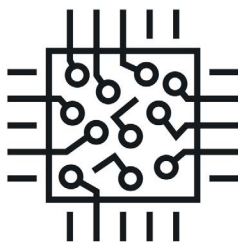


Microsoft Launches \$40M HEALTHCARE ARTIFICIAL INTELLIGENCE PROGRAM

► **Trend Watch:** AI continues to gain traction worldwide in healthcare and pharma applications



Microsoft has launched a 5-year, \$40 million program called AI for Health, an initiative that will use artificial intelligence tools to address some of healthcare's biggest challenges, including disease diagnosis and treatment and global health crises.

The AI for Health program will ensure that nonprofits, academia, and research organizations have access to the latest technology, resources, and technical experts to leverage AI for research and care delivery.

The AI for Health initiative will focus on accelerating medical research to advance the prevention, treatment, and diagnosis of diseases, as well as increasing understanding of mortality and longevity. The program will also work to promote health equity by improving access to care for underserved populations.

The AI for Health program will build on existing partnerships with organizations, including Fred Hutchinson Cancer Research Center, which aims to build an ecosystem that allows safe and secure sharing of biomedical data.

In addition to facilitating data sharing, the AI for Health program will also aim to discover the cause of sudden infant death syndrome through a partnership with Seattle Children's Research Institute.

The AI for Health program will also work to detect diabetic retinopathy to prevent blindness, and accelerate advancements in the fields of maternal mortality, tuberculosis treatment, and pediatric cancer.

The new program is part of Microsoft's AI for Good initiative.

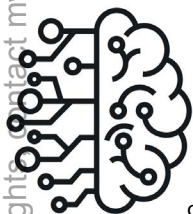
Atomwise and Enamine Work on Therapies FOR CHILDHOOD CANCER

California-based chemistry startup Atomwise and the New Jersey-based chemical building blocks supplier Enamine have partnered to use AI software to simulate up to 10 billion interactions between small molecules and target cancer proteins. Algorithms will analyze the ensuing chemical re-

actions to find molecules that may be used to slow cancer growth or halt metastasis.

This process uses a chemical library that is a thousand times larger, and preclinical success rates of Atomwise's partners are twice the industry average.

Machine Learning Uses EHR DATA TO PREDICT ALZHEIMER'S RISK



Machine learning algorithms analyzed EHR data and accurately predicted the onset of dementia within one to three years of diagnosis. Using structured and unstructured EHR data, machine learning algorithms could accurately identify patients at risk of developing Alzheimer's disease and related dementias.

At least 50% of older primary care patients living with Alzheimer's disease and related dementias never get diagnosis, researchers stated, and many more live with symptoms for two to five years before being diagnosed. Current tests that screen for dementia risk are time-consuming and invasive.

The research team, which included scientists from Regenstrief Institute, Georgia State, Albert Einstein College of Medicine, and Solid Research

Group, used two different machine learning approaches to improve dementia and Alzheimer's diagnosis: A natural language processing algorithm and a random forest model.

To train the algorithms, researchers gathered data from the Indiana Network for Patient Care. The models analyzed information in structured fields, such as prescriptions and diagnoses, as well as unstructured fields like medical notes. In predicting dementia development, researchers found that the medical notes were the most valuable resource for helping to identify high-risk patients.

Future work will involve deploying these machine learning algorithms in real-life clinics to see if they help identify more true cases of dementia and learn how they impact a patient's willingness to follow up on the results.

First AI-Guided Ultrasound GETS GREEN LIGHT FROM FDA



Caption Health, a company based outside of San Francisco, won the first authorization from the FDA for ultrasound software that guides clinicians at capturing images of the heart. The Caption Guidance software should work with any number of ultrasound systems from different manufacturers, but currently it can only be used with a diagnostic ultrasound from Terason, of Burlington, MA, a part of Teratech Corporation.

The Caption Guidance software is indicated for use in ultrasound examination of the heart, known as two-dimensional transthoracic echocardiography (2D-TTE), for adult patients, specifically in the acquisition of standard views of the heart from different angles. These views are typically used in the diagnosis of various cardiac conditions.

As part of the De Novo premarket review that the Caption Guidance software went through, an interesting study was conducted in which eight registered nurses, with little experience in sonography, used the software to help them produce echocardiography images. According to a team of cardiologists that viewed these, the images were of substantially high quality to use for diagnostics.

Healx Uses AI to Predict RARE DISEASE TREATMENTS

The UK-based biotech firm Healx developed a system called HealNet that relies on AI, pharmacology expertise, and patient group insights to predict treatments for rare conditions more accurately than traditional approaches. The algorithms use more than 20 data sources and a knowledge base to make their recommendations.

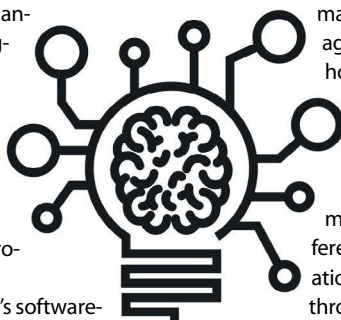
The company is working with the FRAXA Foundation on finding a cure for Fragile X syndrome, a genetic condition that affects one in 4,000 males and one in 8,000 females. It leads to learning disabilities, autistic behaviors, and other issues. With Healx's technology, it took only 18 months for scientists to discover a chemical compound that might tackle the disease. The research is now moving to the second phase of clinical trials.

Honeywell Partnership Aims to Improve PHARMA MANUFACTURING THROUGH AI

Honeywell has partnered with manufacturing solutions company Bigfinite to advance pharmaceutical processes. The companies have agreed to combine their expertise across process automation and data analytics to aid pharmaceutical companies through a more efficient manufacturing process.

Honeywell will utilize Bigfinite's software-as-a-service (SaaS) to enhance manufacturing process operations by consolidating compliance-related manufacturing data into a single, visual interface for drug manufacturers.

By combining data across laboratories, batch



management, control, quality management and more, the companies hope pharmaceutical manufacturers will be able to deliver medical therapies more quickly to customers.

Through the partnership, pharmaceutical manufacturers will be offered real-time visibility of their operations, assisted by predictive insights through advanced analytics, artificial intelligence, and internet-of-things technologies. The goal is that life sciences companies will be able to minimize regulatory risk, increase operational efficiencies, and deliver products to customers faster, while also reducing waste.

AI-developed Flu Shots ENTER THE CLINICAL TRIALS PHASE

Researchers at Flinders University in South Australia used AI to come up with a better solution to flu vaccinations. Although vaccination is an effective prevention strategy, some people might still catch the disease.

They used an AI program called Search Algorithm for Ligands to analyze trillions of different chemical compounds to find candidates that it

thought might be good human immune drugs. The top candidates were then tested on animals. In the next phase, the AI-developed drugs will be deployed in 12-month clinical trials across the U.S.

It is hoped that the same technology may be used to develop many other vaccines. The work is funded by the U.S. National Institute of Allergy and Infectious Diseases.



LabGenius Builds Platform FOR PROTEIN DRUG DEVELOPMENT

LabGenius, a London-based startup, is building a platform called EVA that uses machine learning, robotic automation, and gene synthesis technologies to discover new therapeutic proteins. In addition LabGenius is working with Tillotts Pharma AG, a Swiss pharmaceutical company, to develop molecules that could potentially treat inflammatory bowel disease. The British firm operates by taking the project from concept to the preclinical stage, after which clients can commence clinical trials.

Exscientia and GSK TEAM UP TO FIND A CURE FOR COPD

Tech startup Exscientia joined forces with GlaxoSmithKline to implement an AI-driven platform called Centaur Chemist to accelerate medical research. The software uses AI algorithms to automatically design and prioritize novel compounds for synthesis, decreasing the amount of time needed to develop new drug candidates. In 2019, the startup reported the discovery of a molecule that might treat COPD and has passed the findings to its corporate partner. Exscientia claims that it can deliver pre-clinical drug candidate molecules in 25% of the time and at 25% of the cost of traditional methods.



AI Helps Providers Choose DEPRESSION THERAPIES

An artificial intelligence algorithm can accurately predict whether an antidepressant will work based on brain activity, helping providers objectively diagnose and prescribe depression treatments, according to a study published in Nature Biotechnology.

The findings are part of a national trial initiated by UT Southwestern in 2011, which seeks to better understand mood disorders. Several studies from the trial demonstrate how advanced technologies, including AI, brain imaging, and blood tests, could help doctors choose appropriate depression therapies.

The team evaluated more than 300 participants with depression who were randomly chosen to receive either a placebo or a selective serotonin reuptake inhibitor (SSRI), the most common class of antidepressant. Researchers used an electroencephalogram (EEG) to measure electrical activity in the participants' cortex before starting treatment.

The group then developed a machine learning algorithm to analyze and use EEG data to predict which patients would benefit from the medication within two months. The algorithm was able to accurately predict outcomes. Additionally, further research indicated that patients who weren't likely to respond to antidepressants were likely to improve with other interventions, such as psychotherapy and brain stimulation.

The researchers derived study data from the 2011 trial initiated by UT Southwestern, called the EMBARC trial. EMBARC aims to develop biology-based, objective strategies to treat mood disorders. The trial evaluates participants with major depressive disorder through DNA, blood, and other tests, and seeks to address the fact that most patients don't adequately respond to their first antidepressant.

"We went into this thinking, 'Wouldn't it be better to identify at the beginning of treatment which treatments would be best for which patients?'" researcher Dr. Madhukar Trivedi says.

Previous EMBARC studies identified various predictive tests, including the use of MRI to examine brain activity both in a resting state and during the processing of emotions. EEG will likely be the most commonly used tool, because it is more effective and less expensive. However, a blood test or MRI may be needed for some patients if the depression manifests itself in a different way.

Researchers' next steps involve developing an AI interface that can be widely integrated with EEGs across the country, as well as seeking approval from the FDA. With this new method, providers could significantly improve depression therapies.