GE HealthCare

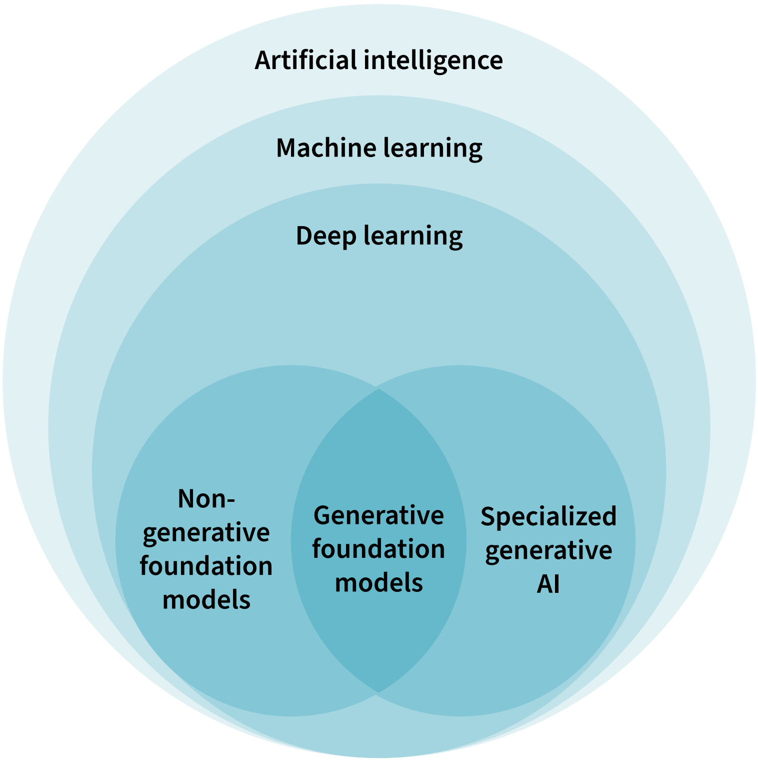
Strategic AI: unleash new possibilities for meaningful clinical improvements in healthcare

AI: the catalyst for a radical shift in healthcare

Artificial intelligence is poised to revolutionize healthcare by streamlining processes, enriching decision-making, and enabling previously unimaginable advances across the entire care continuum. Through a variety of innovative applications and uses, AI could dramatically improve patient care and treatment outcomes by enabling personalized medicine and more accurate diagnostics.

To fully embrace this rapidly evolving technology, it’s important to understand some terminology and high-level concepts.

Unlocking AI: key terms for healthcare innovation



Artificial intelligence (AI) is a machine's ability to perform some cognitive functions we usually associate with human minds.

Machine learning (ML) is a form of artificial intelligence that is able to learn without explicit programming by a human.

Deep learning (DL) is a type of machine learning that is more capable, autonomous, and accurate than traditional machine learning.

Non-generative foundation models are pre-trained neural networks that focus on tasks such as classification, prediction, or analysis, rather than creating new content, providing robust foundations for various AI applications.

Generative foundation models combine the versatility of foundation models with the creative capability of generative AI, enabling them to produce new content while being adaptable to different tasks.

Specialized generative AI models are tailored for specific content creation tasks, such as generating realistic images or synthesizing speech, often excelling in a particular domain but lacking the broad adaptability foundation models.

Even in these early days, we've already seen how AI is reshaping how we approach healthcare and helping us rethink and redesign workflows and clinical pathways. However, despite what you may have heard or read, AI isn't coming here to take over the high-level activities, make inscrutable, opaque decisions, and leave us with the grunt work. Quite the opposite, in fact. AI has the potential to handle the ***routine*** tasks and processes—the repetitive, lower-value activities that have robbed clinicians and administrators of valuable time. That could free talented clinicians to bring a human touch to treatment, find the nuances, and deliver extraordinary care. AI will help us reimagine healthcare delivery and could improve outcomes and efficiencies in unprecedented ways.

But what's getting overlooked in this understandable euphoria: ***how***. Traditionally, the use of AI in healthcare has entailed costly and complex models that must be retrained and refined for each application. However, ***foundation models***—large-scale neural networks—can be reused and fine-tuned for a wide variety of administrative back-end use cases. Foundation models can help accelerate the creation and deployment of new solutions that could streamline healthcare workflows, enhance patient care, and improve operational efficiencies.

Foundation models open the door to multi-modal healthcare

Today, AI in healthcare has primarily focused on narrowly defined tasks, utilizing a single data modality, such as a computed tomography scan or an x-ray. But no single modality offers a complete picture of the patient's health. Healthcare professionals want to interact with various data sources and modalities to arrive at diagnostic conclusions, make prognostic evaluations, and create treatment plans. This process is dynamic, with ongoing data continually shaping clinical decisions over time.

Unfortunately, the data from each clinical modality remains trapped in separate "clinical silos," risking uneven adoption of screening, low trial enrollments, inadequate treatment selection, weakened adherence to clinical guidelines, and poor follow-up and surveillance.

Using foundation models, multi-modal AI has the potential to synthesize complex, longitudinal healthcare data—from a provider's clinical notes, billing codes, and laboratory data to diagnostic images and vital signs—even genomic sequencing and wearables. Imagine being able to predict the recurrence of aggressive cancers by combining data from radiology, pathology, and genomics, creating clinically explainable AI models that lead to better, more personalized treatments.

Why foundation models are the right strategy for healthcare

Generalized

Foundation models are generalized, learning from a wider range of data and easily adapting to new use cases. It's not unlike how an e-commerce provider uses data from millions of customer transactions to ensure a more personalized shopping experience.

Scalable

Models could be shared across healthcare and empower developers and product owners to rapidly build on existing work—not build hundreds of models from scratch. As this capability matures, we can expect an exponential growth in AI-enabled applications providing advanced visualization, workflow optimization, or decision support.

Efficient

By relying on a single model to handle multiple tasks, foundation models reduce costs and speed development. This is like how a search engine uses one core algorithm to efficiently serve multiple searches—text, image, video, and more.

Collaborative

Foundation models complement human expertise. Rather than isolate decision makers, they may uncover deeper insights and drive better decision-making.

Transformative healthcare applications

Foundation models are poised to revolutionize healthcare through their ability to power countless applications that transform and elevate healthcare processes:

Clinical Document Standardization

AI apps could standardize and summarize clinical documentation and histories, streamline patient communications, and retrieve clinical results. Imagine a foundation model extracting a one-page summary—with hyperlinks to specific details—followed by a patient history or a summary of what's changed. The clinician quickly gets to the data and narratives that matter. When he or she must consult on dozens of cases a week, the gains in efficiency become very important.

Phenotyping and Intelligent Clinical Support

Multi-modal EMRs support more personalized treatment, precise diagnoses, and better patient matching for clinical trials. For instance, AI could integrate MRI data and patient data to automate organ and tumor segmentation. Clinicians get greater precision and needn't make extensive annotations. This type of foundation model could also adapt to new data and use cases and will help to drive robust performance across unseen datasets.

Conversational Agents and Companions

Conversational AI technologies such as generative AI agents and chatbots could provide consistent, round-the-clock support for patients and clinicians alike by scheduling appointments, sending timely reminders to refill prescriptions, or helping clinicians prioritize cases by classifying the severity of patient conditions. A recent NIH editorial has even asserted that "the integration of AI chatbots and medical professionals is…likely to evolve into a collaborative approach, where professionals focus on complex medical decision-making and empathetic patient care while chatbots supplement these efforts…marrying the best of digital efficiency and human empathy."[1]

In the years to come, GE HealthCare envisions a future where healthcare teams interact with patient data as naturally as having a conversation. They might ask, "How long will this patient stay?" or "Which medications are best given their history?"—and get precise answers in real time. The goals are enhanced patient care, fewer readmissions, and more efficient operations, all driven by the power of AI and natural language. We believe this is the future of healthcare.

We are committed to ensuring our AI systems are innovative, transparent, and inclusive by adhering to foundational pillars: validity and reliability, safety, security and resiliency, accountability and transparency, explainability and interpretability, privacy and fairness. These principles foster trust and confidence while addressing environmental and societal responsibilities.

Driven by innovative foundation models, we believe AI offers a pathway to both improve clinical efficiencies and elevate patient care to new heights, ensuring both doctors and patients benefit from these advancements. They are setting the stage for a new era in healthcare, where AI-driven insights could lead to greater efficiency, lower costs, and—most importantly—better outcomes.

References
1. National Institutes of Health, AI Chatbots in Medicine, 15th June 2023.

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