AI Applications In healthcare

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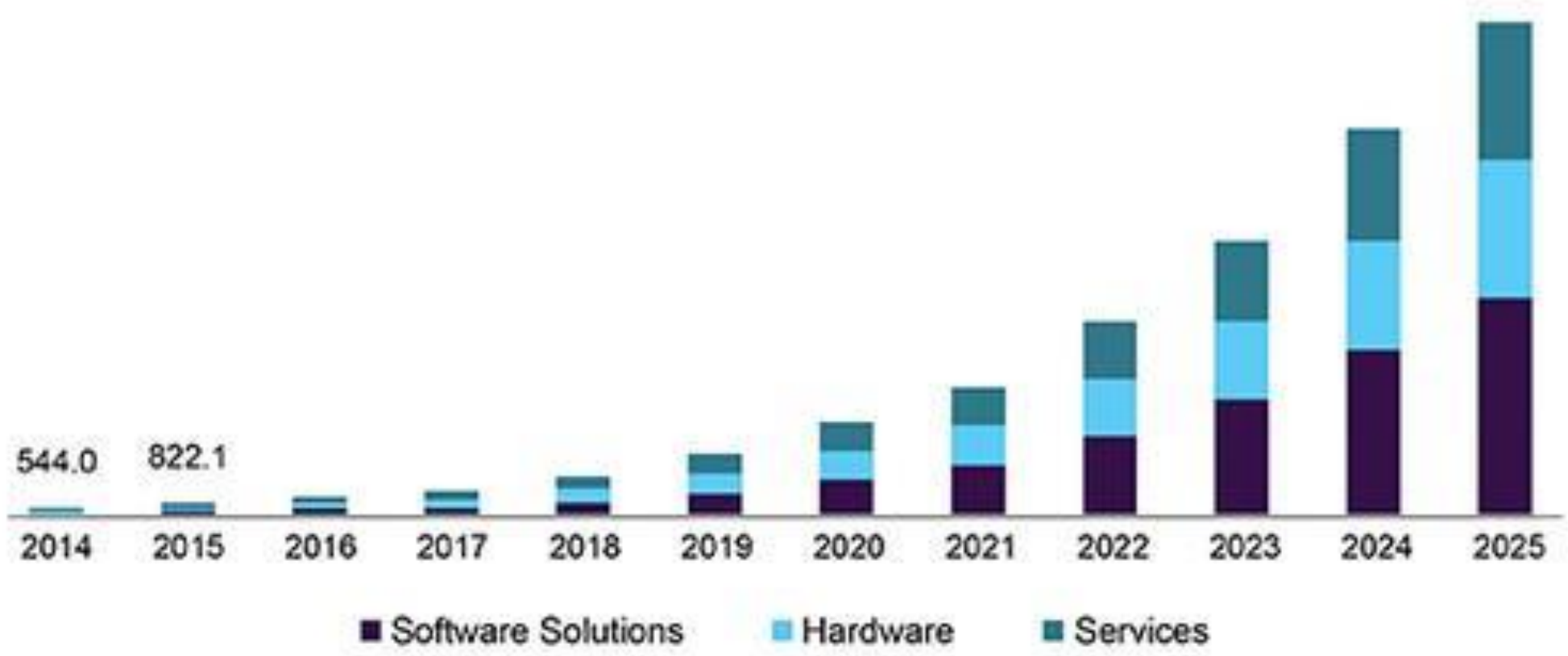
Overview

- **Artificial intelligence** simplifies the lives of patients, doctors and hospital administrators by performing tasks that are typically done by humans, but in less time and at a fraction of the cost.

- One of the world's highest-growth industries, the AI sector was valued at about $600 million in 2014 and is projected to reach a **$150 billion by 2026.**

- AI has countless applications in healthcare. Whether it’s being used to discover links between genetic codes, to power surgical robots or even to maximize hospital efficiency, AI has been a Key player to the healthcare industry.

U.S. artificial intelligence in healthcare market size, by component, 2014 - 2025 (USD Million)



Source: www.grandviewresearch.com

AI Applications in healthcare

In 2015, misdiagnosing illness and medical error accounted for 10% for all US deaths. In light of that, the promise of improving the diagnostic process is one of AI's most exciting healthcare applications.

Incomplete medical histories and large case loads can lead to deadly human errors. Immune to those variables, AI can predict and diagnose disease at a faster rate than most medical professionals. In one study, for example, an AI model using algorithms and deep learning diagnosed breast cancer at a higher rate than 11 pathologists.

AI applications in efficiently diagnose and reduce error

PATHAI

MORE ACCURATE CANCER DIAGNOSIS WITH AI

- **PathAI** is developing machine learning technology to assist pathologists in making more accurate diagnoses. The company's current goals include reducing error in cancer diagnosis and developing methods for individualized medical treatment.
- **PathAI** has worked with drug developers like Bristol-Myers Squibb and organizations like the Bill & Melinda Gates Foundation to expand its AI technology into other healthcare industries.

ENLITIC

AI DEEP LEARNING FOR ACTIONABLE INSIGHTS

- **Enlitic** develops deep learning medical tools to streamline radiology diagnoses. the company's deep learning platform analyzes unstructured medical data (radiology images, blood tests, ekgs, genomics, patient medical history) to give doctors better insight into a patient's real-time needs.
- **MIT** named **Enlitic** the 5th smartest artificial intelligence company in the world, ranking above Facebook and Microsoft

BETH ISRAEL DEACONESS MEDICAL CENTER

DIAGNOSING DEADLY BLOOD DISEASES FASTER

- **Harvard university**'s teaching hospital, **beth Israel deaconess medical center** is using artificial intelligence to diagnose potentially deadly blood diseases at a very early stage.
- Doctors are using AI-enhanced microscopes to scan for harmful **bacterias** (like E. Coli and staphylococcus) in blood samples at a faster rate than is possible using manual scanning. The scientists used **25,000 images** of blood samples to teach the machines how to search for bacteria. The machines then learned how to identify and predict harmful bacteria in blood with **95% accuracy.**

AI in developing new medicines

The drug development industry is bogged down by skyrocketing development costs and research that takes thousands of human hours. It costs about **2.6$ billion** to put each drug through clinical trials, and only 10% of those drugs are successfully brought to market. Due to breakthroughs in technology, biopharmaceutical companies are quickly taking notice of the efficiency, accuracy and knowledge that AI can provide.

BIOXCEL THERAPEUTICS

AI IN BIOPHARMACEUTICAL DEVELOPMENT

- **Bioxcel therapeutics** uses AI to identify and develop new medicines in the fields of immuno-oncology and neuroscience. Additionally, the company's drug re-innovation program employs ai to find new applications for existing drugs or to identify new patients.
- **Bioxcel therapeutics'** work in ai-based drug development was named as one of the "most innovative healthcare AI developments of 2019."

BERG HEALTH

TREATING RARE DISEASE WITH AI

- **BERG** is a clinical-stage, ai-based biotech platform that maps diseases to accelerate the discovery and development of breakthrough medicines. By combining its “interrogative biology” approach with traditional R&D, BERG can develop more robust product candidates that fight rare diseases.
- **BERG** recently presented its findings on parkinson’s disease treatment, they used AI to find links between chemicals in the human body that were previously unknown at the neuroscience 2018 conference.

XTALPI

AI, CLOUD-BASED DIGITAL DRUG DISCOVERY

- Combining AI, the cloud and quantum physics, **Xtalpi's** id4 platform predicts the chemical and pharmaceutical properties of small-molecule candidates for drug design and development. Additionally, the company claims its **crystal structure prediction technology** (aka polymorph prediction) predicts complex molecular systems within days rather than weeks or months.
- **Xtalpi's** big-name investors include google, tencent and sequoia capital.

AI in streamlining patient experience

I. In the healthcare industry, time is money. Efficiently providing a seamless patient experience allows hospitals, clinics and physicians treat more patients on a daily basis.

II. New innovations in AI healthcare technology are streamlining the patient experience, helping hospital staff process millions, if not billions of data points, faster and more efficiently.

OLIVE

AUTOMATING HEALTHCARE'S MOST REPETITIVE PROCESSES

- **Olive's AI** platform is designed to automate the healthcare industry' most repetitive tasks, freeing up administrators to work on higher-level ones. The platform automates everything from eligibility checks to un-adjudicated claims and data migrations so staffers can focus on providing better patient service.
- **Olive's AI-AS-A-Service** easily integrates within a hospital's existing software and tools, eliminating the need for costly integrations or downtimes.

QVENTUS

REAL-TIME PATIENT FLOW OPTIMIZATION

- **Qventus** is an ai-based software platform that solves operational challenges, including those related to emergency rooms and patient safety. The company’s automated platform prioritizes patient illness/injury, tracks hospital waiting times and can even chart the fastest ambulance routes.
- **CB insights named qventus** one of its 100 most innovative **AI startups** for 2019 based on the company's work in automating and prioritizing patient safety.

BABYLON HEALTH

INCREASING ACCESS TO HEALTHCARE

- **Babylon** uses AI to provide personalized and interactive healthcare, including anytime face-to-face appointments with doctors. The company's ai-powered chatbot streamlines the review of a patient's symptoms, then recommends either a virtual check-in or a face-to-face visit with a healthcare professional.
- **Babylon** and **canada's telus health** teamed up to develop a canada-specific AI app that scans a patient's survey answers, then connects them via video with the right healthcare provider or professional.

AI in mining and managing medical data

I. Healthcare is widely considered one of the next big data frontiers to tame. Highly valuable information can sometimes get lost among the forest of trillions of data points, losing the industry around **$100 billion** a year. Additionally, the inability to connect important data points is slows the development of new drugs, preventative medicine and proper diagnosis.

II. Many in healthcare are turning to artificial intelligence as way to stop the data hemorrhaging. The technology breaks down data silos and connects in minutes information that used to take years to process.

TEMPUS

A MASSIVE DATA LIBRARY FOR PERSONALIZED HEALTH

- **Tempus** is using AI to sift through the world's largest collection of clinical and molecular data in order to personalize healthcare treatments. The company is developing ai tools that collect and analyze data in everything from genetic sequencing to image recognition, that can give physicians better insights into treatments and cures.
- **Tempus** is currently using its AI-driven data to tackle cancer research and treatment.

KENSCI

AI FOR HOSPITAL RISK PREDICTION

- **Kensci** combines big data and artificial intelligence to predict clinical, financial and operational risk by taking data from existing sources to foretell everything from who might get sick to what's driving up a hospital's healthcare costs.
- **Kensci** has partnered with some of the biggest names in tech and data science, including ge, KPMG, allscripts and microsoft.

PROSCIA

LOOKING AT THE DATA BEHIND THE MEDICAL IMAGE

- **Proscia** is a digital pathology platform that uses AI to detect patterns in cancer cells. The company's software helps pathology labs eliminate bottlenecks in data management and uses AI-powered image analysis to connect data points that support cancer discovery and treatment.
- **Proscia** recently raised $8.3M in series A funding that will be used to expand deployment of the company's digital pathology software and AI tools.

GOOGLE DEEPMIND HEALTH

ALERTING DOCTORS WHEN PATIENT'S ARE IN TROUBLE

- **Google's deepmind health** ai software is being used by hospitals all over the world to help move patients from testing to treatment more efficiently.
- **The deepmind health program** notifies doctors when a patient's health deteriorates and can even help in the diagnosis of ailments by combing its massive dataset for comparable symptoms. By collecting symptoms of a patient and inputting them into the deepmind platform, doctors can diagnose quickly and more effectively.

AI Robot-Assisted surgery

I. Popularity in **robot-assisted surgery** is skyrocketing. Hospitals are using **robots** to help with everything from minimally-invasive procedures to open heart surgery. According to the Mayo Clinic, robots help doctors perform complex procedures with a precision, flexibility and control that goes beyond human capabilities.

II. **Robots** equipped with cameras, mechanical arms and surgical instruments augment the experience, skill and knowledge of doctors to create a new kind of surgery. Surgeons control the mechanical arms while seated at a computer console while the robot gives the doctor a three dimensional, magnified view of the surgical site that surgeons could not get from relying on their eyes alone. The surgeon then leads other team members who work closely with the robot through the entire operation.

VICARIOUS SURGICAL

VIRTUAL REALITY-ENABLED ROBOTICS FOR SURGERY

- **Vicarious surgical** combines virtual reality with ai-enabled robots so surgeons can perform minimally invasive operations. Using the company’s technology, surgeons can virtually shrink and explore the inside of a patient's body in much more detail.
- **Vicarious surgical technology** impressed former microsoft chief **bill gates**, who invested in the company.

AURIS HEALTH

AI ROBOTS REVOLUTIONIZING ENDOSCOPY

- **Auris health** develops a variety of robots designed to improve endoscopies by employing the latest in micro-instrumentation, endoscope design, data science and AI. Consequently, doctors get a clearer view of a patient's illness from both a physical and data perspective.
- The company is developing AI robots to study **lung cancer,** with the goal of curing it someday.

ACCURAY

PRECISION ROBOTIC TREATMENT FOR TREATING CANCER

- **The Accuray** cyber-knife system uses robotic arms to precisely treat cancerous tumors all over the body. Using the robot's real-time tumor tracking capabilities, doctors and surgeons are able to treat only affected areas rather than the whole body.
- **The Accuray** cyber-knife robot uses 6D motion-sensing technology to aggressively track and attack cancerous tumors while saving healthy tissue.

Thank You