Board

Artificial Intelligence - overview

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# Artificial Intelligence – what do we mean?

"Artificial Intelligence (AI) leverages computers and machines to mimic the problem-solving and decision-making capabilities of the human mind"

Alan Turing's definition would have fallen under the category of *"systems that act like humans."*

Generative AI (**gen** AI)

Generative AI (gen AI) is a predictive language model producing unstructured content such as text, images, and audio.
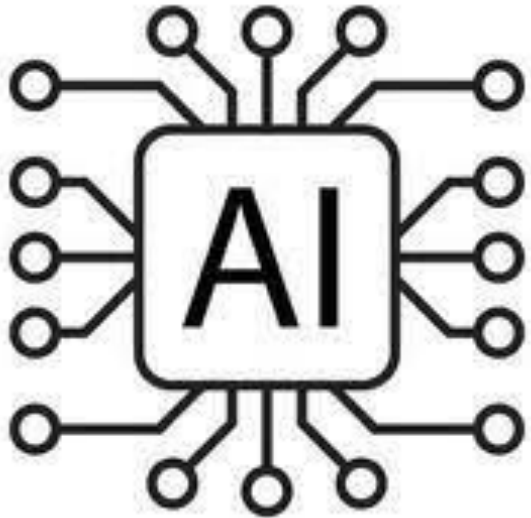
Analytical, AI, is used to solve tasks i.e. classifying, predicting, clustering, analysing, and presenting structured data.

Gen AI is powered by AI models (*foundations*), trained on a broad set of data, can be adapted to **gen**erate content that seems human, i.e. written documents, audio conversations and visual images etc.

Gen AI doesn't calculate or do maths, therefore, won't displace traditional AI, each will complement and enable the other.

Many people often asked about the difference between Robotic Process Automation (RPA) and Artificial Intelligence (AI)….some even confused the two to be the same.

RPA is a software robot that mimics human actions, whereas AI is the simulation of human intelligence by machines.

Real-world applications of AI systems today.

Speech recognition: Also known as automatic speech recognition (ASR), uses natural language processing (NLP) to process human speech into a written format.

Customer service: Online virtual agents are replacing human agents along the customer journey.

Computer vision: This AI technology enables computers and systems to derive meaningful information from digital images/visual inputs and can take action.

Automated stock trading: Designed to optimise stock portfolios, AI-driven high-frequency trading platforms make thousands or even millions of trades per day without human intervention.

Widespread AI adoption in Healthcare

Keeping Well – major potential benefits is to help people stay healthy, minimising frequent clinical interventions, by encouraging healthier behaviour (***Shift left***).

Early Detection - already being used to detect diseases, such as cancer, more accurately and in their early stages.

Diagnosis - unlocks vast amounts of health data, AI can review and store vast medical data – every medical journal, symptom, and case study of treatment.

Decision making - Alignment of health data with appropriate and timely decisions, predictive analytics supporting clinical decisions/actions.

Treatment - help clinicians with a more comprehensive approach for disease management, better coordinate and comply with care plans.
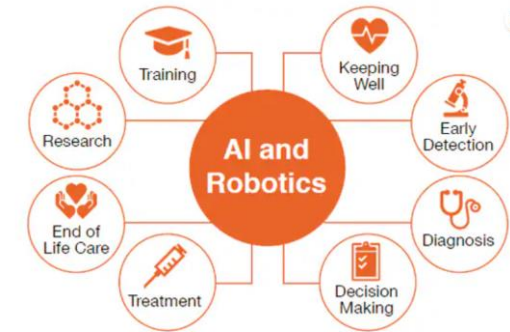
Widespread AI adoption in Healthcare

End of life (EoL) – People living longer and often with conditions such as dementia, and heart failure. AI can support "isolation" and help people to remain independent for longer during EoL phase.

Research - Drug research is a recent application for AI in healthcare. Directing the latest AI to streamline the drug discovery and drug repurposing, potential to cut both the time to market for new drugs and their costs.

Training - Through simulations, natural speech and the ability of AI to draw instantly on a large database of scenarios, means responses to questions, decisions or advice from a trainee can challenge in a way that a human cannot.
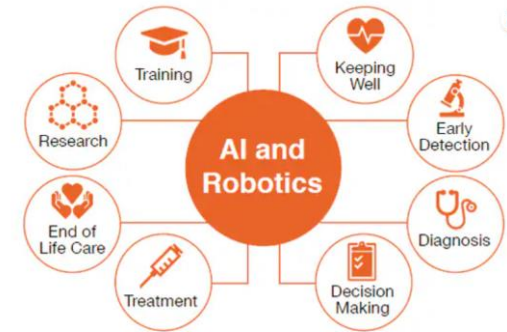
AI adoption in Healthcare - examples

C2-Ai – working in acute settings to provide risk stratification and prioritisation at individual patient level, calculating risk of mortality and complications plus the impact of deterioration on the waiting list – September 2023, Cheshire & Merseyside ICS had signed an agreement to deploy C2-AI solutions across all its acute settings.
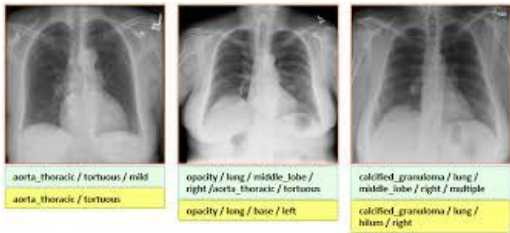
Rotherham NHS FT (**Machine Learning**) in Radiology for all bone and chest X-rays 24 x 7, with view to then deploy across the ICS region, plans are emerging to do similar in endoscopy and upper GI.

Early implementations of AI - examples

Risk stratification solutions that are gaining traction include:

- **Health Navigator** (HN) – AI screens patient data, rapid identification of risks such as disease progression across entire populations in real time. At risk patients, HN provides access to Health Coaches, to work with patients to reduce/prevent disease progression. HN have previously undertaken work with Staffordshire ICS, which to 35% reduction in A&E admissions.

- **PinPoint Data Science** - using ML to combine signals from multiple blood analytes and basic patient information into a single clinical decision support tool. Allows clinicians to identify patients to be referred to specialists for cancer diagnosis, red flag particularly urgent cases and identify those who can be safely investigated for other possible causes of their symptoms.

Early implementations of AI - examples

AI coupled with computer vision is being developed in specialities such as ophthalmology and dermatology to support clinical decision making, such as:

- *Researchers at Moorfields Eye Hospital and UCL Institute of Ophthalmology developed an AI system that has potential to identify sight-threatening eye diseases but also to predict or identify other health conditions, including heart attacks, stroke, and Parkinson's disease.*

Predictive analytics utilising diverse data is an emergent field with innovators such as:

- ***Pangaea Data*** *- unsupervised AI to extract intelligence from both structured and unstructured textual data to provide doctors and researchers with a full picture of an individual's health. This helps clinicians accurately diagnose and detect patients at risk earlier. It can also support identification of patients that have been misdiagnosed.*

AI **opportunities** for health and care

- **Diagnostics**: AI is being used for image analysis, such as interpreting medical images; X-rays, MRIs, and CT scans to aid in diagnosing conditions like cancer and fractures.

- **Predictive Analytics**: AI is used to predict patient outcomes, such as identifying patients at risk of readmission or deteriorating health, which can help in proactive patient care.

- **Virtual Health Assistants**: Chatbots/virtual assistants are used for patient engagement, appointment scheduling, and providing information.

- **Electronic Patient Records (EPR) management**: can assist in managing/analysing EPRs for more efficient/personalised patient care.

- **Administrative Tasks**: AI - automating administrative tasks; i.e. HR, finance/transactional processing, and patient appointment scheduling.

AI **implications** for health and care

☐ AI will lead to improved health outcomes, but few have been trialled and evaluated in real-world settings. **Clinical Safety** assessments, need to be understood and implemented.

☐ Automation may reduce the time spent by staff on routine work, though they may **require new skills to use AI**.

☐ Concerns that AI could **dehumanise** healthcare, others argue staff time saved could be spent caring for patients.

☐ Patient data are often used to produce and test AI systems, raising issues around data quality, accessibility and **patient privacy**.

Generated by Synthesia AI

AI related opportunities in NENC

£2M Funding for AI
Supporting LC Diagnosis

Clinical Consultations

HINENC - Spirometry
AI assistance

Discharge Summary
AI assistance

NENC ICB
AI Research Support

Finally....

"AI is becoming increasingly sophisticated at doing what humans do, but more efficiently, more quickly and at a lower cost.

The potential for both AI and robotics in healthcare is vast. Just like in our every-day lives, AI and robotics are increasingly a part of our healthcare eco-system."