CIFAR AI FUTURES: CASE STUDY (2018 → 2028)

InnerEye → AI-Driven Health Monitoring

Theme: Health

2018 AI Use Case: [InnerEye](#)

Project InnerEye, a research initiative led by Microsoft, applies state-of-the-art computer vision and machine learning algorithms to automatically analyze three-dimensional medical CT (Computer Tomography) and MR (Magnetic Resonance) images and identify tumors and organs at risk.

The current process of marking up radiology images is time consuming and expensive, often meaning that images are only marked up once before radiotherapy begins, and once again at the end of the treatment cycle. InnerEye serves to enhance the workflow of healthcare professionals, such as radiologists, surgeons, and medical physicists by analyzing images pixel-by-pixel to identify the exact position and size of the tumor as well as the healthy organs that surround it. This enables healthcare professionals to more effectively plan a patient's radiotherapy strategy or surgery navigation.

By making this process more effective and cost efficient, InnerEye patients can potentially receive "adaptive radiotherapy", with scanning, image markup, and therapy planning being done after every treatment session. In doing so, InnerEye can help identify which type of treatment works best by monitoring changes in tumor size.

InnerEye has been trained on scores of images from past patients that have been marked up by experienced health professionals, meaning its system should perform as well as a leading expert every time. Nevertheless, doctors retain full control of InnerEye's system, and can make adjustments to the software at any time until they are completely satisfied with the results they receive.

InnerEye is currently being used by the U.K.'s National Health Service for prostate cancer diagnosis and treatment, but could potentially benefit any health processes that use 3D imaging.

Potential Future: AI-Driven Health Monitoring

As AI-driven diagnostics technologies, offered by private companies, continue to improve in quality and decrease in price, they have become more and more widely available, and are increasingly being integrated into physical infrastructure in homes, workplaces, and hospitals. These technologies - which include computer vision, natural language processing, and predictive analytics, along with infrared sensors, accelerometers - collect individual data on body temperature and speech composition. Individuals also have the option to allow these diagnostic technologies to access data collected by their smartwatches or activity trackers in order to measure pulse as well as track sleep and exercise habits. Together, these devices enable continuous monitoring of almost every aspect of health and wellbeing, and are able to detect fever, heart attacks, and even strokes.

However, public sector health providers have been limited in their ability to integrate these devices into their practice. As a result, those who can afford it often seek out private health services, which offer digital consultations as well as AI-driven prescriptions, treatment, and diagnosis. There is an increasing culture of patient-driven care requests and advocacy. While the province has not allowed AI-driven prescriptions, it is increasingly common for clinics to operate through digital consultations, and are typically responsive to patient-initiated requests for prescriptions based on the analysis of their devices.