

Virtual and Retail Healthcare

ACCESS - HOME CARE - EQUITY- EXPERIENCE - EFFICIENCY - CASES

Innovation Round-up: How Virtual and Remote Care Transform Patient Outcomes Across Medical Fields

Thierry Godelle

Strategic Activation Planning for Outpatient Clinics

Bishan Nandy

Virtual Care Readiness: Exploring Adoption Perspectives

Sofia Zanrosso | Shane Fitch | Mustafa Abusalah

Hybrid Health Approach: Integrating Traditional Treatments and Wearable Technologies

Alan Zettelmann | José A Cano

Evolution and Impact of Telenursing and Telemedicine

Samar Abdelsalam

Impact of AI Multimodality in Retail Healthcare

Bragadeesh Sundararajan

Virtual Reality In Nursing: A New Frontier in Healthcare

Precious Chisom Uzoeghelu



Impact of AI Multimodality in Retail Healthcare: Diagnostics, Personalised Treatment and Consumer Experience

AI multimodality is transforming healthcare by integrating diverse data sources for more accurate diagnostics, personalised treatments, and real-time monitoring. Its incorporation into retail healthcare enhances accessibility, efficiency, and consumer experience, positioning retail clinics as key players in the future healthcare system.



**BRAGADEESH
SUNDARARAJAN**

AI & ML Leader |
Chief Data Science
Officer | Dvara KGFS
| Chennai, India

key points

- AI multimodality in healthcare integrates diverse data sources such as text, images, and clinical data to revolutionise diagnostics, personalised treatments, and real-time monitoring.
- Retail healthcare, particularly in clinics affiliated with drugstores or supermarkets, is becoming more popular and accessible, offering personalised care through AI-driven technologies.
- Privacy, security, and ethical concerns, particularly related to data protection and biases in AI models, are critical considerations as AI continues to reshape the future of healthcare and retail healthcare systems.

AI is currently reshaping most industries in various ways, but none seem to have as much potential to benefit from AI as healthcare. With its access to abundant data and digital advancements, AI multimodality, which utilises a combination of text, images, and clinical data, is expected to revolutionise how healthcare is delivered. AI multimodality offers new possibilities for diagnostics, personalised treatment, and real-time monitoring.

However, retail care, provided in clinics located in or affiliated with a drugstore or supermarket, is becoming a more popular and available option. When these retail strategies incorporate AI multimodality, delivering excellent, efficient, and personalised care to a larger group of people becomes possible.

AI Multimodality Integrates Diverse Data for Better Decision-Making Process

Multimodality in the context of AI refers to the ability of artificial intelligence systems to process multiple types of information simultaneously. In healthcare, this may include analysing and integrating various patient data such as X-rays, modern imaging, electronic health records, laboratory test results, and patient symptoms.

AI multimodal systems use data from multiple sources, rather than just one, to make the decision-making process more accurate and efficient. For instance, a diagnosis can be made by comparing an MRI scan of the brain with the patient's medical records, reports,

and genetic test results. This makes multimodal AI valuable for clinicians as it allows them to simultaneously assess different aspects of the human body.

AI multimodality is supported by several advanced technologies, including:

- **Natural Language Processing (NLP)** can perform literal comprehension of text, which may originate from patient records or research articles.
- **Computer Vision** is used in diagnosing medical images such as CT scans or X-rays.
- **Machine Learning and Deep Learning** enable AI systems to be trained on data to improve diagnostic and future prognostic capabilities.
- **Wearables, IoT, and EHR Integration:** Smartwatches and fitness trackers continually provide health data to the system, which AI then uses in conjunction with the patient's medical history.

One significant advantage of AI in healthcare is its ability to analyse data from multiple sources simultaneously. This capability is crucial for advancing personalised medical treatments, where patient characteristics are taken into account. For example, in cancer therapy, incorporating genetic data with images and laboratory tests can enhance treatment efficiency.

Additionally, using multiple forms of data through AI can help reduce diagnostic errors. Analysing various data types can prevent single-source blindness, allowing for the recognition of patterns or anomalies that may not be apparent when using just one data source.

How Multimodal AI Can Transform Healthcare Management

1. Improved Diagnostics and Imaging

Co-modality is a revolutionary concept with diverse applications, especially in diagnostics and imaging. In radiology, AI can assist in analysing CT scans and X-rays by integrating them with patient lab data and medical history, leading to more accurate diagnoses. This is particularly crucial for detecting hard-to-diagnose conditions like cancer, where early detection is vital. For example, in breast cancer screening, AI-based systems can combine mammogram images with a patient's clinical history to identify early signs of the disease. Studies have shown that these systems have the potential to outperform human radiologists in early detection.

AI multimodal systems use data from multiple sources, rather than just one, to make the decision-making process more accurate and efficient.

2. Personalised Treatment Plans

Machine learning multimodality involves integrating different data types, such as genetic information,

demographics, and lifestyle information, into personalised treatment plans. These tailored treatment approaches may include targeted cancer treatment based on genetic test results, imaging data, and patient's medical history, aiming to provide the most effective treatment based on individual characteristics. This approach can significantly improve treatment effectiveness and suggests that better methods can be applied compared to traditional treatment regimens.

3. Tele-monitoring and Tele-care

AI multimodality is also beneficial in providing real-time observations during telemedicine practice. Wearable technology synchronises a patient's biometrics, such as heart rate, blood pressure, and glucose levels, with their previous clinical history and assists clinicians in delivering better care. This is particularly helpful in remote care situations as it allows patients to be proactively monitored, and interventions can be initiated immediately upon detecting any abnormalities. For example, in diabetes care, the multimodal AI system can monitor glucose levels, compare them to behaviours, and create plans for adjustment to enhance the patient's condition without requiring constant hospitalisation.

The Rise of Retail Healthcare in a Consumer-Driven Era

Retail healthcare is a form of healthcare delivery provided in a convenient store format rather than traditional clinics and hospitals. These centres offer outpatient services such as administering simple injections, conducting tests, and treating non-severe ailments. The trend of retailisation of healthcare is growing as people seek easily accessible and

convenient healthcare services. Patients find long wait times and high costs at traditional healthcare facilities inconvenient, and the option to receive healthcare while shopping is seen as convenient.

Extra-Modal Applications of AI for Retail Healthcare

The use of AI in retail healthcare has the potential to simplify many diagnostic procedures and make them more accessible. Retail healthcare centres are utilising AI systems capable of analysing data from multiple sources, such as patient history, diagnostic images, and real-time monitoring devices, to provide faster and more accurate diagnoses on-site. For example, a patient with flu-like symptoms visiting a pharmacy clinic may undergo AI-driven diagnostics that consider symptoms, medical history, body temperature, and oxygen saturation to determine whether the patient is suffering from pneumonia or COVID-19, among other conditions.

Enhancing the Consumer Experience

It is widely used to improve the consumer experience in retail healthcare. People's health records can be used to recommend care plans so retail clinics can offer customised advice. Symptoms and disease diagnoses could also be taken using AI self-service kiosks, expediting the visit and minimising wait time. All these AI tools enhance healthcare delivery while enhancing health consumerism, enabling the consumer to take charge of their health.

Improving Accessibility and Efficiency

AI multimodality encompasses accessibility and efficiency in retail healthcare. Artificial intelligence

is particularly useful in reducing the manual effort required for tasks such as scheduling appointments, managing patient flow, and maintaining records. This, in turn, alleviates the workload of healthcare providers while improving service delivery to patients.

When these retail strategies incorporate AI multimodality, delivering excellent, efficient, and personalised care to a larger group of people becomes possible.

Privacy, Security and Ethical Issues

Privacy and security are always top concerns when dealing with health data, especially when it comes to technology. AI systems must comply with the regulations of the country or state in which they operate. For example, in the USA, AI systems must adhere to HIPAA (Health Insurance Portability and Accountability Act) regulations regarding the protection of patient data. Retail healthcare, in particular, requires improved data security measures to manage large volumes of patient information effectively.

Another ethical dilemma concerns biases in specific AI models. If they are trained on a biased dataset, the systems will produce skewed results in the same manner. Therefore, the specifics of how an AI arrives at a decision must be made clear to patients so that everyone is treated fairly and prejudices are minimised.

Multimodal AI Will Shape the Future of Healthcare

Integrating medicine and technology aims to create a better future by simultaneously combining different modes. With the current advancements in AI systems, there will be further merging of multimodal data to assist in diagnosing, treating, and monitoring patients. The focus will shift towards personalised medical interventions rather than general disease treatments, with AI playing a pivotal role in enabling precision medicine.

Retail healthcare is expected to play a dominant role in the future healthcare system as AI's potential to accelerate and streamline services continues to grow. As more people rely on retail clinics for affordable and accessible healthcare, these centres will likely become the primary point of contact for numerous non-critical patient cases.

Integrated AI multimodality can be the game changer in healthcare, with improved diagnostic accuracy, customised treatment, and continuous in vivo monitoring. Even in retail healthcare, one of the central benefits of AI – optimisation of processes and, consequently, consumer experience – is being actively explored. In the future, it will be even more so about how AI multimodality blends with retail healthcare strategies to advance the healthcare

sector and the patients' experience. Healthcare professionals should adopt these technologies, keep themselves updated, and be prepared as AI continues to revolutionise the healthcare sector.

Conflicts of Interest

None.

references

Davenport T, Kalakota R (2019) The potential for artificial intelligence in healthcare. *Future Healthc J.* Jun;6(2):94-98

Jiang F, Jiang Y, Zhi H et al. (2017) Artificial intelligence in healthcare: past, present and future. *Stroke and Vascular Neurology.* 2(4):230-243

Topol E J (2019) *Deep Medicine: How Artificial Intelligence Can Make Healthcare Human Again.* Basic Books; 2019. ISBN: 9781541644632



HealthManagement

Promoting Management and Leadership