



Artificial Intelligence: A Step Forward in Clinical Trials

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By 2021, the global use of artificial intelligence (AI) in healthcare is expected to achieve a CAGR of 42 percent – a rapid adoption rate. The marketplace needs innovation to fast-track development of new compounds, evaluate their efficacy and safety, and reduce failure rates. Artificial intelligence (AI) shows great potential to address these challenges. Advanced AI systems enabled with deep learning can help accelerate drug discovery and reduce the number of failures in clinical trials. GSK recently announced a strategic drug discovery collaboration with Exscientia that will help discover small molecules through Exscientia's AI-enabled platform. Moreover, Genentech, along with GNS Healthcare, aims to use artificial intelligence to convert high volumes of cancer patient data into computer models that can be used to identify new targets for cancer therapy.

Artificial intelligence in healthcare aims to improve patient outcomes by assisting healthcare practitioners in the implementation of medical knowledge. AI systems thoroughly analyze and memorize medical knowledge, thereby providing excellent clinical and medical solutions.

In a clinical trial, there are different formats and ontologies, different papers and report forms, different patient populations and sites – all offering the ideal test bed to prove the benefits of bringing together different aspects of AI to find solutions to complex processes like patient recruitment and data analysis.

Key Advantages Offered by Artificial Intelligence in Clinical Research and Development

- **Prediction:** Artificial intelligence is used to predict how drugs will interact with targets, which will reduce the number of clinical trials by 70%. This attempts to reduce the random nature of certain trials by applying algorithms that repeatedly choose experiments based on emerging patterns.
- **Efficient data capturing:** Most clinical trials today are conducted without direct input from patients, as most clinical data are collected by healthcare providers during patient visits. However, billions of people are already carrying connected personal computing devices, including smart phones and tablets, and billions more people are expected to be connected through wearable devices. This provides the opportunity to capture information directly from patients in a frequent and timely manner. Patients can enter data on their personal mobile devices, and this information is contextual, precise and high quality. Also, patients' suggestions and complaints can be factored into clinical trial protocol in real time, which lessens the probability of a drug causing adverse reactions and getting rejected by regulators.
- **Data Integration:** Clinical trial systems will soon move to the cloud, allowing millions of mobile data points to transmit information and customize frameworks required to analyze data. Worldwide adoption of electronic health records would speed up such integrations.

- **Adherence:** As local recordings will be available through the cloud, it will allow investigators in clinics to evaluate and catch anomalies in drug intake patterns, in real time, among patients and even remind patients if they forget to take their medication. Intelligent AI platforms send alerts to the patient's doctor/hospital if the symptoms increase or recur.

Early Adopters in the Clinical Research Domain

- Computers with learning capabilities, such as IBM Watson, are capable of digesting and interpreting millions of pages of scientific literature and data to assist pharma companies in developing new drugs and repurposing existing ones. Watson has demonstrated the ability to discover previously unknown connections between diseases and as it continues to learn, it can modify its recommendations based on new information provided. Companies like Johnson & Johnson, Novartis and Pfizer are collaborating with the IBM Watson Discovery Advisor team to read and understand scientific papers that detail clinical trial outcomes used to develop and evaluate medications and other treatments.
- MedRespond has begun the adoption of artificial intelligence systems in their processes to streamline clinical trial data and other records.
- AiCure has developed a powerful, scalable, and real-time advanced non-adherence mobile technology platform that visually confirms medication ingestion by combining the power of AI with deep learning, computer vision, machine learning, and predictive analytics to make sure the right patient is taking the right medication at the right time, which increases adherence to medication. It is expected to combat the medication adherence problem occurring in clinical trials (a \$15 billion problem for pharma companies, with compliance being only 50%) by using predictive analytics to optimize adherence and treatment.

Future of Artificial Intelligence

By 2025, AI systems are expected to be implemented in 90% of the U.S. and 60% of global hospitals and insurance companies. In turn, AI systems will deliver easily accessible, less expensive and higher quality care to 70% of patients.

AI is regarded as the fourth industrial revolution, as it can understand natural language, chemical notes, dates and numbers which helps it generate hypotheses based on evidence.

Processing large clinical and medical data isn't the only place where AI could affect the pharma industry. Even business and marketing-based decisions could be helped by computing "brains," for example, by analyzing and assisting with mergers and acquisitions and providing guidance on the most efficient and effective way to market new products.

Summary

Partnerships between AI technology vendors and healthcare providers are of prime importance for wide-scale implementation, adoption and viability of AI service solutions

to answer critical care delivery. AI has the capability to run all trials through computer simulations before they are conducted. The ability of artificial intelligence to “learn” patterns and differences across patient data offers many possibilities in clinical trials and drug discovery.

The banner features a blue and white background with a network of red and blue dots connected by lines. The title 'CLINICAL TRIALS' is in large, bold, blue letters, with 'INNOVATION ASIA 2018' in smaller, grey letters below it. To the right of the title are three hexagonal icons: a DNA helix, a molecular structure, and a heart with a pulse line. A dark blue speech bubble on the right contains the text 'The Only Conference Featuring Real Life Case Studies on Clinical Trial Innovation and Digital Implementation!'. Below the title, a dark blue bar contains the text 'EMPOWERING YOUR CLINICAL TRIAL OPERATIONS THROUGH DIGITAL INNOVATION'. At the bottom, a dark blue bar contains the text 'BOOK BY 7 SEP 2018 TO SAVE UP TO S\$900'.

CLINICAL TRIALS
INNOVATION ASIA 2018

Main Conference: 5-6th Dec 2018 **Pre-Conference Workshops:** 4th Dec 2018 **Post-Conference Workshop:** 7th Dec 2018 **Venue:** Grand Copthorne Waterfront Hotel, Singapore

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