

AI in Healthcare: Everything You Need to Know

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A study by Accenture has predicted that growth in the AI healthcare space is

expected to touch \$6.6 billion by 2021 with a CAGR of 40%

As on today, Artificial Intelligence and Machine Learning are well and truly poised to make the work of healthcare providers more logical & streamlined than repetitive. The technology is helping shape personalized healthcare services while significantly reducing the time to look for information that is critical to decision making and facilitating better care for patients.

Artificial Intelligence in Healthcare has immense potential to improve costs, the quality of services, and access to them. Here's how -

Overview of Artificial Intelligence in Healthcare

According to CIO, AI-powered healthcare are driving meaningful changes across the entire patient journey. Applications of Artificial Intelligence in Healthcare primarily revolves around-

1. Making healthcare providers efficient and productive
2. Providing a far more streamlined and robust experience to in patients and out patients
3. Making back-end processes effective and organized

But, clinical applications of Artificial Intelligence in Healthcare are rare - a trend we expect to change soon. Here are a few potential and current implementations of AI and Machine Learning in Healthcare.

Virtual Assistants for Patients and

Healthcare Workers

The key driver for adopting virtual nursing assistants has been the shortage of medical labor that often leads to pressure on the available healthcare workers. A virtual assistant powered by AI can enhance the communication between patient as well as the care provider while leading to better consumer experience and reduced physician burnout. With a voice recognition technology, voice biometrics, EHR integrations, and a speaker customized for healthcare, Nuance Communication had unveiled an artificial virtual assistant in September 2017.

When physicians appear to be taking time with their patients, the latter end up feeling cared for and carry a sense of contentment. A virtual assistant can carry out initial dialog between the patient and healthcare provider, setting the tone for more in-depth conversations later. By doing so, a virtual assistant for healthcare can take some responsibilities off the shoulders of physicians, allowing them to focus on delivering better service and care.

AI-Powered Chatbots

Chatbots powered by AI can make a world of difference to healthcare. A report by Juniper Research states that chatbots will be responsible for saving \$8 billion per annum of costs by 2022 for Retail, e-Commerce, Banking, and Healthcare. As inquiry resolution times get reduced, and the initial communication gets automated, the healthcare sector can expect massive cost savings through the use of chatbots.

AI-powered bots can help physicians in healthcare diagnosis through a series of questions where users select their answers from a predefined set of choices and are then recommended a course of action accordingly. The same research study also predicts that the success of chatbot interactions where no human interventions take place will go up to 75% in 2022 from 12% in 2017.

Knowledge management systems will become a critical part of chatbots for AI where the common questions and answers would be accumulated throughout the life of a solution, aiding in the learning process of the chatbot. You can read more about how conversational AI will impact healthcare in [this article](#).

Robots for Explaining Lab Results

In 2017, Scanadu developed [doc.ai](#). The application takes away one task from doctors and assigns it to the AI – the job of interpreting lab results. The company's first software solution makes sense out of blood tests. The application was planned to interpret genetic tests, and then other tests would be added to the list.



The platform works with [natural language processing](#) to converse with the patients via a mobile app and explains their lab results to them in a way they can understand. The technology is powered by AI and relieves doctors from their not-so-favorite part of the healthcare process, allowing them to focus on the more

critical aspects. Walter DeBrouwer, the founder of Scanadu, believes that these applications of Artificial Intelligence in Healthcare are only expanding the decision tools in the domain, enabling physicians to avail necessary help in order to make critical decisions.

Robot-Assisted Surgery

Microsurgical procedures in the healthcare space require precision and accuracy. Robots powered with AI are assisting physicians to help reduce variations that could affect patient health and recovery in the longer term. Robot-aided procedures can compensate for the differences in the skills of physicians in cases of new or difficult surgeries, which often lead to implications for the health of the patient, or costs of the procedure.

Robots are known to have skills humans don't. With robot-assisted surgeries, doctors can eliminate any risks of imprecision or anomalies in the procedure. As machine learning and data analytics reach new heights for healthcare, robots will be able to uncover critical insights and best practices for any surgery.

Inefficiencies and poor outcomes will be substantially reduced, ultimately leading to better patient care and service delivery. With robots conducting or assisting doctors in surgeries, training costs can be saved, and routine tasks can be automated with precision.

Automated Image Diagnosis with AI/ML

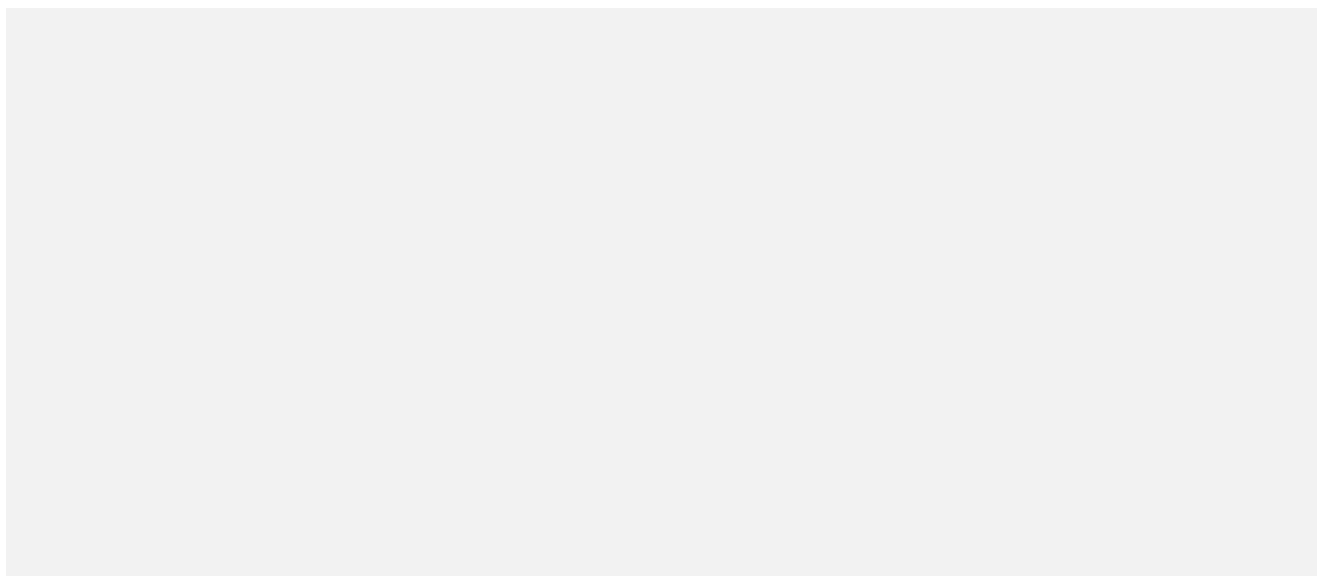
Medical image diagnosis is another AI use case in healthcare. One of the most significant issues that medical practitioners face is sifting through the volume of information available to them, thanks to EMRs and EHRs. This data also includes imaging data apart from procedure reports, pathology reports, downloaded data, etc. In the future, patients will send even more data through their remote portals,

including images of the wound site to check if there is a need for an in-person checkup after a healing period.

These images can now be potentially scanned and assessed by an AI-powered system. X-rays are only one piece of the puzzle when it comes to medical imaging. We also have MRIs, CT scans, and ultrasounds. IBM's celebrated implementation of AI, Watson, already has applications of AI in healthcare. IBM's AI-powered radiology tool, **IBM Watson Imaging Clinical Review** sets the ground for more innovation to happen in the image diagnosis aspect of healthcare.

Personal Health Companions Powered by AI

People today need medical assistance in the comfort of their homes, for as long as they can. For the first preliminary overview of any symptom, personal health companions have become popular amongst people all around the world. Babylon Health is a UK-based start-up that has developed a chatbot for the early prevention and diagnosis of diseases. When the application receives a symptom explanation from a user, it compares the same to its database and recommends an appropriate course of action based on the history of the patient, his circumstances, and the symptoms he reports.





Similarly, Berlin-based Ada is a similar companion that uses AI and ML to track the patient's health and provides insights and understanding to the patient for any changes in their health.

Oncology – Detecting skin cancer with AI

Artificial Intelligence in Healthcare also talks about deep learning. Researchers are using deep learning to train machines to identify cancerous tissues with an accuracy comparable to a trained physicist. Deep learning holds unique value in detecting cancer as it can help achieve higher diagnostic accuracy in comparison to domain experts.

One of the current applications of deep learning in healthcare is the detection of cancer from gene expression data, something researchers from Oregon State University were able to do with deep learning. This use case opens us to the long-ranging and critical impact of deep learning on the oncology industry today

and in future.

AI in Pathology

Pathology concerns with the diagnosis of diseases based on the analysis of bodily fluids such as blood and urine. Machine learning in healthcare can help enhance the efforts in pathology often traditionally left to pathologists as they often have to evaluate multiple images in order to reach a diagnosis after finding any trace of abnormalities. With help from machine learning and deep learning, pathologists' efforts can be streamlined, and the accuracy in decision making can be improved.



While these networks and AI-powered solutions can assist pathologists, we need to clarify that artificial intelligence is not replacing physicians in this regard any sooner. Deep learning networks can only become so efficient when they get experience and learning over a period, just as physicians do.

AI in Healthcare, specifically in pathology, can help replace the need for physical samples of tissues by improving upon the available radiology tools – making them more accurate and detailed.

Rare Diseases Detection with AI

Rare diseases pose challenges for AI. While their detection is one of them, we also need to ensure our healthcare systems are not inclined towards detecting rare diseases when the diagnosis could be something commonplace. Through a series of neural networks, AI is helping healthcare providers achieve this balance. Facial recognition software is combined with machine learning to detect patterns in facial expressions that point us towards the possibility of a rare disease.

Face2gene is a genetic search and reference application for physicians. In this solution, AI scans through the image data of a patient's face and spots signs of genetic disorders such as Down's Syndrome.

Another similar solution is Moon developed by Diploid which enables early diagnosis of rare diseases through the software, allowing doctors to begin early treatment. Artificial Intelligence in Healthcare carries special significance in detecting rare diseases earlier than they usually could be.

Cybersecurity Applications of AI in Healthcare

Errors and frauds mar the landscape of healthcare. Therefore, one of the more critical applications of AI in healthcare is ensuring the security of data and solutions. Fraud and breach detection traditionally relied on running rules and reviewing systems manually. However, as AI has become poised to help detect breaches, it is estimated that \$17 billion can be saved annually by improving the speed of fraud detection.

Cybersecurity has become a significant concern for healthcare organizations, threatening to cost them \$380 per patient record. Using Artificial Intelligence in Healthcare for monitoring and detecting security anomalies can create trust and loyalty as the foundation for more digital disruption in the healthcare space.

Medication Management with AI and ML

The **AiCure** app developed by The National Institutes of Health helps monitor medication by a patient. With a motto of “Intelligent Observation. Better Care.”, the application enables autonomous confirmation that a patient is regularly consuming the prescribed medication. A smartphone’s webcam is integrated with AI to manage medicines for the patient.

Frequent users of the system could be patients with severe medical conditions, those who voluntarily miss their medication, and participants of clinical trials. There are benefits of medication management in dealing with patients who have mental conditions that stop them from regularly taking necessary medicines prescribed by their physician.

Health Monitoring with AI and Wearables

Health monitoring is already a widespread application of AI in Healthcare. Wearable health trackers such as those offered by Apple, Fitbit, and Garmin monitor activity and heart rates. These wearables are then in a position to send all of the data forward to an AI system, bringing in more insights and information about the ideal activity requirement of a person.

These systems can detect workout patterns and send alerts when someone misses out their workout routine. The needs and habits of a patient can be recorded and made available to them when need be, improving the overall healthcare

experience. For instance, if a patient needs to avoid heavy cardiac workout, they can be notified of the same when high levels of activity are detected.

The role of Artificial Intelligence in Healthcare is not limited to these. As trends emerge and physicians look for newer ways to improve healthcare services and experiences for patients, we will have novel concepts turning into reality. While the healthcare space is buzzing with innovation, it will be a while before these systems can be made affordable, scalable, and available to all healthcare institutions.

In the complex world of healthcare, Artificial Intelligence can support providers with faster service, early diagnosis, and data analysis to identify genetic information to predispose someone to a particular disease. Saving seconds could mean saving lives in the healthcare space & that is the reason why AI and ML hold such significance for every patient.

AI working hand-in-hand with doctors, physicians and healthcare providers is likely to continue to be the current course for a while, and eventually it will get to a point where it will be a crawl-walk-run endeavour with less complex tasks being addressed by bots. At Maruti Techlabs, we work extensively with leading hospitals and healthcare providers by assisting them in deploying virtual assistants that address appointment booking, medical diagnosis, data entry, in-patient and out-patient query addressal and automate customer support through the use of intelligent chatbots and **Robotic Process Automation**.

Get in touch with us today to learn more about how we are assisting hospitals in scaling their operations and customer support.

About the Author



Mitul Makadia is Founder of **Maruti Techlabs** and a true technophile. With his industry experience, he has rapidly developed Maruti Techlabs in specialized services like Chatbot Development, Artificial Intelligence, Natural Language Processing and Machine Learning. Makadia has considerable expertise in Chatbot Development and NLP.

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