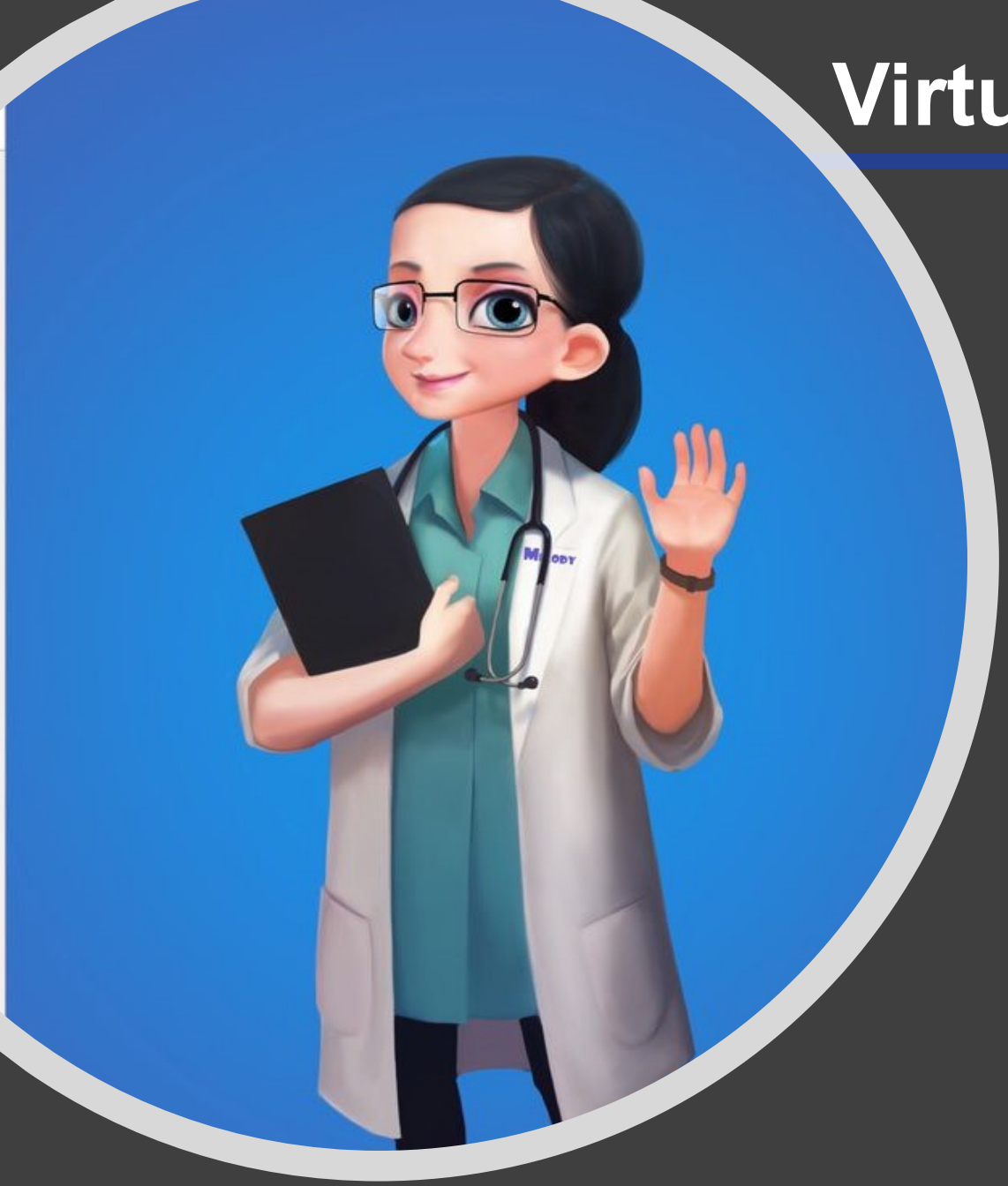
Virtual Health Assistants



The idea of a robotic chat agent isn't new. Eliza, the world's first chatbot, was created by MIT scientists 50 years ago as a Rogerian psychotherapist that could reflect and provide feedback on what patients said. Current examples of virtual health assistants include:

Florence acts as a virtual nurse helping patients with medication adherence and maintaining healthcare regimens. It also can help locate specialists and schedule appointments.

Eva helps women track their menstrual cycles and pregnancies.
Molly — an avatar-based virtual nurse assistant — connects patients with clinical advice to assess their condition and suggest appropriate follow-up.

HealthTap allows people to chat with a doctor and send pictures and copies of lab results to see if a problem requires additional care.

Your.MD asks users about symptoms and offers medically approved potential conditions and then makes referrals and schedules appointments.

Ada is an AI-powered technology, asking people how they're feeling and guiding them on next steps.

From an efficiency standpoint, chatbots offer a real opportunity to relieve staff of repetitive tasks. They also could help organizations deal with staff and budget constraints.

Reception & Bedside Bots

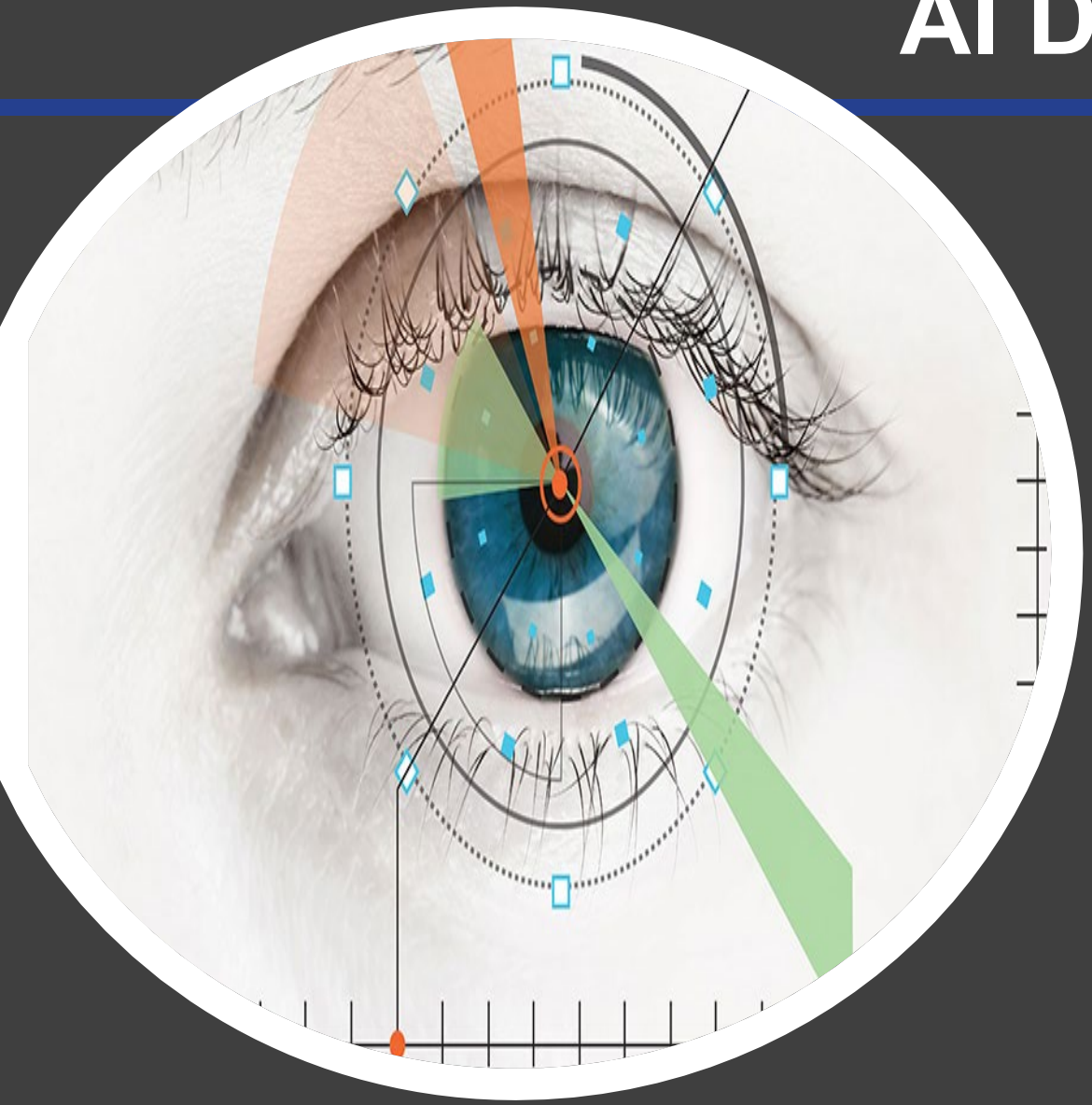
Belgian hospitals: Friendly droid is being used to greet patients at reception

Pepper robots are being tested at Belgian hospitals in Ostend and Liege

The humanoid robot uses cameras and sensors to detect human emotions

It will act as a greeter and interact with visitors entering the hospital

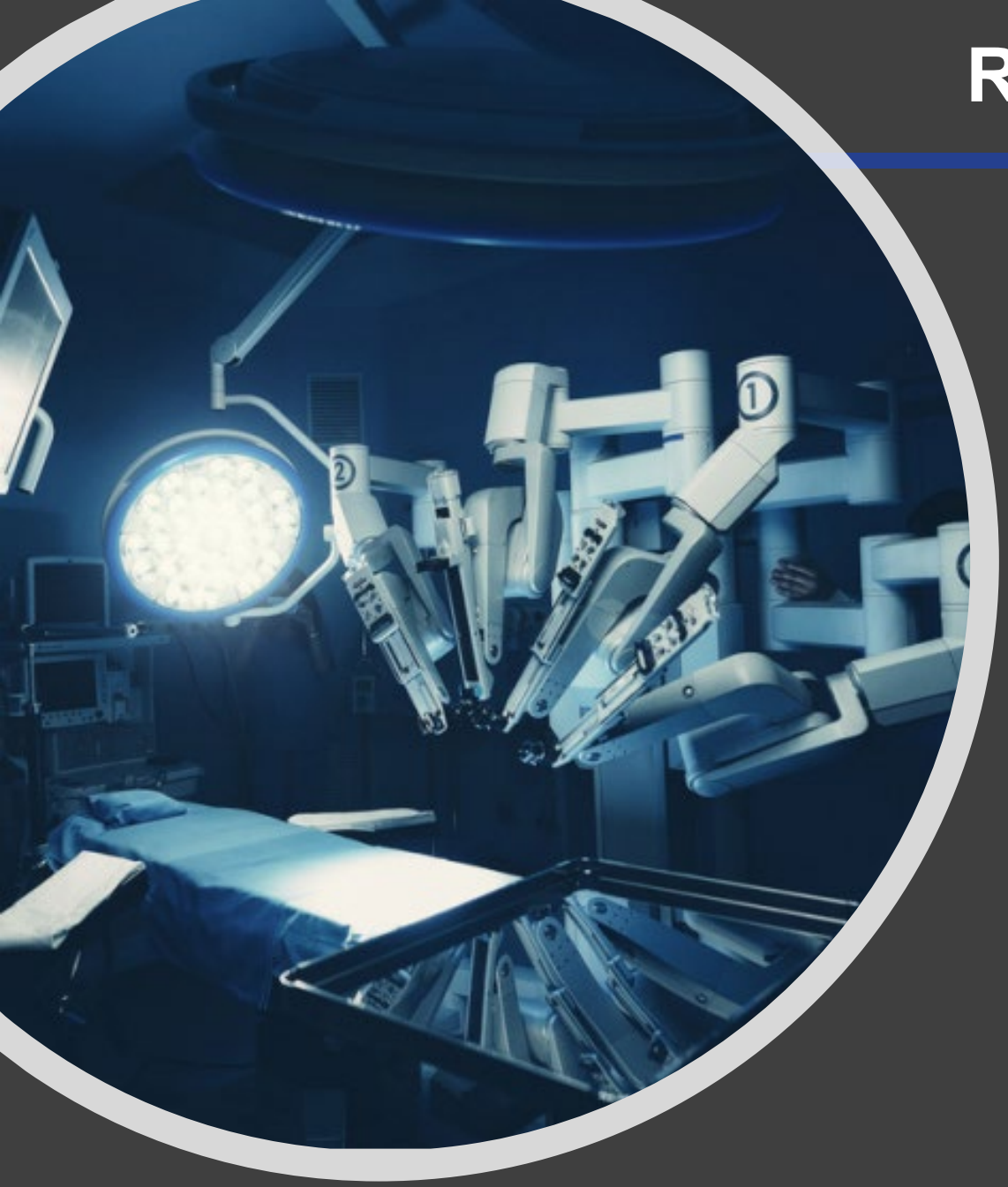
AI Diagnostics



- For the first time, the US Food and Drug Administration has approved an artificial intelligence diagnostic device that doesn’t need a specialized doctor to interpret the results. The software program, called IDx-DR, can detect a form of eye disease by looking at photos of the retina.

- It works like this: A nurse or doctor uploads photos of the patient’s retina taken with a special retinal camera. The IDx-DR software algorithm first indicates whether the image uploaded is high-quality enough to get a result. Then, it analyzes the images to determine whether the patient does or does not have diabetic retinopathy, a form of eye disease where too much blood sugar damages the blood vessels in the back of the eye. Diabetic retinopathy is the most common vision complication for people with diabetes, but is still fairly rare — there are about 200,00 cases per year.

Robot-Assisted Surgery



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.

How Does it Work:

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.

AI Powered EHRs

EHR have utilized AI for years, we just never called it AI. Programed triggers, defaults and rules are examples of EHRs using AI. The original concept was called “Charting by Exception”, which would auto navigate the documentation based on the previously text. For example, if user enters 47-year-old female, the system would filter out anything that could be applicable to only males, children, infants, etc.… If the next entry was “non-smoking” they system would remove the part of the examine applicable to someone who is a smoker. Most have also seen or used smart text, which can drop in entire paragraphs with an entry of just a few initials. And finally, speech recognition has been around for years and is now evolving beyond just voice to text.

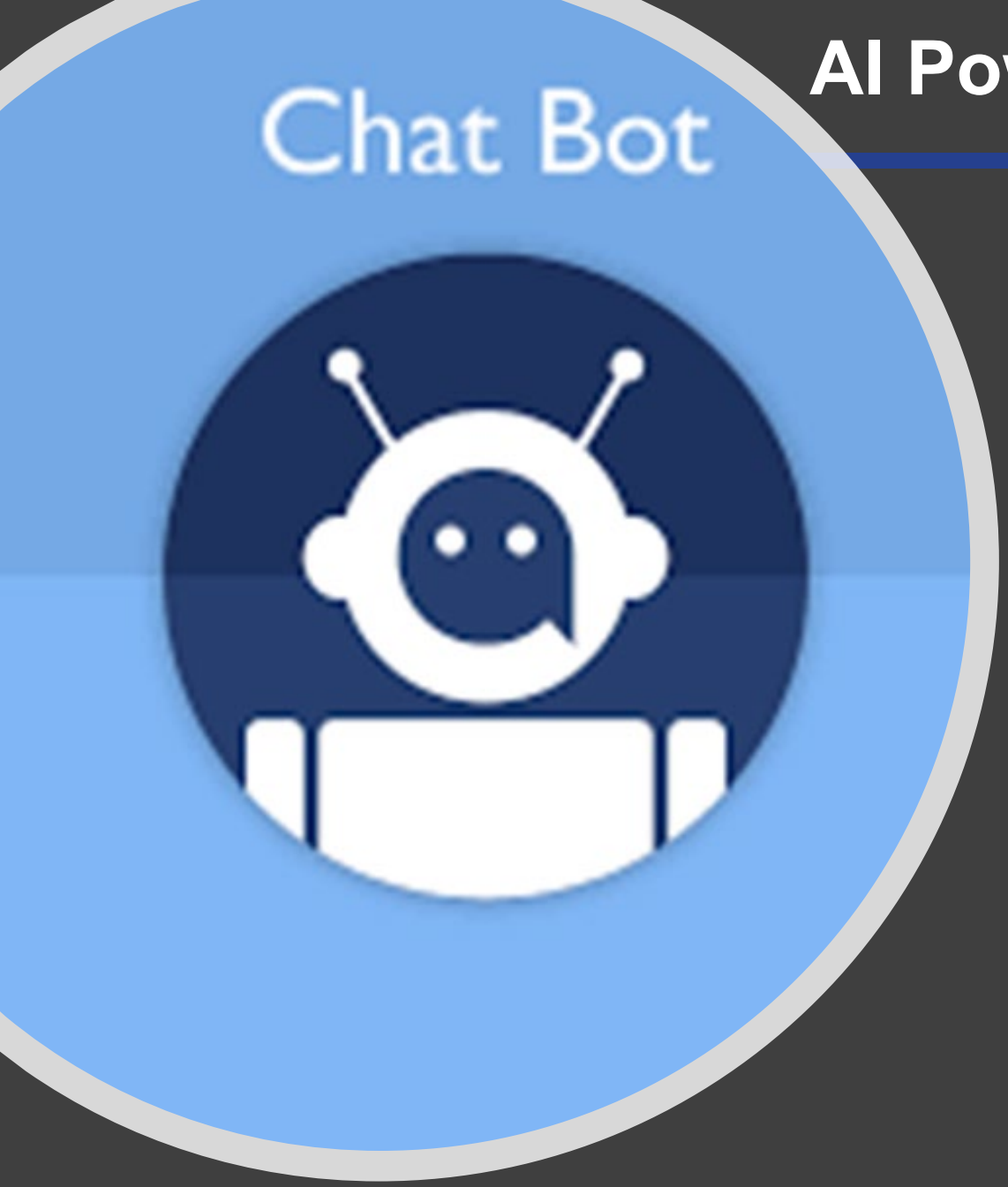
AI Powered Collections

HighRadius Corporation launches the FIRST Artificial Intelligence-based machine learning platform to power their Integrated Receivables solution offerings for credit, collections, cash application, deductions, billing and payments.

Other examples include LexisNexis, providing powerful consumer data enabling practice to identify who is at risk for not paying and/or being slow to pay.

Text to pay alerts is also very common today

AI Powered Help Desk Support

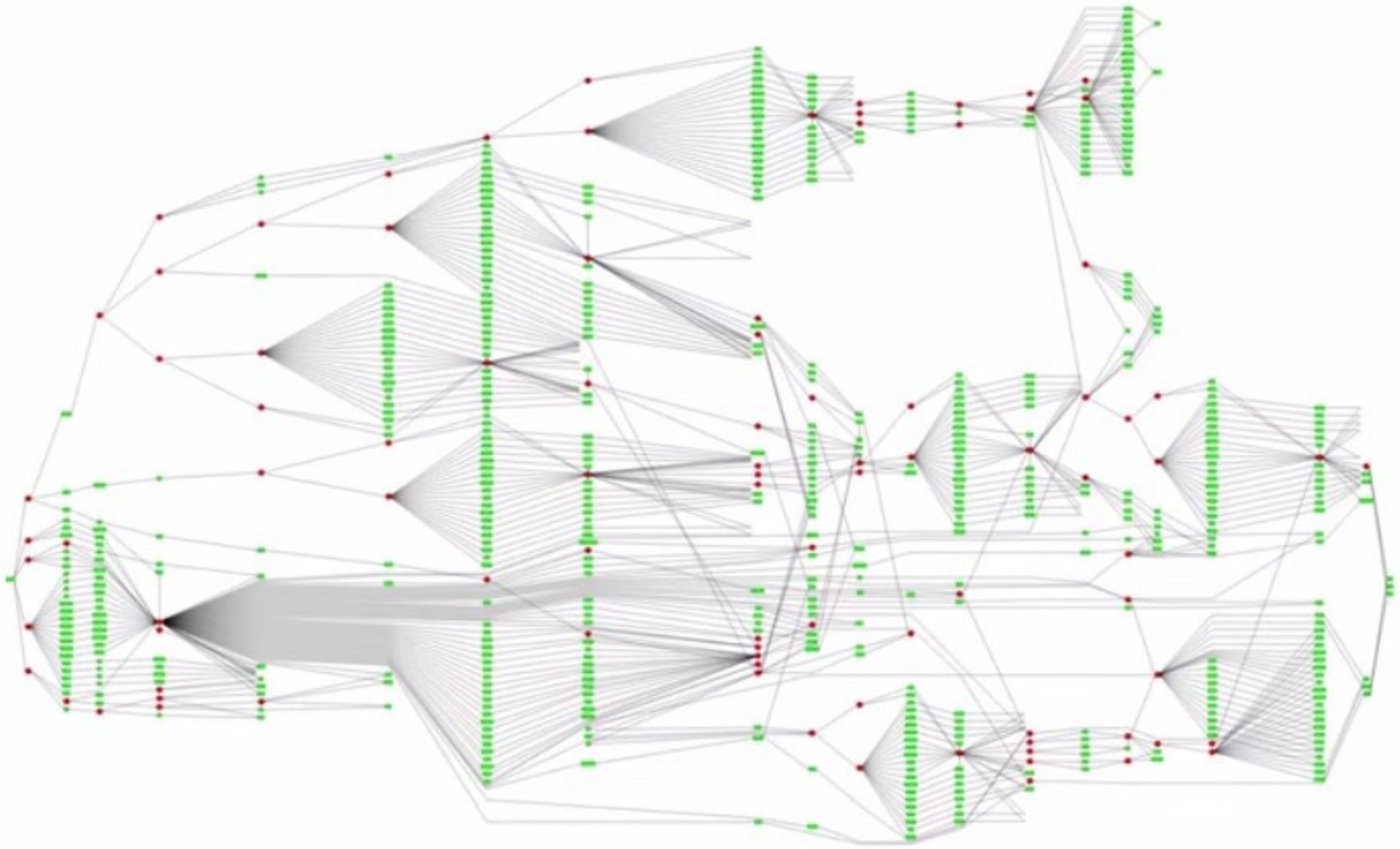


Using Chat Bots to manage tier one IT support calls and to perform self healing transactions. Improves customer support by providing a means for self-help

Stat: 80% of clinicians report being "impeded" by inadequate tech support, and that most help desks are falling short of the needs of healthcare systems. Source: Black Book Report

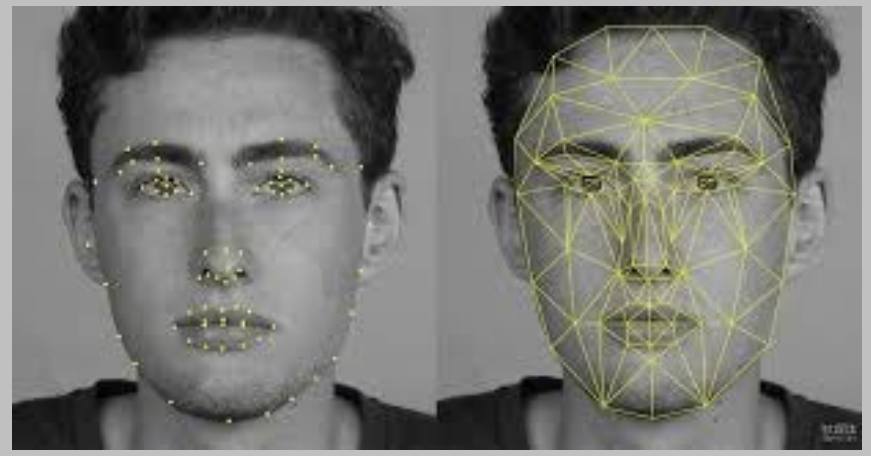
How it works: See next slide

Illustration of Chat Bot Logic…



Facial Recognition

- Detection of non-employees interacting with PHI or entering into secure areas
- Advanced knowledge of patients entering the building who may require special services (Wheelchair, translator)
- Triggers check in processes
- Alerting the campus of a hostile/threating patient
- Active shooter/terrorist in the area



AI Legal and Ethical Concerns…

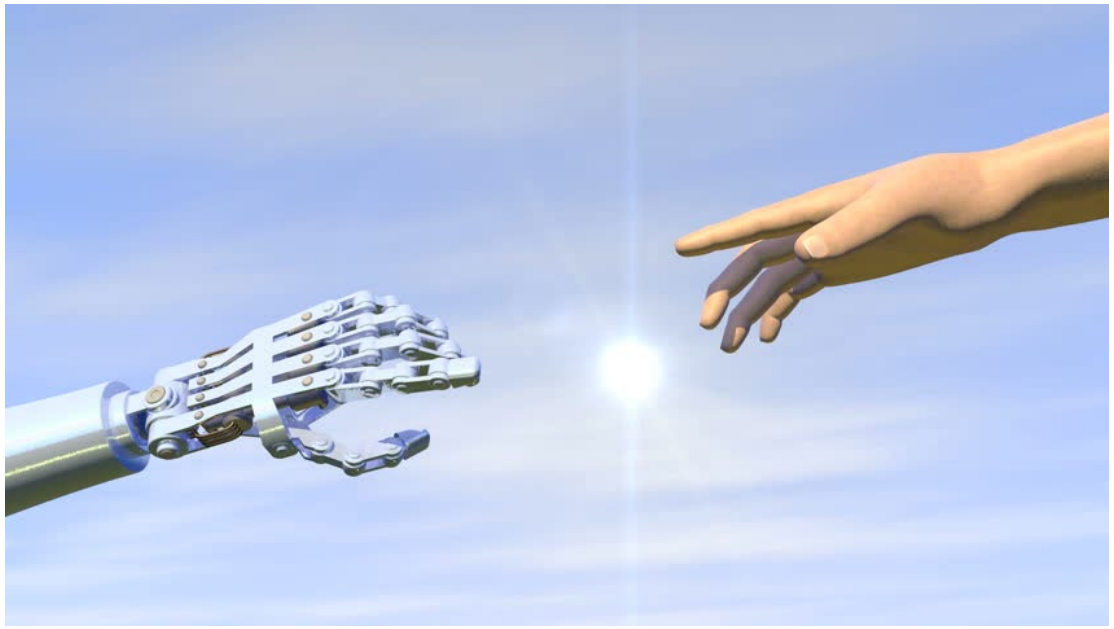
- When AI shows bias or acts racist (see: Microsoft Tay)
- Inequality - How do we distribute the wealth created by machines?
- Evil AI (Cures cancer by killing all humans)
- AI Rights (Can non-humans have rights? A: See Corporations)
- Humanity (How do machines affect our behavior and interaction?)
- IP developed by AI (Who owns it?)
- Causing harm (Who is at fault)
- Privacy and Consent (Facial recognition, tagging)
- AI can now predict the propensity to pay (Are these patients treated differently?)
- AI can now predict the propensity to commit crimes (Should it be for employment screening?)
- Security - How do we keep AI safe from adversaries?
- Limitation - Requires access to the cloud and to an enormous amounts of data

https://www.researchgate.net/publication/320826467_Exploring_Legal_Ethical_and_Policy_Implications_of_Artificial_Intelligence

AI Implementation and Adoption

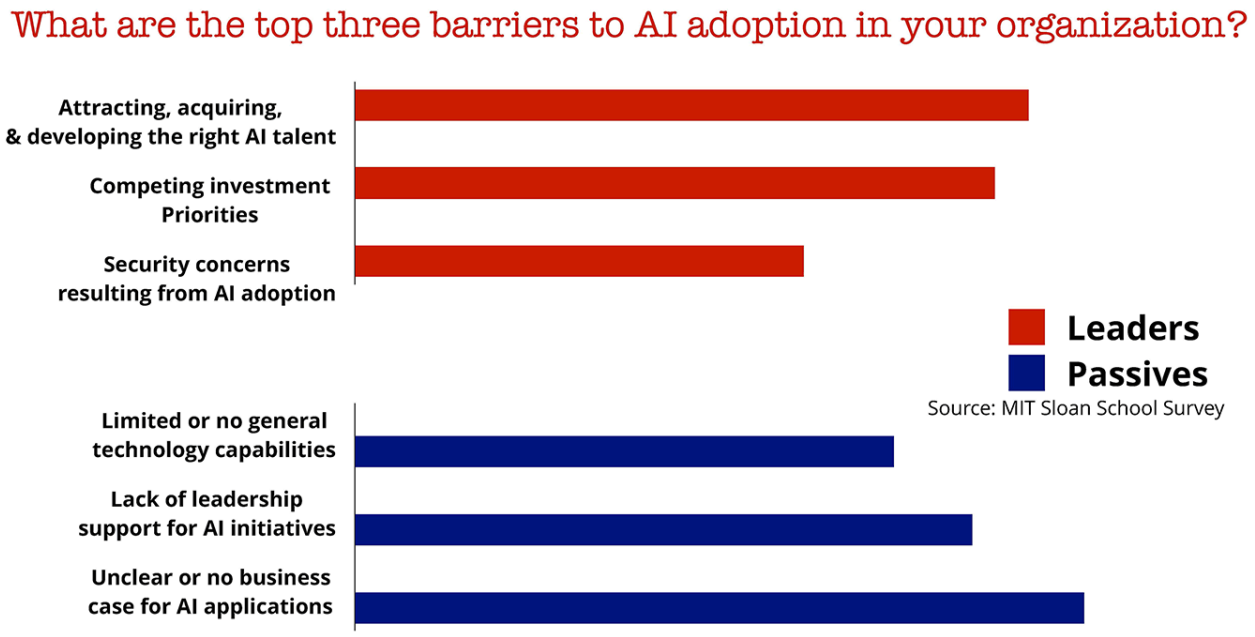
AI is beginning to play a role in transforming health care, in and out of the clinical setting. The opportunities and limitations is just being explored. However, there are significant challenges in this field that include:

- The acceptance of AI at the point of care
- The availability of quality data from which to build and maintain AI applications.
- The missing data streams.
- The limitations of AI methods in health and health care software applications.



Top Barriers to Implementing AI

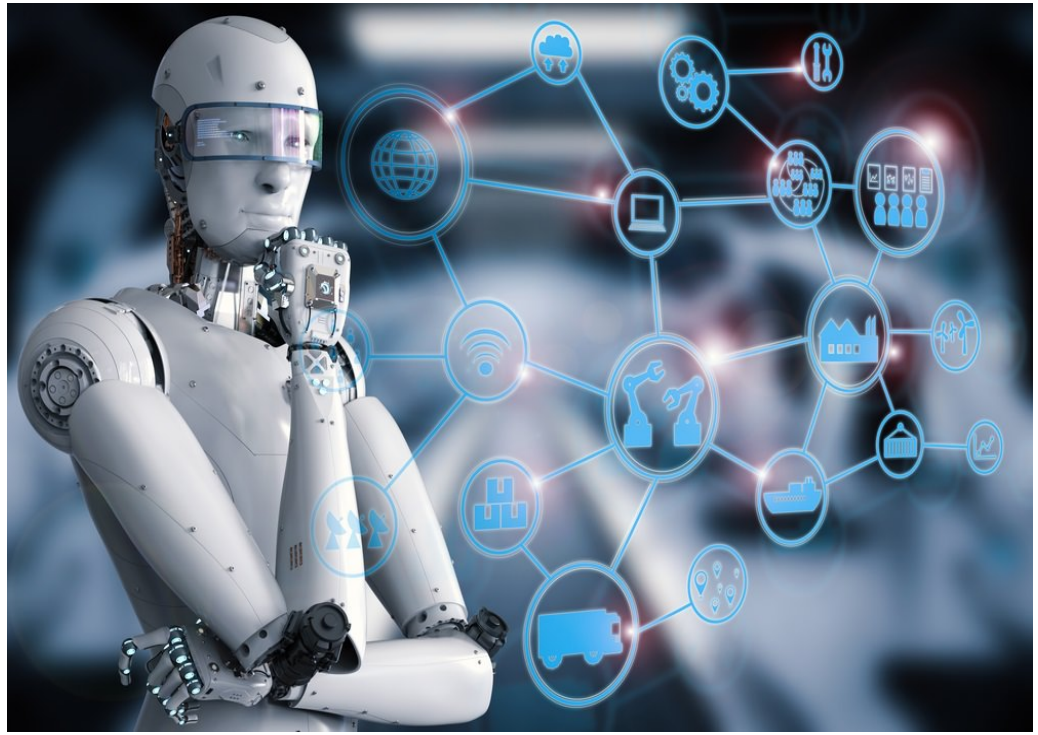
- While AI technology has improved significantly in recent years, it doesn't always live up to the hype.
- Organizations continue to face technological, cultural, and organizational challenges to their AI initiatives.



Where to Start…

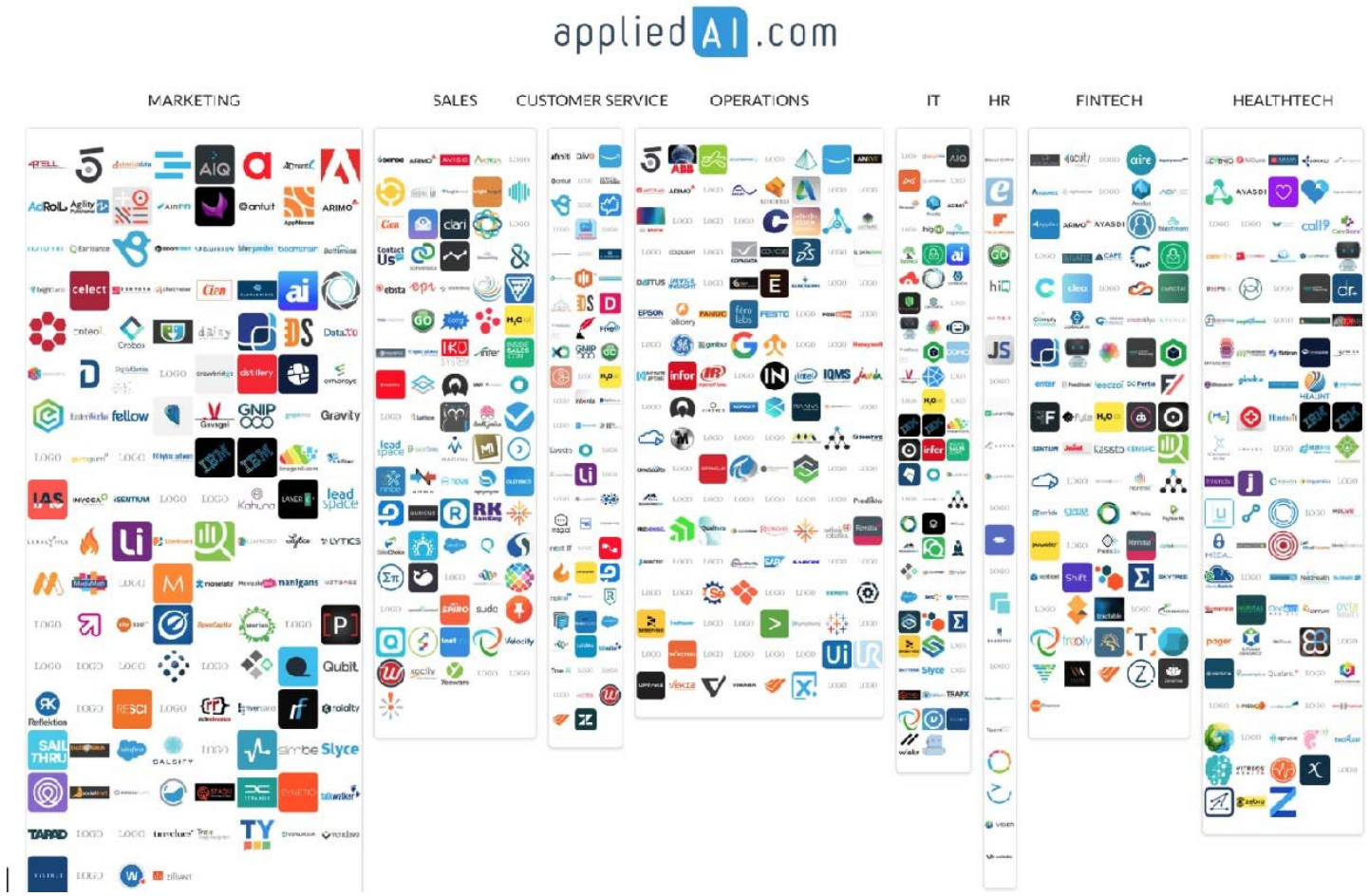
10 Step Plan

1. Learn and research AI (See Resource Slide)
2. Create awareness
3. Change mindset based on reaction from awareness campaigns
4. Educate leadership
5. Start off setting low expectations
6. Identify easy wins (Most Critical)
7. Embrace cloud computing
8. Form a workgroup
9. Identify gaps in data / capabilities
10. Consider enlisting a third-party expert to transfer knowledge



Working with AI Vendors

License or Co-development
Who owns the IP rights
Royalty Agreements
Scope of Work
Acceptance Agreements
Payment Terms
Late Fees
Documentation of programing and ERD
Price Escalation / Caps
Cyber Security
Patient Safety / Liabilities
Warranty
Termination
Data Ownership
Data Migrations
Version
Venue / Governing Law for Disputes



- ***Short-term:*** **Focus on current digital capabilities and proven technology solutions already available on the market. Avoid the temptation to build an AI solution or co-development. The key is to get an early win.**

- ***Medium-term:*** **Test the waters with emerging but still relatively immature AI to prove its value in key business use cases before scaling. (Ex: deep learning AI Chatbots and service bots)**

- ***Long-term:*** **Work with a third party to solve a high-impact use case with bleeding-edge AI technology to potentially capture a sizable first-mover advantage.**

- **Consider working with experts or peers who have already started**

Real World Examples of AI in Use

Coker GROUP
Business Advisors for the Healthcare Industry

Flagler Hospital uses AI to create clinical pathways that enhance care and slash costs, lowered length of stay by two days and significantly reduced readmission rate. AI tools points to 2300 data elements within the EHR looking for common patterns

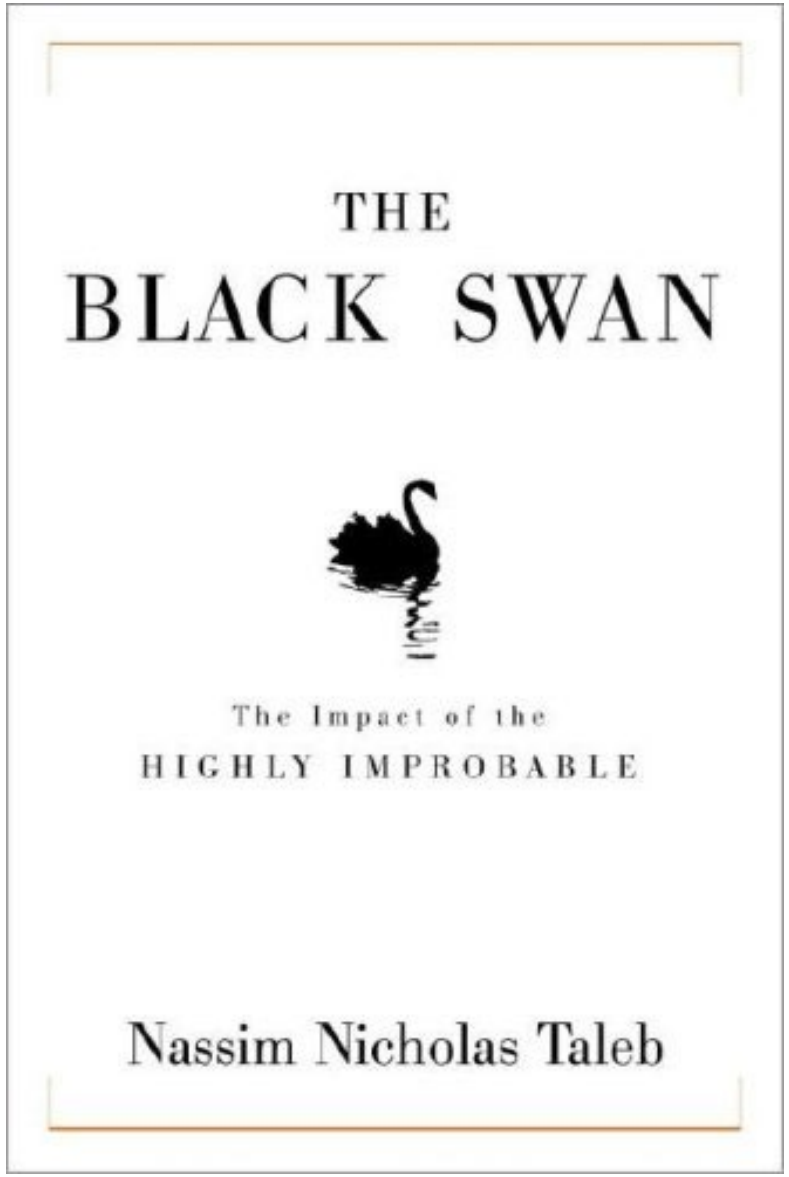
Mayo Clinic teamed up with Tempus, a health tech startup focused on developing personalized cancer care using a machine learning platform. The partnership involves Tempus conducting "molecular sequencing and analysis for 1,000 Mayo Clinic patients participating in studies relating to immunotherapy" for a number of cancer types including "lung cancer, melanoma, bladder cancer, breast cancer and lymphoma."

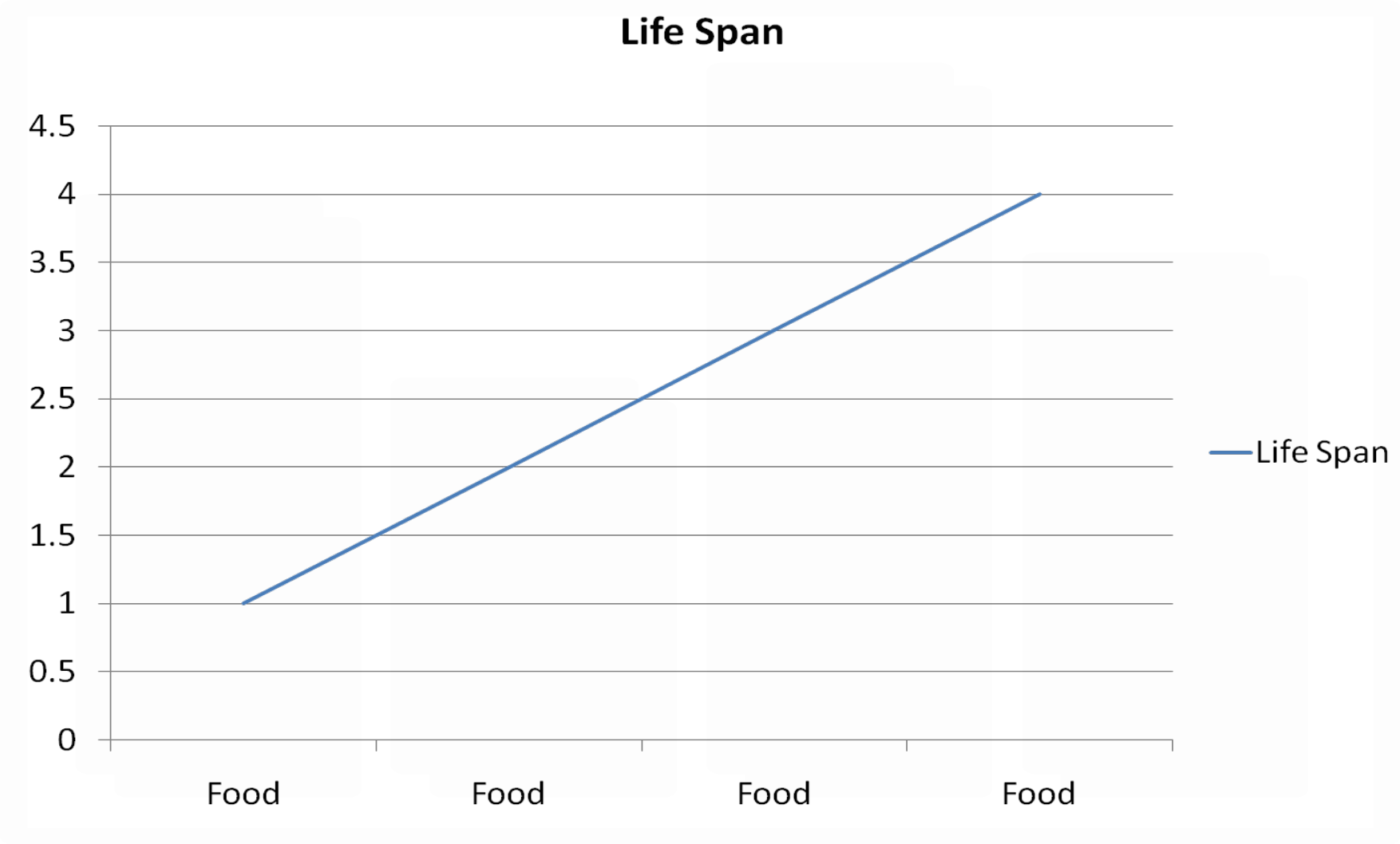
Cleveland Clinic and Microsoft announced a collaboration to help the medical center "identify potential at-risk patients under ICU care." Researchers used Cortana, Microsoft's AI digital assistant, to tap into predictive and advanced analytics.

Massachusetts General Hospital is currently in the early stages of its AI strategy with NVIDIA. The hospital aims to serve as a hub for AI applications in healthcare for the "detection, diagnosis, treatment and management of diseases.

Johns Hopkins Hospital announced the launch of a hospital command center that uses predictive analytics to support a more efficient operational flow. The Command Center which receives "500 messages per minute" and integrates data from "14 different Johns Hopkins IT systems" across 22 high-resolution, touch-screen enabled computer monitors.

Final Thought…




Life Span
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Food
Food
Food
Food
Life Span

AI Learning Resources…

The following are a number of online resources (free and paid) that you can use to get started:

- Udacity's Intro to AI course and Artificial Intelligence Nanodegree Program
- Stanford University's online lectures: Artificial Intelligence: Principles and Techniques
- edX's online AI course, offered through Columbia University
- Microsoft's open-source Cognitive Toolkit (previously known as CNTK) to help developers master deep-learning algorithms
- Google's open-source (OS) TensorFlow software library for machine intelligence
- AI Resources, an open-source code directory from the AI Access Foundation
- The Association for the Advancement of Artificial Intelligence (AAAI)'s Resources Page
- MonkeyLearn's Gentle Guide to Machine Learning
- Stephen Hawking and Elon Musk's Future of Life Institute
- OpenAI, an open industry and academia-wide deep-learning initiative

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Thank You!

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