

# The Accessibility of AI: Innovation at Your Fingertips



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**T**he availability of datasets keeps growing exponentially. With this we are witnessing an escalation of available new life-altering systems. Some of these tools are highly autonomous and can perform functions with little to no human intervention. Self-driving cars, rockets that land upright on drone ships, computers that write poetry and perform their own music, tireless warehouse workers, and medical tools that are capable of making diagnostic decisions. These technologies use massive amounts of data, machine and deep learning with language processing, audio and visual processing algorithms all working in orchestration so they can form decisions on how to perform primary functions effectively.

## Artificial Intelligence Innovation

There is a fearful side of the AI conversation when we mention the robots taking our jobs or how The Terminator movie is going to become reality. But the more realistic outcome for now is that our AI counterparts are powerful tools we program that require our command and enhance our abilities. They make us better craftspeople, military personnel, or healthcare professionals and leave us available for higher-level intellectual tasks. Why does cyborg enhancement come to mind? Maybe I read and watch too much science fiction and we've all had life-imitates-art hammered into our psyches as a part of the culture. The technology we use every day is composed of electronic components that have been miniaturized to a minuscule scale. What was once many different tools performing dedicated functions now can live on one powerful device that easily serves up a laboratory of useful functions at your disposal and fits in our pocket. Because of this transformation, many tools are now powerful enough to run the computations required for AI models and algorithms making these everyday devices smarter and affordable. The pharma and medical field has the potential to be a leader in AI innovation.

**Disease identification and diagnosis:** studies show that AI is as accurate as healthcare professionals at analyzing medical imaging and diagnosing conditions and identifying disease.

**Optimizing personalized treatment and behavioral modification:** AI streamlines finding the appropriate drug combinations and dosing strategies based on the individual. This ultimately limits side effects and improves the quality and length of a patient's life.

**Synthesizing new drugs:** through deep learning, AI can speed up the discovery process. By programming a massive range of variables into an AI, it can make better predictions in turn sending new drugs to human trial in shorter timeframes.

**Clinical trial research, data analysis and recruitment for enrollment:** patients usually rely on their doctors to learn about applicable studies. Or they search on ClinicalTrials.gov, which contains more than 300,000 studies, a daunting task of trial and error. AI can help filter out 60%-80% of trials that the patient wasn't eligible for.

**Radiology and radiotherapy imaging diagnosis:** trained physicians manually review medical imaging to make a subjective assessment based on education and experience. AI, on the other hand, can recognize complex patterns and provide quantitative assessments almost instantly. When healthcare professionals are under intense workload, they may not have the time required to interpret every image with the same care. AI can increase efficacy and reduce errors.

**Wearables and Internet of Things:** great strides have been made in devices that can diagnose from home. The goal is to open up a HCP's schedule by ruling out unnecessary visits. During a pandemic, higher risk patients won't need to risk the visit if it is not needed.

**Epidemic outbreak modeling and prediction:** a Canadian start-up that uses AI to detect disease outbreaks was one of the first to initially raise concern for the outbreak of a respiratory illness in Wuhan, China. Now AI is used to determine many factors concerning COVID-19: where outbreaks will occur, what regions need hospital beds, patterns in spread and more.

## Man and Machine

What excites me about healthcare making strides in AI innovation is that it's at a time when the barrier of entry to learning the technology and cost of hardware to run it for our personal use has become attainable to more people. Many of the libraries and methods used for machine and deep learning are open-source and backed by great communities. These technologies are accessible to anyone with a desire to learn a human readable programming language like Python. An example of this is

interventional cardiologist Dr. Paul Lee who's affiliated with the NY Mount Sinai School of Medicine. After realizing he could one day be replaced by AI, he made the decision to be the one programming the AI and started taking online courses in Python, deep learning and computer vision techniques. Within two years of research and after compiling a reference library of images, he was able to train an AI to analyze and interpret coronary angiograms, detect blockages in patient arteries with high confidence levels, and help those patients reduce and prevent heart attack. With improvements made in the available libraries, he's able to run his code on a mobile device. Time otherwise spent analyzing these scans can now be spent focusing on other aspects of his practice. He was invited to present his research and findings at the American Heart Association Scientific Session in Philadelphia last year. Lee PC, Lee N, Pyo R. Abstract 12950: Convolutional neural networks for interpretation of coronary angiography. *Circulation*. 2019;140(suppl 1):A12950-A12950. [https://www.ahajournals.org/doi/10.1161/circ.140.suppl\\_1.12950](https://www.ahajournals.org/doi/10.1161/circ.140.suppl_1.12950).

Those with technical acumen should explore the many open platforms. Learn Python, at a minimum, it will help you work better with data. See if you can fold these techniques into your everyday workflow. If you don't have a desire to use these techniques, keep in the know of the latest innovations in ethical AI by checking out <https://openai.com>. Some of the ways we use AI in the Innovation Lab include sending sensor data, as part of one prototype, to the cloud for further analysis to detect patterns and improvement in patients' health over time. Another use has been to scan submitted video clips of walking patients to analyze and detect skeletal abnormalities.

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