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Transforming Healthcare With Generative AI

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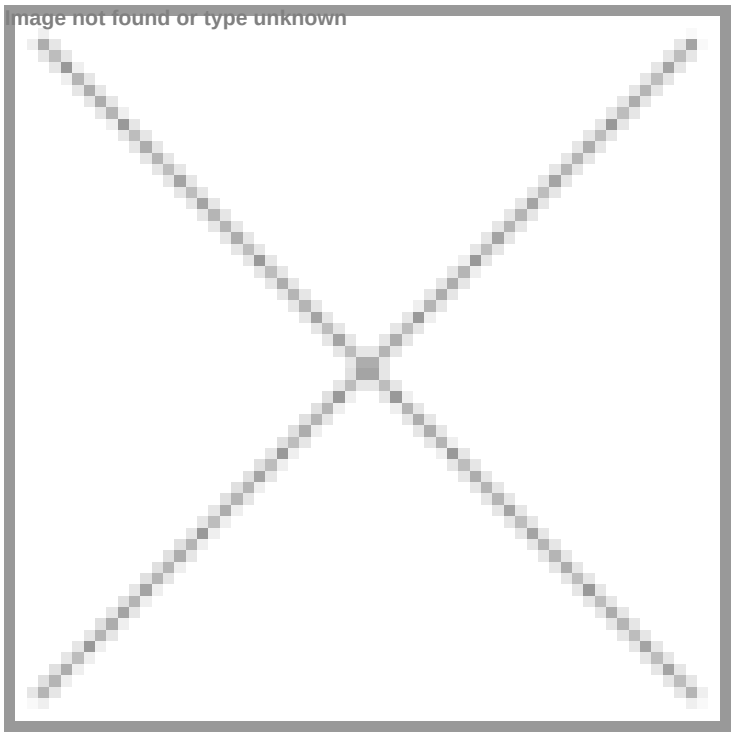
Generative AI is selling itself to emerge as the new frontier in the horizon for the booming healthcare industry. Highlighting some of the significant developments in this technology space, this article has a few Indian leaders voicing their opinions on exploring Generative AI to progress their businesses and services.



Generative AI solutions are touted to address high-touch areas throughout the healthcare value chain to drive unified experience and improve business outcomes for healthcare organisations. The technology can help researchers more easily access, identify and correlate data, mine large troves of research data for possible connections, and even automate the time-intensive tasks of drafting clinical trial communications and helping translate them to different languages.

Google, Microsoft, and Amazon Web Services (AWS) in their own strengths are partnering with various healthcare and pharma giants to bring this cutting-edge technology at integration level. To cite a recent collaboration, Google Cloud in late June 2023 announced a collaboration with Mayo Clinic to transform healthcare with Generative AI. Mayo Clinic will deploy Generative AI to improve the efficiency of clinical workflows in anticipation to make it easier for clinicians and researchers to find the information they need in a shorter time, and ultimately help improve patient outcomes.

Google currently assists many other leading healthcare and life sciences companies including Bayer Pharmaceuticals, HCA Healthcare, and Meditech with its Med-PaLM 2. Generative AI especially will be seen deployed in new drug discoveries. Developing new pharmaceutical products is time intensive and costly. According to a research paper published in NCBI, the entire process, from ideation to launch, can take up to 12-15 years and cost over $1 billion. There are some parts of this complex process that AI may be able to speed up. So, Bayer Pharmaceuticals is exploring how Generative AI solutions, like Google Cloud's Vertex AI and Med-PaLM 2, can help bring drugs to market faster.

EVERSANA, one of the leading providers of commercial services to the global life sciences industry, teamed up with Amazon Web Services (AWS) to accelerate Generative AI use cases across the life sciences industry. EVERSANA and AWS expect to '*pharmatise'* the use of AI across the life sciences industry, offering security and privacy controls and adhering to ethical frameworks for responsible AI development, to ultimately benefit patients, healthcare providers and payers.

AWS is very bullish on deploying AI tools in healthcare. The company recently unveiled AWS HealthScribe, an AI-powered tool that automates the process of clinical documentation for doctors. This new service allows physicians to effortlessly generate comprehensive transcripts, extract essential details, and create summaries from their interactions with patients. The goal of AWS HealthScribe is to enable healthcare professionals to dedicate more time to creating innovative care solutions and conducting research for their patients rather than mundane documentation.

On August 17, 2023, American medical software giant Epic and Microsoft announced their expanded partnership to bring Generative AI to the forefront of the healthcare industry. The companies are teaming to help clinicians better serve their patients and to address some of the other most urgent needs, from workforce burnout to staffing shortages. The companies aim to bring AI to healthcare at scale, integrating conversational, ambient, and Generative AI technologies across Epic's Electronic Health Record (EHR) ecosystem. The outcome of this is expected to witness tangible results in enhanced patient care, increased operational efficiency, improved healthcare experiences, and in supporting the financial integrity of health systems globally.

Applications in pharma and healthcare

Generative AI is globally touted as a tool with transformative powers, driving innovation and vested with the ability to reshape the landscape of drug discovery and patient care. Its application in pharma and healthcare can be broadly classified into three main areas: Drug Discovery and Development, Medical Imaging Analysis and Diagnosis, and Personalised Medicine and Treatment Optimisation.

a) Drug Discovery and Development: About one-third of the $1 billion it costs to develop a drug is spent on its discovery, which generally spans between three to six years. Unlike traditional methods, Generative AI can help generate novel drug candidates based on researcher-provided criteria and constraints.

Gartner predicts that by 2025, Generative AI will be used by 50 per cent of drug discovery and development initiatives. This translates into a potential reduction in costs and timelines associated with the development of new drugs by decreasing the need for expensive and time-consuming experimental trials.

The power of Generative AI playing a crucial role in accelerating drug discovery and development processes can be seen with a few partnerships signed between technology and pharma majors recently. Two years back, NVIDIA helped AstraZeneca work on a transformer-based Generative AI model for chemical structures used in drug discovery, which was one among the very first projects using GenAI.

This article will be incomplete without the mention of Insilico Medicine's drug discovery success using Generative AI. The company's end-to-end platform, Pharma.AI, has produced three novel drugs in clinical trials, including a lead drug for idiopathic pulmonary fibrosis that is in Phase II trials, the first fully Generative AI drug (with both an AI-discovered target and AI design) to reach this stage.

Nitesh Mirchandani, SVP & Global Head, Life Sciences & Services, Birlasoft, says, "Generative AI stands on the brink of revolutionising the healthcare sector. Its aptitude for scrutinising extensive datasets, refining medical imagery, simulating diverse medical scenarios presents transformative potential to drive progress in patient care, hyper personalised treatment plans, and accelerate medical research. Further, it holds the capability to expedite and streamline the discovery of pharmaceuticals in a cost-efficient manner to improve the overall healthcare delivery. At Birlasoft, we have crafted a game-changing Gen AI Automation platform for our pharma clients, reshaping pharmacovigilance, swiftly identifying, and categorising medical literature, expediting responses, and aligning with pharmaceutical industry demands."

b) Medical Imaging Analysis and Diagnosis: Generative AI is widely applied in medical imaging analysis, helping to interpret and enhance medical images, such as X-rays, MRI scans, and CT scans. SigTuple, Qure.ai, Niramai Health Analytix, Tricog Health are a few Indian startups who have already deployed Generative AI in this segment.

And the future is now as we see Google Health working to build lightweight, multimodal Generative AI models for medical imaging. By grafting language-aligned vision encoders onto a fixed large language model (LLM), Google is able to solve previously challenging tasks using an approach they call ELIXR. This ELIXR is trained using images and their free-text radiology reports.

Similarly, Project InnerEye from Microsoft Research is developing machine learning and open-source software to empower healthcare organisations and innovators to develop their own solutions that can assist clinicians in planning radiotherapy treatments so that they can spend more time with their patients.

c) Personalised Medicine and Treatment Optimisation: Generative AI is employed to analyse large-scale patient data, including genetic information, medical history, and lifestyle factors, to tailor medical treatments specifically for individual patients. A few hospitals are already using AI-based prediction technology to reduce the number of cardiac arrests by more than 86 per cent in the ICU. By leveraging AI models, healthcare providers can predict patient outcomes, identify risk factors, and optimise treatment plans.

INDIA primed to adopt Gen AI

India’s Chandrayaan-3’s success is a testimony to the adoption of digital technology to develop indigenous solutions. It is obvious that the country is racing to keep pace with the developments in technology, and Generative AI will be no exception.

On August 22, 2023, Deloitte announced the launch of its Global Generative AI Market Incubator that will promote innovation in Generative AI and serve businesses in India and across the globe. With the Generative AI boom leading to its soaring global demand, it is considered a significant step towards nurturing tech innovation and talent in India and enabling enterprises to achieve their business objectives. At present, Deloitte has active global engagements in the areas of drug discovery, customer experience, content generation, and personal avatars marking over 100 corporations in the past six months. These engagements demonstrate the increasing relevance of Generative AI.

As per a 2023 NASSCOM report, the integration of data and AI into healthcare could potentially boost India's GDP by $25 to $30 billion by 2025. The strategic mechanisms for AI-driven transformation will be significant in augmenting Indian healthcare services, fostering improved quality, reduced costs, heightened accessibility, and a strong focus on patient care, experience, operational efficiency, and research and development.

Shweta Berry, Director Marketing & Head of Strategic Alliances at Aeris Communications believes the healthcare sector is on a transformative phase because of Generative AI, which holds immense potential for elevating patient care and results. She says, “Generative AI possesses the capability to process vast volumes of data, enhance medical imaging, simulate diverse medical scenarios, and predict outcomes. This technology can play a pivotal role in addressing the scarcity of adequately qualified medical experts, bolstering preventive care and overall quality of life, generating more precise diagnoses and treatment strategies, and ultimately enhancing patient outcomes. Consequently, AI could wield substantial influence over India's public health landscape, aiding in the battle against pandemics and epidemics.”

According to **Sriraman R, Chief Architect, Digital Innovation & Solutions, Marlabs**, as India's healthcare landscape is marked by limited resources, a shortage of qualified professionals, and uneven medical access, AI solutions offer a remedy. Especially in drug discovery, Generative AI expedites the identification, prediction, and refinement of drug candidates, streamlining affordable medication development. AI-driven telemedicine bridges gaps in remote areas, facilitating virtual consultations and diagnoses. Generative AI's versatility extends to translating medical records into multiple languages and realistic simulations, enhancing healthcare staff training.

Amidst great potential, challenges like ethical concerns, biased data, regulations, and infrastructure gaps persist. Collaboration among AI experts, healthcare practitioners, government, and businesses become pivotal for responsible integration of Generative AI in India's burgeoning $372 billion healthcare market, predicted to contribute $1 trillion to the economy by 2035, with AI investment projected to reach $11.78 billion by 2025.

The adoption of Generative AI in the healthcare industry has been faster than one could imagine. Generative AI will keep evolving and advancing, so organisations require an agile strategy and integrated approach to leverage underlying opportunities while ensuring there are no biases being introduced in the process, opines **Mohit Sood, Regional Managing Principal, ZS**. Sood’s company, ZS, is helping healthcare clients in getting better products to the market faster. By integrating Generative AI capabilities in analytics used in drug development and brand planning, Sood claims the company has helped reduce effort and time by more than 30 per cent and has helped achieve a 2-4x time faster speed to execution.

Sharing another key perspective, **Neeta Singal, Director, Molecule AI**, opines that India's strong foundation in IT and software development positions it favourably to excel in AI solutions for life sciences and healthcare – spanning drug discovery, medical imaging analysis, disease prediction, and personalised treatments. Also, according to Neeta Singal, leveraging its vast and diverse population, India can harness abundant data to train AI models tailored to its populace.

“In applications like drug discovery, AI's appeal lies in expediting drug development by streamlining certain processes. The integration of Generative AI might reduce the need for extensive wet lab testing, impacting business and employment at contract research organisations (CROs). Similarly, AI's potential to produce more drug candidates could render some roles redundant for medicinal chemists at major pharmaceutical companies. This trend extends to in vivo tests as well. While AI's enhanced productivity and economic efficiency might foster job growth overall, it is plausible that certain positions will be displaced,” says Neeta.

Investments in this field have certainly surged over tenfold, with Indian startups securing over $500 million since 2022. This surge translates into fresh employment prospects across various roles, including AI researchers, data scientists, AI engineers, healthcare AI specialists, and bioinformatics experts. Professionals capable of bridging AI and medical expertise, as well as those well-versed in ethics and regulations, are also going to be in demand.

So far, we have seen the rosy picture of what can be expected out of Generative AI applications. While Generative AI indeed offers numerous advantages, there is constant warning to companies adopting this technology to be cautious and consider several potential challenges and risks that are associated with biased data and other matters that infringe ethical functioning. Generative AI can inadvertently produce content that is offensive, biased, or inappropriate. It might also be used for malicious purposes like generating fake news, deep fakes, or fraudulent content. Companies need to ensure that their AI models are designed to mitigate these risks and uphold ethical standards. Also, AI models can learn biases present in the training data, leading to biased outputs.

India especially has tremendous work to do in mitigating these biases in an efficient manner. “The future prospects of India embracing Generative AI to develop domestic solutions hold potential benefits. However, there are certain areas that need attention for successful implementation. Firstly, effective data collection processes should be established, learning from practices in other countries, India can gain insights into creating comprehensive patient records to support treatments and intelligent systems. Secondly, data privacy regulations play a crucial role, particularly when dealing with sensitive patient data. Comparing regulations in other nations, India needs to strengthen its data protection laws to ensure the safe and ethical use of healthcare data. Thirdly, enhancing healthcare efficiency is vital, considering India’s lower doctor-to-patient ratio compared to global standards. There are around 60-65 doctors per lakh of population, which is almost half of what is the global standard for any developed country or economy. Learning from Western counterparts, India can adopt strategies to optimise healthcare delivery, thereby addressing the unequal distribution of resources across different regions,” opines **Bhaskar Roy, Client Partner APAC and Bangalore Centre Head, Fractal**.

Brink of a new era

As we move forward into a future where AI-driven solutions are seamlessly integrated into healthcare, it’s crucial for stakeholders – from researchers and practitioners to policymakers and technology developers – to collaborate closely. By fostering interdisciplinary partnerships, maintaining a strong ethical framework, and continuously refining the technology, the future can ensure that Generative AI becomes a force for good in healthcare. As its capabilities expand and its reliability strengthens, we're on the brink of a new era where precision medicine and patient outcomes are revolutionised, ultimately leading to healthier and more fulfilling lives for individuals around the world.

In conclusion, to emphasise the necessary adoption of AI in healthcare, I would like to quote Google's Chief Health Officer, Karen DeSalvo’s, statement that she shared with *The Washington Post* recently – “AI won't replace doctors, but doctors who use AI will replace doctors who don’t.”

Anusha Ashwin