Generative AI in Healthcare

Introduction

In today's rapidly evolving healthcare landscape, technology has become an invaluable ally, revolutionizing various aspects of the industry. Among the most promising advancements is the utilization of generative AI and Large Language Models. It is perhaps no exaggeration to say that generative AI is poised to reshape healthcare operating and business models across the value chain. This article explores the potential of generative AI and large language models, highlighting their strengths and the transformative impact they can have on the healthcare sector.

An introduction to generative AI and large language models

Generative AI represents the forefront of artificial intelligence, focusing on creating original and contextually appropriate content. Generative AI refers to a set of neural networks that can create new content based on human instructions. That new content can take the form of text, images or sound. Here we discuss language models, which are primarily trained to produce text output. GPT 3/3.5/4 from OpenAI or BARD from Google are examples of large language models, which are loosely defined as language models with more than a billion parameters.

These large language models are very mature and have been trained on vast amounts of text data, enabling them to comprehend and generate human-like responses in natural language. Fundamentally, large language models are adept at four key functions. They can generate new content with little or no guidance. They can summarize existing content in a manner that can be understood by the target audience. They can hold intelligent conversations with an almost humanlike understanding of various domains. Lastly, they can perform Chain of Thought (CoT) activities that break complex problems into smaller component parts.

Harnessing the power of language models in healthcare

Large language models exhibit exceptional proficiency in processing and comprehending human language, allowing them to generate coherent and meaningful responses. Their inherent strengths make them uniquely suited for a range of applications in healthcare payer, provider, and pharmacy settings.

There are several business functions in healthcare that can improve or acquire differentiable capabilities. Some of these are described below.

Streamlining payer administrative processes

Language models excel at analyzing claims or prior authorizations, swiftly extracting crucial information and identifying areas where humans need to focus more. By reducing the cognitive load on human users for complex processes such as claims auditing or overpayment detection, these models enhance the efficiency of processes that so far have been heavily manual, while reducing the likelihood of errors. Similarly, high quality recommendations can be generated by large language models to assist current payer clinical staff. This will improve payer productivity as well as increase member and provider satisfaction.

Market expansion

Language models excel in generating new content. Healthcare organizations can customize their messaging for their target audience by leveraging language model output. This would improve marketing campaign effectiveness for healthcare organizations.

Improving care management

Language models allow mass customizations of a patient's engagement point. This alone can help payers to engage the members at the right time to maximize the impact of the interventions as part of care or disease management programs. Language models can also allow better planning and care management related messaging to a diverse set of populations, from self-insured organizations to Medicare/Medicaid populations.

Automating clinical documentation

Healthcare providers face the complex and critical task of translating clinical documentation into accurate medical codes. Language models can automate this process, accurately capturing diagnoses and procedures from clinical notes and alleviating the burden on healthcare professionals. In addition, language models can extract the appropriate social determinants of health information from clinical text, thus providing an easier way for providers to get a broader picture of the patient's holistic care.

Enhancing clinical decision support systems

Large language models can serve as intelligent companions, providing clinicians with comprehensive information at their fingertips. By integrating with clinical decision support systems, these models can offer real-time insights, aiding in accurate diagnoses and treatment recommendations.

Intelligent chatbots for customer service

Language models can power intelligent chatbots that offer round-the-clock support to patients and members, addressing their queries, scheduling appointments, and providing relevant information. These chatbots enhance customer service while improving access to care. They are also more capable of understanding human language and can provide more holistic and empathetic responses.

Data analysis and insights

Language models can mine structured and unstructured data, identify patterns, and provide insights that support strategic decision-making, resource allocation, and risk management. These insights can span multiple functional areas including financial planning and contract analysis.

Improving medication management and medication adherence

Pharmacies can leverage large language models to optimize medication management processes. These models can assist in identifying potential drug interactions and potential adverse reactions factoring in the latest research. In addition, Pharmacy Benefit Management organizations, in association with pharmacies can better engage with patients through customized and contextual messages to improve medication adherence.

"There are a number of business functions in healthcare that can improve or acquire differentiable capabilities through generative AI."

Language models can also be harnessed in healthcare IT. There are several use cases that are poised to get disrupted. Some of these are:

DevSecOps

Language models help IT workers to be more productive by helping them to create more accurate code first time. Language models can also analyze code base, identify potential security vulnerabilities, and assist in secure software development practices. By integrating language models into DevSecOps workflows, organizations can enhance their code review processes and mitigate cybersecurity risks.

Data governance and compliance

Healthcare organizations handle vast amounts of sensitive patient data, necessitating robust data governance and compliance practices. Language models can aid in data management and governance tasks, ensuring compliance with privacy regulations, facilitating data anonymization, and improving data quality.

Knowledge management

Language models can automatically extract key concepts, relationships, and insights from textual data such as internal policy documents, research papers, clinical notes, and medical literature. When a user enters a search query, the language model processes the query and maps it to relevant documents based on semantic similarity, context, and topic modeling. This enables more accurate and contextually relevant knowledge retrieval, enabling several healthcare knowledge management use cases such as the retrieval of medical policies and searching the latest clinical research papers.

Data privacy, security and AI safety

As language models are deployed in healthcare, organizations need to be proactive in taking steps to ensure data security, privacy and AI safety.

In addition to that, there are three levels of safeguards that a healthcare enterprise needs to put together in order to use language models safely.

At the first level, data deidentification and tokenization are essential strategies to ensure that a healthcare organization's interaction with the language models remains secure and data remains private.

The second level of safeguard would be at an operating model level. Here the operating model, by design, prevents any detokenized data leakage. Similarly, the operating model also needs to ensure that any potentially wrong output from the language model is prevented from contaminating the current business process. Both human and AI based feedback loops may be utilized to ensure this.

The third level of safeguard would be at a business level, ensuring that consumers of generative AI content understand that it has been created by AI. At the same time, the organization should provide delineation of responsibility based on the language model they are using and their contract with the language model provider.

The hyperscalers and the model vendors do play a key role in determining the security of the operating model. However, overall, we think that with the right set of safeguards, generative AI can be very secure and reliable, so as to meet your data privacy and security needs.

The EU has proposed the AI Act, a sweeping set of consumer protections from potentially dangerous applications of AI in general. In the US, a legal framework around AI generated content is still in its early days. This would be an area that is sure to evolve rapidly in the near future.

Last, but not the least, we need to remember that language models have been trained on a set of data that may have some inherent biases. These biases are manifestations of years of decision making by human agents, many of whom were biased. To ensure healthcare equity, any healthcare organization must therefore track the AI driven decision-making process over a longer time horizon in order to detect potential biases and correct those as needed.

Prioritizing areas of investment on generative AI

The utilization of language models in healthcare holds immense promise, enabling organizations to unlock new capabilities and improve patient care. However, selecting the right use case for language model deployment requires careful consideration of both the risks and rewards involved. By balancing the potential risks, rewards and cost of integrating the language model output within their workflow, healthcare organizations can select the right generative AI investment areas.

Stakeholder benefits

A successful language model deployment should bring tangible benefits to multiple stakeholders within the healthcare ecosystem. Payers must evaluate impact of language model usage on members, providers, internal staff, employers and brokers. Similarly, providers must understand the benefit on patients, payers and their internal staff. Healthcare organizations can determine the value of a particular area of investment based on the differentiated capability generative AI brings in or the size of the problem it can potentially solve.

Risk assessment

For every generative AI use case, healthcare organizations need to consider the risks associated with that specific area. This risk can vary dramatically based on the use case. For example, a recommendation of prior authorization based on generative AI carries far higher risk compared to customization of content for a marketing campaign.

System integrations

Language models may generate valuable insights but integrating them into existing healthcare systems and workflows is essential for realizing their full potential. Consider the integration of generative AI with existing enterprise applications such as EHR systems, clinical decision support tools, and care management. Adequate resources, technical expertise, and collaboration with IT teams is necessary to ensure seamless integration and implementation.

Implementing necessary guardrails

To address potential scenarios where language models generate incorrect or unreliable outputs, healthcare organizations must establish appropriate guardrails. These guardrails can include human oversight, validation processes, and feedback loops to identify and rectify errors. Implementing a strong quality assurance framework, ongoing model monitoring, and continuous improvement processes are essential to maintain accuracy, reliability, and safety.

To strike the right balance between risk and reward in language model deployment, healthcare organizations can follow these guiding principles:

Start with low stakes use cases

Begin with use cases that have relatively low impact and risk to understand the capabilities and limitations of language models within the healthcare context. Gradually expand to more complex scenarios as confidence and experience grow. A number of the use cases mentioned earlier could be a great starting point of a generative AI journey. We have seen healthcare organizations trying to improve effectiveness of internal process, since it is relatively inexpensive to create a framework to supervise the output of the generative AI in such scenarios. Such use cases can be agent assistive capabilities for a contact center, creating customized content for a marketing campaign or member/patient engagement and knowledge management.

Collaborative approach

Generative AI needs a truly diverse set of skills to implement them in a safe and responsible manner. Organizations should collaborate with stakeholders such as clinicians, data scientists, legal experts, and patient representatives, in addition to the traditional IT organization, in the decision-making process. Organizations should also foster collaboration and communication to ensure a comprehensive assessment of risks and rewards.

Iterative deployment

Adopt an iterative approach, continuously evaluating the performance, impact, and risks associated with language models. Implement feedback loops and mechanisms to address issues, refine processes, and improve outcomes over time.

Select the right partner

It is critical that healthcare organizations select the right partner as they embark on their generative AI journey. Cognizant, as your business partner, brings knowledge of core payer administrative platforms, knowledge about your business, be it for payers, providers, PBM or retail pharmacies. Keeping in mind how critical generative AI would be in healthcare's future state digital operating model, Cognizant has invested in Neuro AI, a platform that brings together multiple features spanning areas such as IT services, automation and AI to offer a comprehensive

approach to accelerating enterprise adoption of generative AI, with a focus on delivering meaningful business benefits.

Cognizant has forged best in class partnerships with the major hyperscalers, such as Google, Microsoft and Amazon Web Services, each with their own generative AI solution. Cognizant also has deep knowledge of open-source language models that can be deployed for specific use cases. We are currently working with several healthcare clients to plan their generative AI journeys in collaboration with these hyperscaler partners and we would be happy to be your partner as well.

Conclusion:

Move forward while balancing risk and reward

Generative AI and large language models have the potential to revolutionize healthcare payer, provider, and pharmacy processes. By leveraging their capabilities, organizations can streamline operations, enhance decision-making, and improve patient experiences. However, this transformation must be approached with a strong commitment to data security, privacy, and AI safety. To learn more about generative AI and its potential for your healthcare organization contact us.

To learn more about how Cognizant can help you with your digital transformation initiatives, visit cognizant.com/healthcare

Cognizant (Nasdaq: CTSH) is an AI Builder and technology services provider, bridging the gap between AI investment and enterprise value by building full-stack AI solutions for our clients. Our deep industry, process and engineering expertise enables us to build an organization's unique context into technology systems that amplify human potential, drive tangible outcomes and keep global enterprises ahead in a fast-changing world. See how at cognizant.ai or @cognizant.

World Headquarters

300 Frank W. Burr Blvd.
Suite 36, 6th Floor
Teaneck, NJ 07666 USA
Tel: +1 201 801 0233

European Headquarters

280 Bishopsgate
London
EC2M 4AG
England
Tel: +44 (01) 020 7297 7600

India Corporate Office

Siruseri-Software Technology Park of India (STPI)
SDB Block—Ground Floor North Wing
Plot No H4, SIPCOT IT Park
Chengalpattu District
Chennai 603103, Tamil Nadu
Tel: 1800 208 6999

APAC Headquarters

1 Fusionopolis Link, Level 5
NEXUS@One-North, North Tower
Singapore 138542
Tel: +65 6812 4000

© Copyright 2025–2027, Cognizant. All rights reserved. No part of this document may be reproduced, stored in a retrieval system, transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the express written permission of Cognizant. The information contained herein is subject to change without notice. All other trademarks mentioned herein are the property of their respective owners.

WF 5256050