to accelerating the time it takes to discover a treatment for all types of viral disease.

DOWNLOAD THE MAGAZINE

COVID-19 is upending life as we know it. The potential effect of this viral disease on mortality and public health, as well as the lasting socioeconomic impact of the crisis, is unfathomable.

To mitigate the wide-scale impact of this growing pandemic, our hopes are trained on a vaccine, prophylactic or curative, and the life sciences industry that can produce it. Prior to the emergence of COVID-19, advanced forms of artificial intelligence (AI) were facilitating and accelerating each stage of the research, discovery and production process. Now, AI continues to be an essential tool in the search for "repurposable" molecules. The COVID-19 fight reaffirms why advanced technologies like AI are essential to accelerating the time it takes to discover treatments and cures for all types of disease, infectious ones notwithstanding. (We will explore this further in an upcoming post.)

A Not-So-Secret Weapon

AI, in the form of natural language processing (NLP), optical character recognition (OCR) and machine learning (ML), is providing human-like intelligence to help researchers sense, comprehend, learn, adapt, analyze and advise for therapeutic/clinical and operational/commercial purposes.

Clinical uses of AI include identifying new targets, discovering molecules, exploring drug repurposing, developing genetically personalized medications, selecting trial subjects and predicting drug performance during testing. Companies such as Atomwise are using proprietary AI to accelerate the identification of repurposable molecules, and leaders like IQVIA are integrating and enriching foundational data assets to which proprietary analytics and AI can be applied to accelerate clinical trials.

Our LEAF platform is also advancing the cause. It applies evolutionary computing constructs to improve existing ML algorithms, and to recommend the best combination of resources to achieve a business objective. Currently, LEAF is helping a biopharmaceutical manufacturer assess potential therapeutic outcomes based on individualized interventional strategies.

In the operational realm, AI is being used at biopharmaceutical and medical device companies to enhance efficiency throughout the product lifecycle to reduce operating costs, improve predictive maintenance, enhance pharmacovigilance and reengineer business processes. Zenith Technologies, a Cognizant company, is applying machine learning across biopharmaceutical and medical device manufacturing operations to improve productivity and time to market. SalesForce's Einstein platform provides life sciences companies with advanced AI and analytics capabilities to enhance clinician engagement and provide virtual or digitally-augmented sales programs.

A Forcing Function?

Discovering vaccines for viral diseases, either preventative or curative, is a difficult and unpredictable undertaking. Nevertheless, a vaccine for COVID-19 is expected to be available within 12 to 18 months. As of this writing, almost 40 products are entering clinical trials. Because human testing is required to ensure vaccine safety and efficacy, it takes at least 14 months on average to complete human testing. While regulators may accelerate the testing timeline, AI presents an opportunity to improve the quality of decision making along the journey to discovery and commercialization.

While the COVID-19 virus has spurred international competition to find a cure, it has also accelerated global cooperation that pivots around the sharing of public-health, clinical and scientific data. The explosion of public-health and scientific data gathered to combat COVID-19 - when it's harmonized and made accessible to researchers - will offer data scientists wonderful opportunities.

Once analyzed, the development of algorithms to query the data for novel insights could lead to discoveries in how to treat the virus and, perhaps equally likely, provide insights into the next viral disease or bacterial pathogen that will upend modern life as we know it.

Because, unfortunately, future pandemic threats are real; in fact, the volume of threats will only increase, likely beyond the ability of our best researchers and clinicians to effectively anticipate and react. Powered by more robust and available clinical, scientific and public health data, AI is the not-so-secret weapon that will allow us to continue to protect the health and safety of humanity by combating illness and viral disease.