

Bayer Uses AI to Boost PHARMACOVIGILANCE

► *Trend Watch: Pharma Use of AI Increases*

In an effort to accelerate its patient safety data monitoring by using artificial intelligence, Bayer has partnered with Genpact to employ its Pharmacovigilance Artificial Intelligence (PVAI) products.

These AI tools will be added to Bayer's existing pharmacovigilance database and IT systems and according to the company, will strengthen its focus on patient safety.

Genpact reports that its PVAI solution, which extracts adverse event data from source documents in an automated fashion, has taken part in, and won, a number of competitive proof-of-concept trials run by large pharmaceutical companies.

Bayer's deal with Genpact opens up new ground for pharma's use of artificial intelligence, where to date the focus has tended to be on improving patient outcomes — as was the case with Novartis' work with IBM Watson — or lifting patient-care standards, as with last month's collaboration between Orbita and a U.S. hospital.

In other AI Bayer news, the drugmaker has partnered with Imperial College London to leverage AI to drive drug discovery for heart disorders.

Under the three-year project, researchers will analyze UK Biobank data and attempt to identify pathways associated with heart disease and could offer new treatment targets.

A team led by the MRC London Institute of Medical Sciences and Imperial's Institute of Clinical Sciences will jointly work with Bayer to devise machine learning tools for assessing 3D images of the heart. The tools will also be used to evaluate genetic information.

The team will use machine learning to explore cardiac magnetic resonance imaging (MRI) with genetic and health data for discovering key pathways that could be potential drug targets.

Bayer and Imperial expect the project to accelerate drug discovery and yield new approaches for the treatment or prevention of serious heart conditions.

MRC London Institute of Medical Sciences researcher Declan O'Regan says: "AI has the potential to transform our understanding of heart disease and accelerate the discovery of new treatments."

Bayer has committed to fund a cross-disciplinary scientist working across the genetics, clinical imaging, and AI domains.



Philips HealthWorks Supports Startups Using AI FOR RADIOLOGY, ULTRASOUND, AND ONCOLOGY

In 2018, Philips gave 19 startups — out of 750 applicants — the opportunity to participate in an intensive, 12-week Philips HealthWorks program to accelerate their innovations, its first global program that took place across

all innovation hubs, including Cambridge (US), Eindhoven, Bangalore, and Shanghai simultaneously. The focus of the program was using AI in healthcare to improve patient outcomes and the efficiency of care delivery. During the program, the startups, representing 14 different countries, validated their value propositions, built, tested, and scaled their ideas, and explored potential collaborations with Philips and others. Participants also got to use Philips' own AI platform for healthcare, Philips HealthSuite Insights. This platform is



already used today to enable machine learning and deep learning applications in the areas of imaging, telehealth, oncology, and genomics.

On its website, Philips states that AI and adaptive intelli-

gence have the potential for enormous disruption, particularly in healthcare. According to Alberto Prado, head of Philips HealthWorks, "We are already working closely with clinical partners to develop AI-enabled solutions that are grounded in scientific research and validated in clinical practice," he says. "This new collaboration program recognizes the role that start-up companies play in bringing breakthrough healthcare innovations to the market." This particular cohort was focused on radiology, ultrasound, and oncology.

AI Healthcare Market PROJECTED TO REACH \$36 BILLION BY 2025

Artificial intelligence in the healthcare market is expected to grow to \$36.1 billion by 2025. The Artificial Intelligence in Healthcare Market by Offering, Technology, End-Use Application, End User And Geography — Global Forecast to 2025 report revealed that AI used in healthcare will grow at a compound annual growth rate of 50.2% during the forecast period.

Machine learning's ability to collect and handle big data — and increasing adoption of ML by hospitals, research centers, pharmaceutical companies and other healthcare institutions to improve patient health — are fueling its growth in AI-in-healthcare market, according to the report. The growing adoption of NLP in applications such as patient-data and risk analysis, lifestyle management and monitoring, and mental health is propelling the growth of this technology in the market.

The report noted that North America is likely to experience the highest CAGR during the forecast period, with the United States as one of the major contributors in the region's AI-in-healthcare market.

For example, two Safeway stores in the Phoenix area offer AI-powered medical clinics through a partnership with Akos Med Clinic. The clinic uses technology developed by AdviNOW Medical to diagnose and treat a variety of common conditions, such as sinus infections, earaches, sore throats, rashes, UTIs, strains and sprains.

Companies cited in the report include NVIDIA, Intel, IBM, Google, Microsoft, AWS, General Vision, GE Healthcare, Siemens Healthineers (Germany), Medtronic, Johnson & Johnson, and Philips (Netherlands).

Keen Eye and Iris Pharma BRING AI TO OPHTHALMOLOGY STUDIES

Keen Eye, a French technology company specializing in image analysis for the life-sciences industry, has partnered with Iris Pharma, an ophthalmology-focused CRO to make Iris Pharma's assays faster, more reliable, and more efficient.

"The advanced AI technology of Keen Eye allows us to optimize the performance of the bio-imaging analysis during the preclinical ophthalmic drug development, and in the future for clinical development," says Yann Quentric, president of Iris Pharma.

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PLENARY KEYNOTE SESSION:

Enabling Patient-Centric Clinical Trials

Chairperson Remarks: Patient-Centric Trials: How to Engage
the Patients in a Clinical Study

Basker Gummadi, IT Strategy & Digital Transformation,
Digital Innovation, Bayer U.S. LLC

Keynote Presentation: Patient-Centric Trials: Moving from
What's the Matter with Patients to What Matters to Patients

Lisa Shipley, Vice President, Global Digital Analytics, Merck

Keynote Panel Discussion: Going Virtual – Moving towards
Patient-Centric, Site-Less Trials

Lisa Shipley, Vice President, Global Digital Analytics, Merck
Joseph Kim, MBA, Senior Advisor, Patient Experience and Design
Innovation, Eli Lilly

Basker Gummadi, IT Strategy & Digital Transformation, Digital
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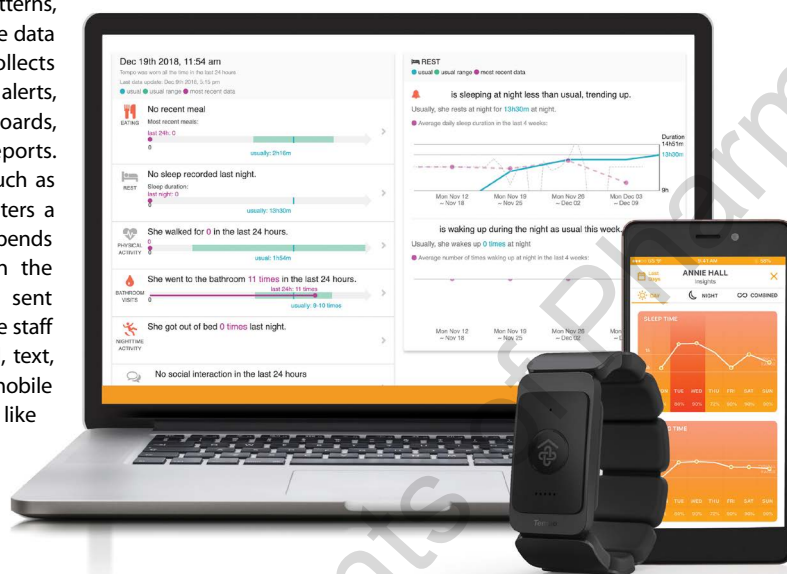
CarePredict AI Wearable MONITORS SENIORS' HEALTH

CarePredict, a health-tech startup that aims to improve seniors' quality of life with machine learning-driven wearables, has created Tempo, a wrist-worn bracelet with a touch-button sensor and built-in microphone and speaker. The bracelet can monitor activities of daily living (ADL). With the aid of sophisticated AI algorithms, Tempo is able to sense ADLs such as eating, drinking, bathing, grooming, tooth-brushing, toilet use, walking, sitting, sleeping, and more and to communicate wirelessly with peel-and-stick beacons to pinpoint the rooms in which those activities are occurring. Tempo takes about seven days to learn a wearer's normal activity patterns, and it serves up the data it continuously collects through real-time alerts, web-based dashboards, and self-serve reports. Urgent items — such as when a wearer enters a restricted area or spends too much time in the bathroom — are sent immediately to care staff via the web, email, text, and CarePredict's mobile app, while trends like

infrequent eating get highlighted on a daily health and wellness report.

CarePredict claims its platform can surface actionable insights that predict a UTI up to 3.7 days ahead of clinical diagnosis and depression two weeks ahead of diagnosis. The startup also claims it has managed to reduce falls by 25% in senior communities.

CarePredict is currently available in the U.S. and Canada for assisted, memory care, independent living, and home care, with service expected to launch in Japan, Brazil, Mexico, Argentina, China, and Germany.



Merck KGaA Uses AI FOR R&D

Germany's Merck KGaA has begun a licensing agreement with Canadian pharma R&D company Cyclica using AI to uncover new drug targets and predict any side effects. Cyclica has a cloud-based technology that screens small molecules to determine their properties.

While traditional development of small molecule drugs focuses on specific, disease associated protein targets, Cyclica's approach tries to factor in dozens, and perhaps hundreds, of interactions that can occur before it is eliminated from the body.

Cyclica's Ligand Express technology makes it possible to capture a panoramic view of these interactions. Because the technology can model how a small molecule will interact with any known protein, it can help identify desirable on-target interactions, as well as off-target adverse effects elsewhere.

"Assessing new technologies is central to how we will advance our discovery programs, and artificial intelligence applications like Ligand Express will provide important insights to enhance how we think about target identification to support phenotypic screening and off-target profiling in general," says Friedrich Rippmann, director of computational chemistry and biology at Merck.

FDA-Approved AI Device ACHIEVES HIGH DIAGNOSTIC ACCURACY

Pivotal trial results assessing the safety and efficacy of IDx-DR, an autonomous AI diagnostic system that detects diabetic retinopathy, have been in the peer-reviewed, open access journal Nature Digital Medicine.

In the clinical study, IDx-DR achieved high diagnostic accuracy when compared with the most rigorous determination of the severity of diabetic retinopathy using advanced imaging techniques — wide-field stereo fundus imaging and optical coherence tomography (OCT) evaluated by the Wisconsin Fundus Photograph Reading Center.

The IDx-DR pivotal trial, which is the first study to prospectively assess the performance of an autonomous AI system in patient care, involved 900 subjects with diabetes at 10 primary care sites across the United States. The results showed that IDx-DR exceeded all pre-specified superiority endpoints at 87% sensitivity, 90% specificity, and a 96% imageability rate, demonstrating the AI system's ability to bring specialty-level diagnostics to primary care settings.

Novo Nordisk to Use AI DRUG DISCOVERY TECHNOLOGY

Novo Nordisk has signed a deal with UK biotech e-Therapeutics to use its AI-based drug discovery technology to find new therapies for type 2 diabetes.

e-Therapeutics will work with Novo Nordisk for a year and use its technology to identify novel intervention strategies, biological pathways, and compounds that could form the basis of new therapies.

The U.K. biotech company will be reimbursed for its work in the collaboration and has the option to license any intellectual property generated.

Any future license will require mutual agreement of commercial terms and no other financial details were disclosed.

e-Therapeutics uses a suite of powerful computational tools to augment and interrogate the vast amount of biological information currently available in both public and private databases.

Using techniques such as machine learning, AI,

and state-of-the-art data analysis, e-Therapeutics creates and analyses network models of disease to identify likely proteins that could be disrupted to treat diseases.

The company said this approach more realistically reflects the true complexity of disease with its multiple and often interconnected cellular pathways.

The models will be used in Novo Nordisk's research center in Oxford, where visiting researchers are working with Oxford University academics to advance development of therapies for type 2 diabetes.

Jan Nygaard Jensen, deputy head of Novo Nordisk Research Centre Oxford and head of bioinformatics, says: "We are looking forward to cooperating with e-Therapeutics. It is an exciting technology and we will investigate if it can support some of the early target discovery efforts we are building in the Novo Nordisk Research Centre in Oxford."



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