

Artificial Intelligence in Early Detection



ARTIFICIAL INTELLIGENCE (AI)

The ability of a computer to perform tasks commonly associated with human intelligence, such as how to act, reason, and learn.



MACHINE LEARNING (ML)

A type of AI that is programmed to learn over time from the data provided to make predictions or decisions; the more comprehensive and inclusive data provided to an ML model, the better it will perform.



DEEP LEARNING (DL)

A type of ML that learns from huge amounts of data using complex algorithms, called artificial neural networks, that are modeled after how the human brain processes information.

BENEFITS OF AI IN CANCER DETECTION

Key benefits of AI-based approaches in early detection are **speed and accuracy** with which such strategies can help detect existing cancers or rule out that cancer is present. This may allow for better surveillance and intervention if/when needed. Two of the most common AI-enhanced approaches for cancer early detection and diagnosis include:

- **Detecting and classifying cancerous tumors** using various scans from radiological or pathological imaging.
- Combining conventional blood tests as well as liquid biopsies with AI-powered analyses for **more accurate cancer diagnosis**.

BARRIERS IN THE USE OF AI IN CANCER DETECTION

- The **lack of large, well-annotated cancer datasets** that are representative of the diverse patient population as well as of the distinct cancer burdens of various population groups is a significant barrier for the use of AI in cancer research and patient care.
- The use of AI in early detection and diagnosis of cancer is **still in its infancy**; all stakeholders must work together to ensure an equitable uptake of this major technological advance in cancer science and medicine.
- Because the use of AI in medicine is a newer technological advance, there may be **concerns among patients about the use of their medical records**, including images and tissues.

SELECTED EXAMPLES OF AI-BASED DEVICES AND SOFTWARE SYSTEMS IN CANCER DETECTION



GI Genius

A medical device that uses AI-based software to assist clinicians in identifying precancerous lesions or polyps that may not be detectable otherwise during routine colonoscopy.



Paige Prostate

An AI-based software that reviews digitally scanned slide images from prostate biopsies to assist pathologists in the detection of areas that are suspicious for cancer.



Lunit INSIGHT MMG

An AI-based software that analyzes mammography images and provides the location of breast lesions suspected of being cancerous (see text for more detail).



EndoScreener

An AI software system that aims to identify potentially precancerous polyps during a colonoscopy (see text for more detail).