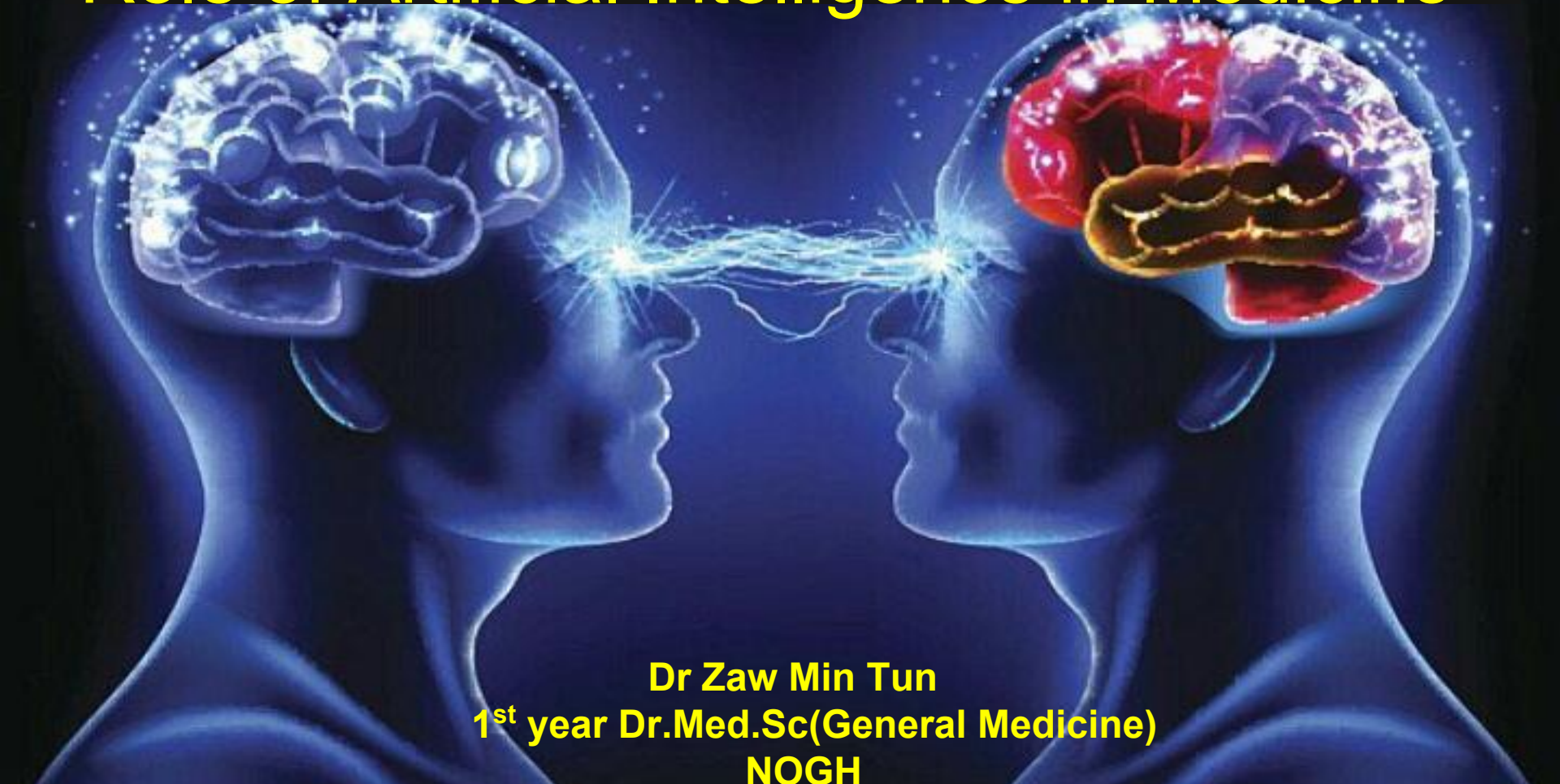
Role of Artificial Intelligence in Medicine



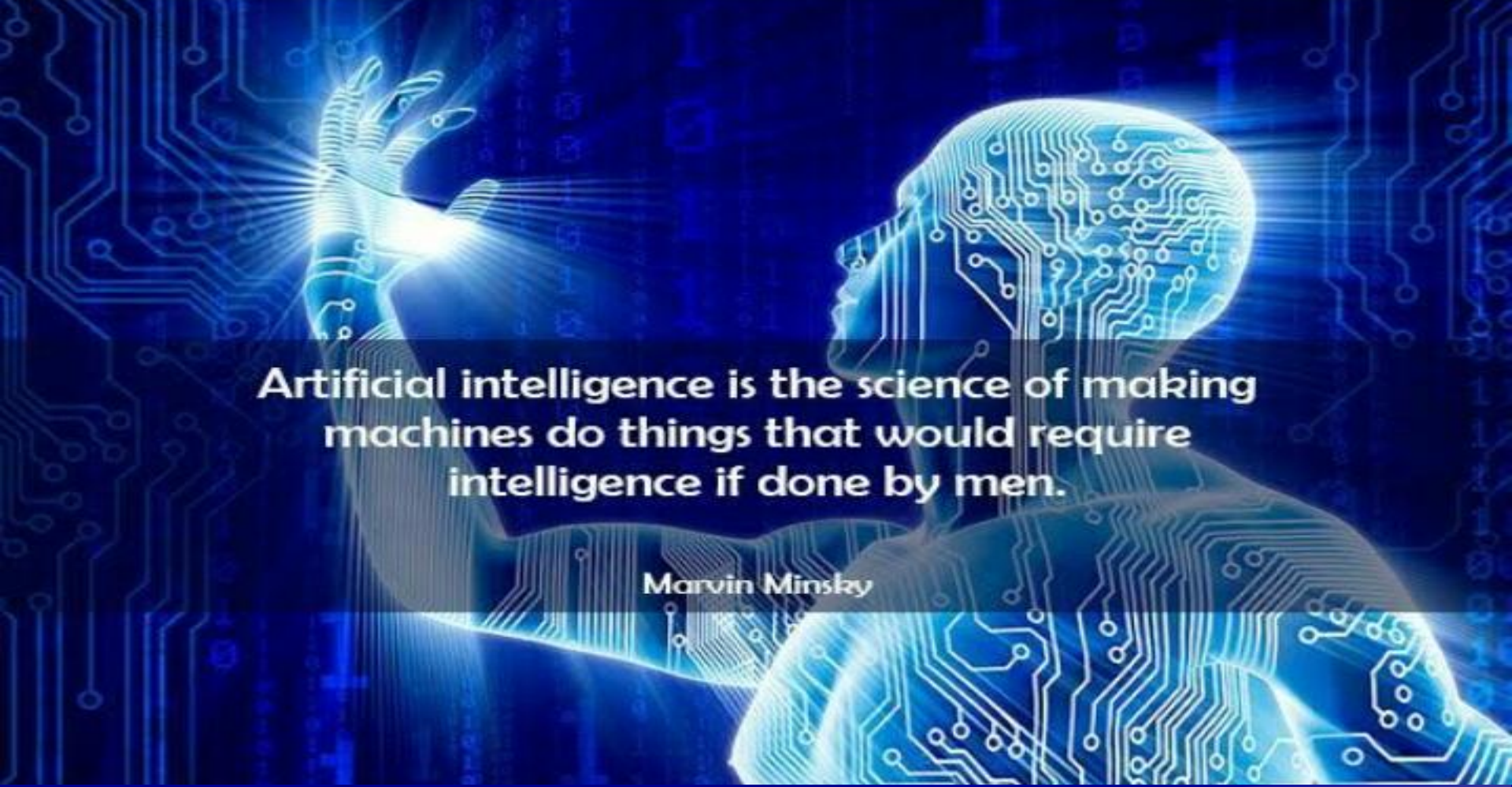
Dr Zaw Min Tun
1st year Dr.Med.Sc(General Medicine)
NOGH

- What is Artificial Intelligence?
- History
- Philosophy of AI
- Goals of AI
- Application of AI
- AI in medicine
- Human Intelligence Vs Artificial Intelligence

- What is Artificial Intelligence?

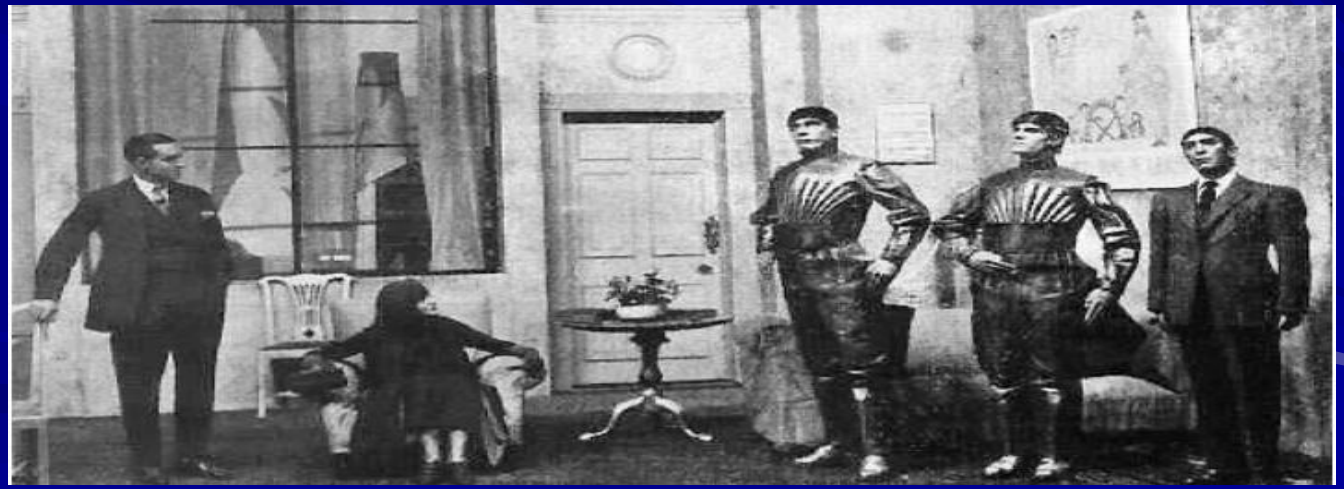
-The science and engineering of making intelligent machines, especially intelligent computer programs.

John McCarthy


Artificial intelligence is the science of making machines do things that would require intelligence if done by men.
Marvin Minsky

History

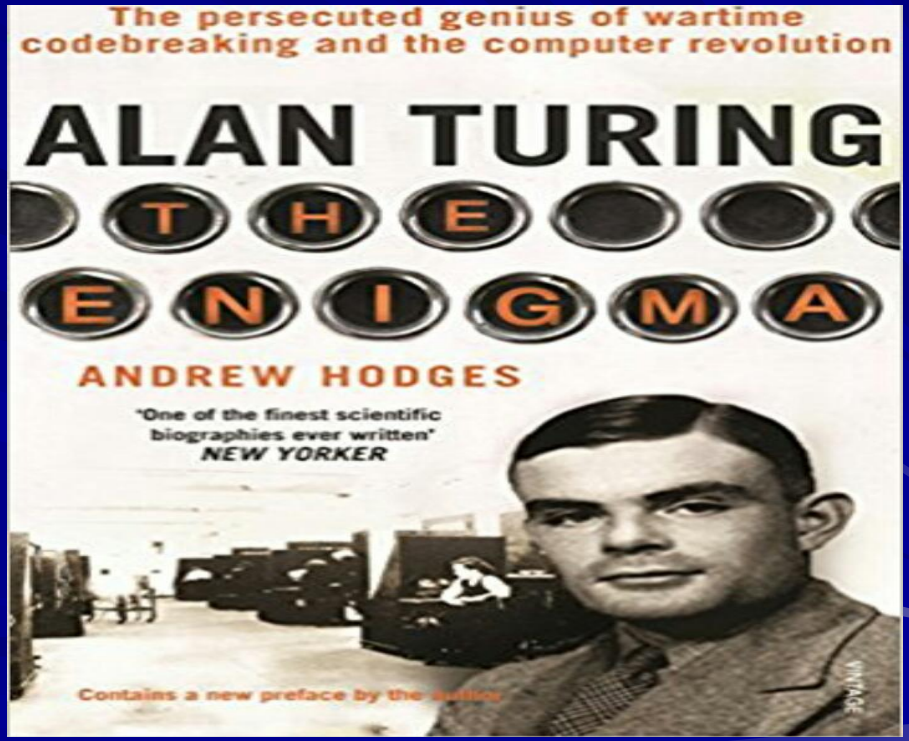
- Rossum's Universal Robots(RUR)
  science fiction play by Czech writer Karel Capek
  in 1920



History

- Alan Turing(1912 -1954)

  - encrypted the code of the enigma which were used from Nazi Germany to communicate



The Advent of the Computer

1945 ENIAC *The first electronic digital computer*

1949 EDVAC

The first stored program computer

The Dartmouth Conference and the Name Artificial Intelligence

J. McCarthy, M. L. Minsky, N. Rochester, and C.E. Shannon. August 31, 1955.

The study is to proceed on the basis of the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine

History

John McCarthy

- Computer scientist
- Received the Turing Award in 1971
- Mathematical logic supporting the creation of LISP
  - The choice for AI development

History

- Dartmouth conference (1956)
  First workshop of AI

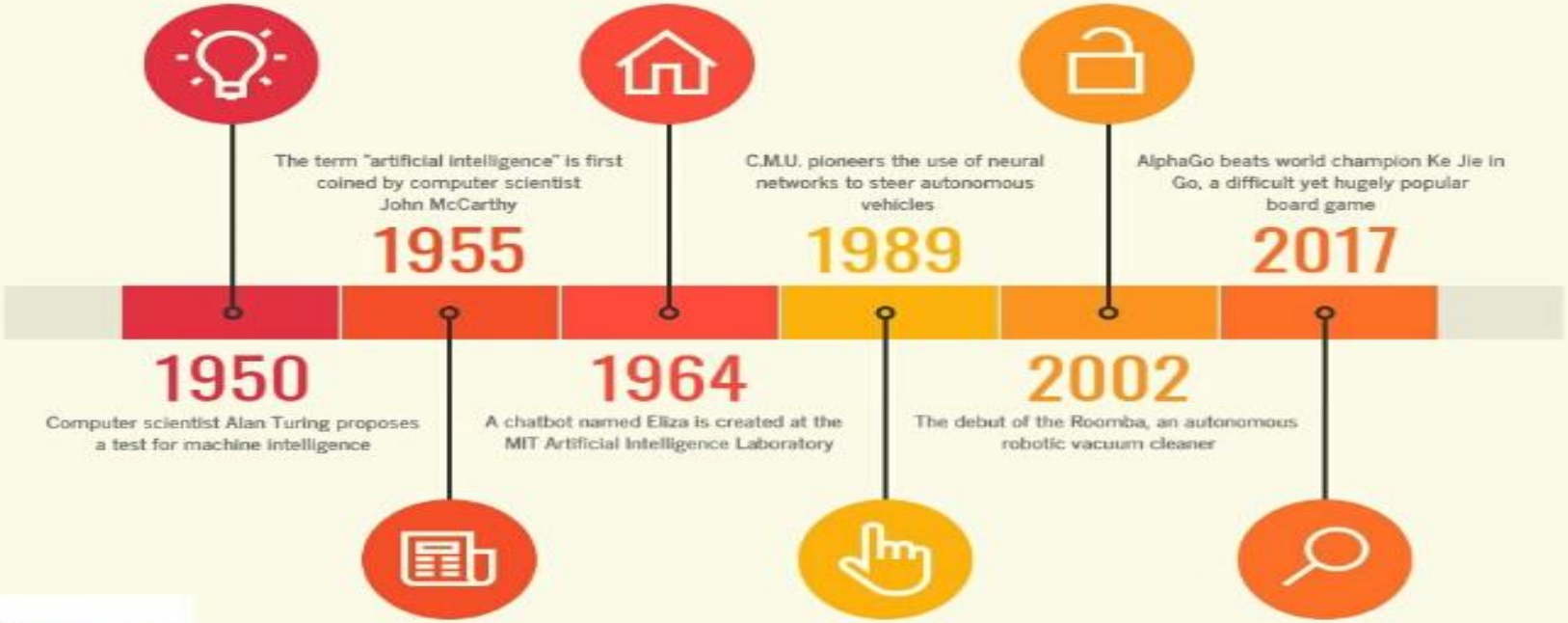
Machines will be capable, within twenty years, of doing any work what man can do.” – Herbert A. Simon (CMU)

Chess Today

In 1997, Deep Blue beat Gary Kasparov.

7 Decades of Artificial Intelligence History

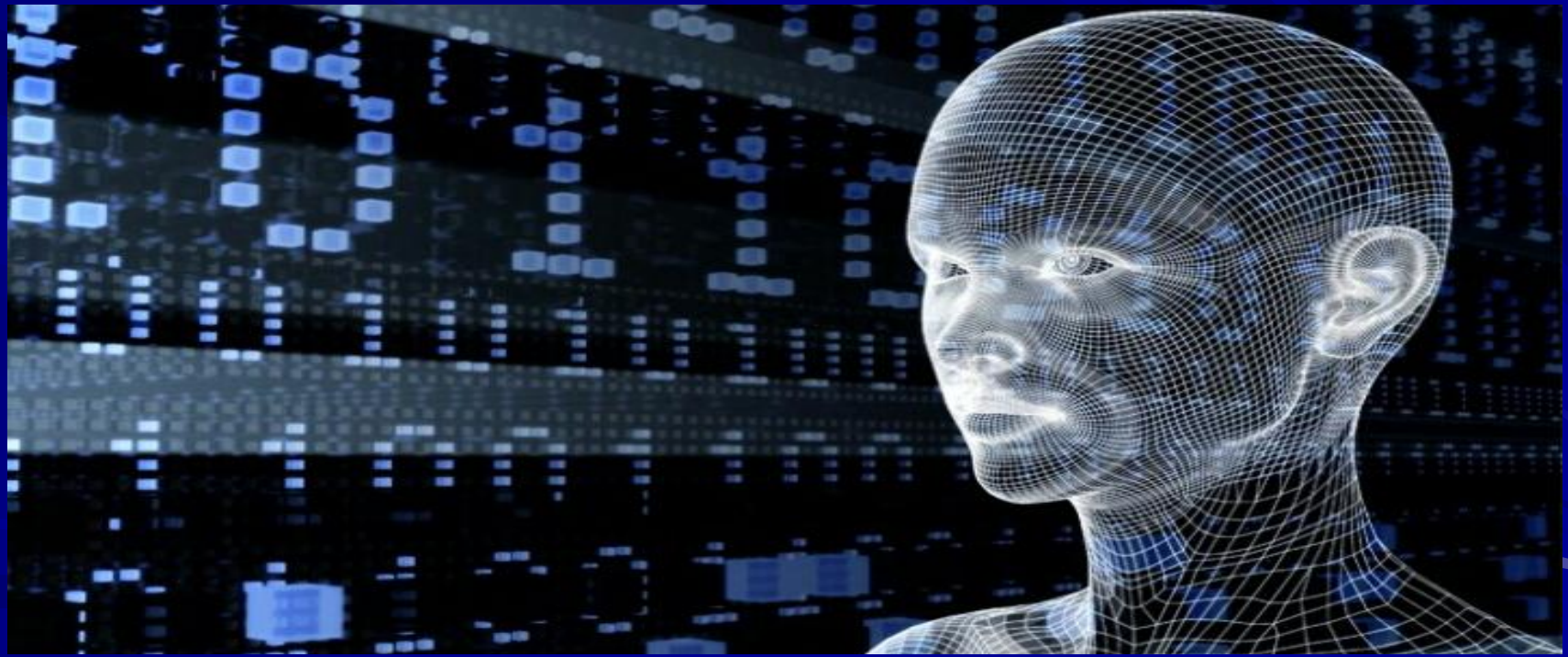
Artificial Intelligence, or AI, is revolutionizing industries. Business executives, managers, and analysts worldwide see it as strategic priority in an ever shifting Information Age. Here is a timeline of six of AI's big moments.



VTB Capital

Rise of Machines:
AlphaGo beats humanity (Ke Jie) 2:0
柯洁 KE JIE
00:13:45
ALPHAGO
01:34:23
Google
浙江省体育局
Match 1
AlphaGo vs Ke Jie
Google DeepMind

Philosophy of AI



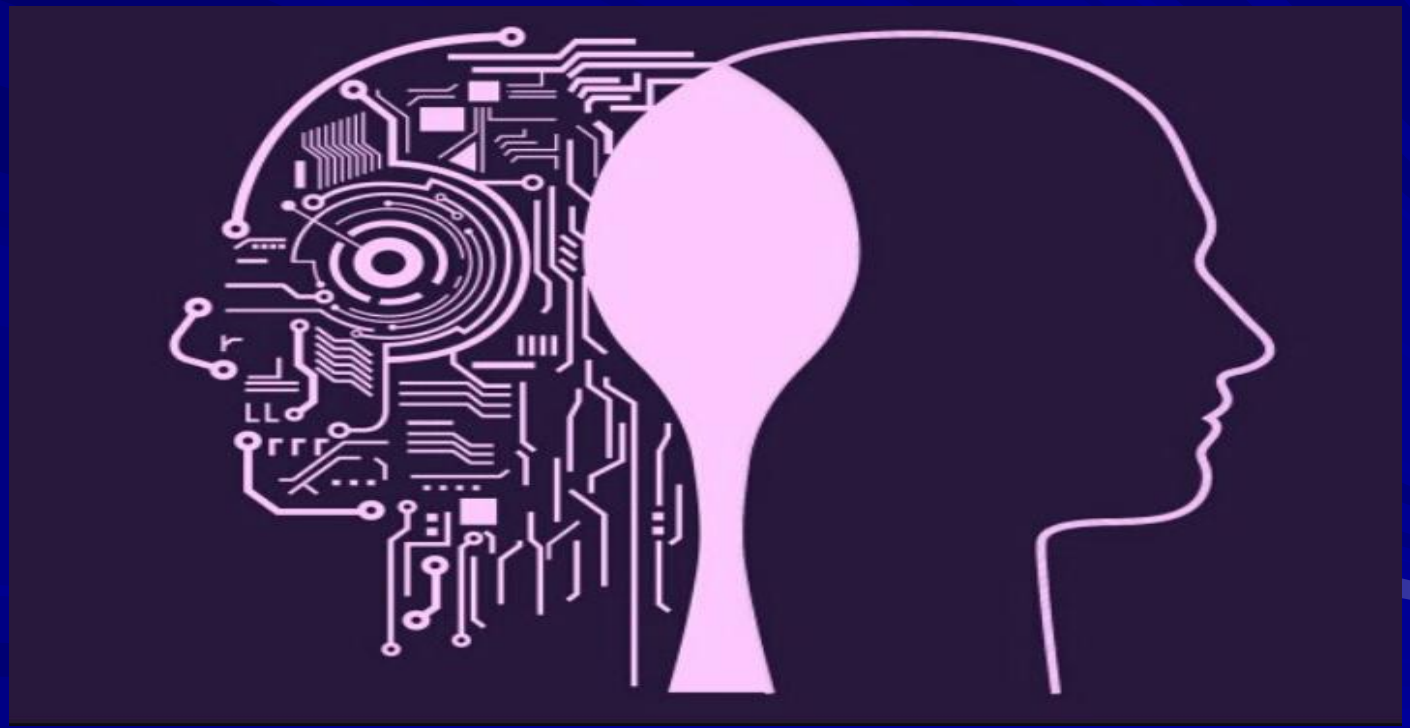
Philosophy of AI

- While exploiting the power of computer systems, the curiosity of human leads him to wonder,

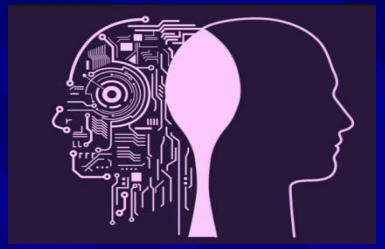
  'Can a machine think and behave like humans do?'

Thus, the development of AI started with the intension of creating similar intelligence in machines that we find and regard high in humans.

Goals of AI



Goals of AI



- To create expert systems which exhibit intelligent behaviour, learn,demonstrate,explain and advice its users.

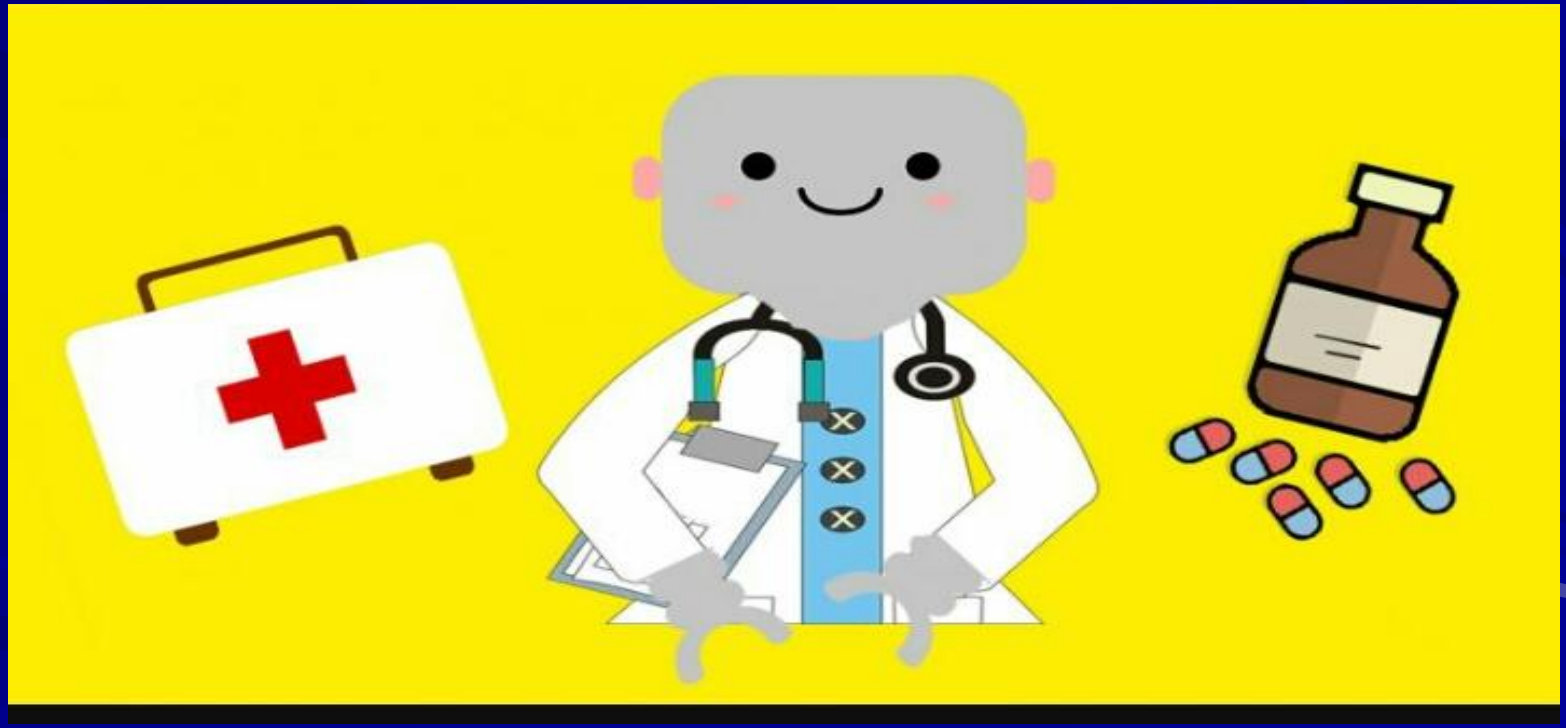
- To implement human intelligence in machine: Creating systems that understand,think,learn,and behave like humans

Uses or Applications of AI

- Finance.
- Hospitals and Medicines.
- Heavy Industry.
- Online and TCS.
- Transportation
- Video games.
- Military.
- Space science.
- Music

Google's computer-vision system for supporting self-driving vehicles.

AI in medicine



AI in medicine

AI in medicine

- Educational systems
- Diagnostic systems

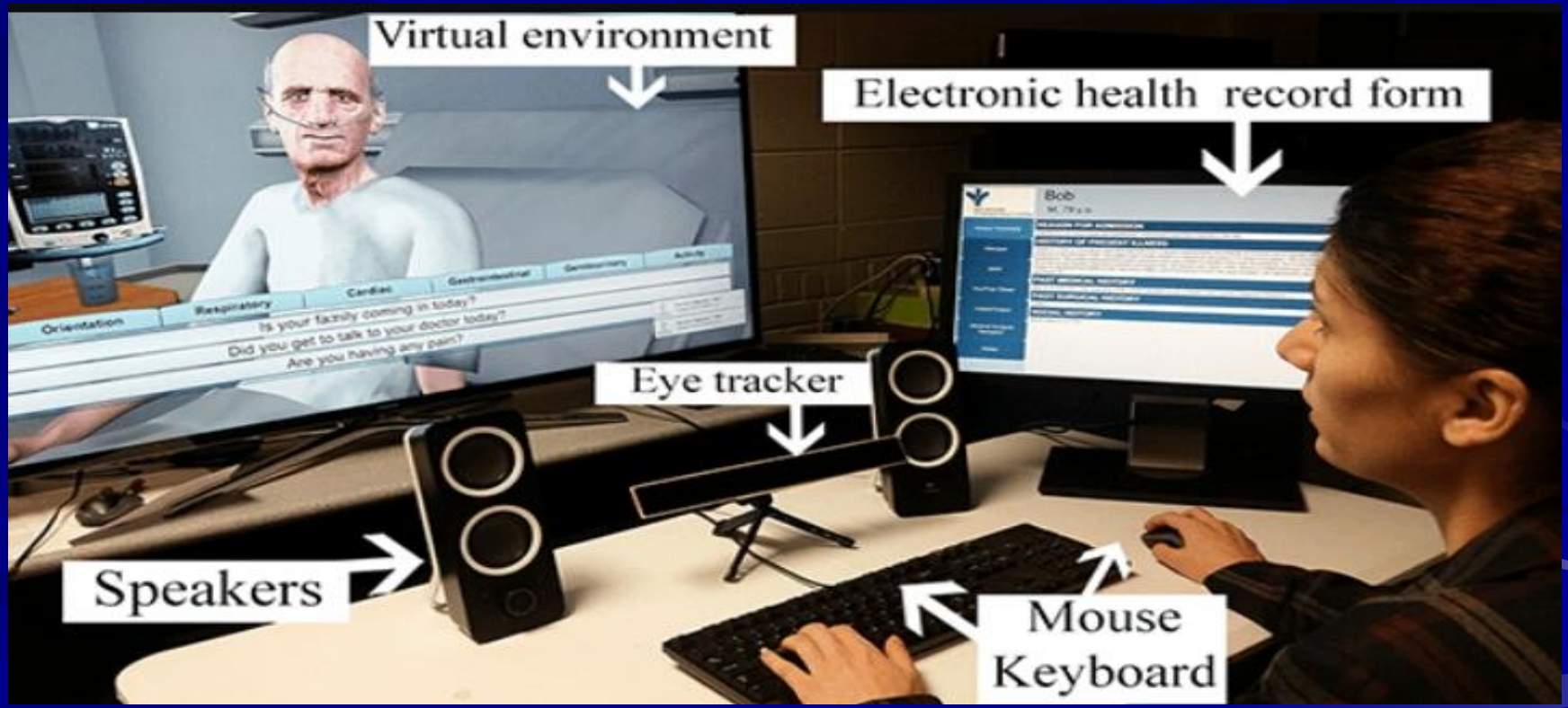
Three Types of AI in medical education

- Computer Aided Instruction (CAI)
- Virtual Patients (VP)
- Human Patient Simulation (HPS)

CAI

(Web-based learning), and include a wide variety of applications or online materials

VP


Virtual environment
Electronic health record form
Eye tracker
Speakers
Mouse
Keyboard

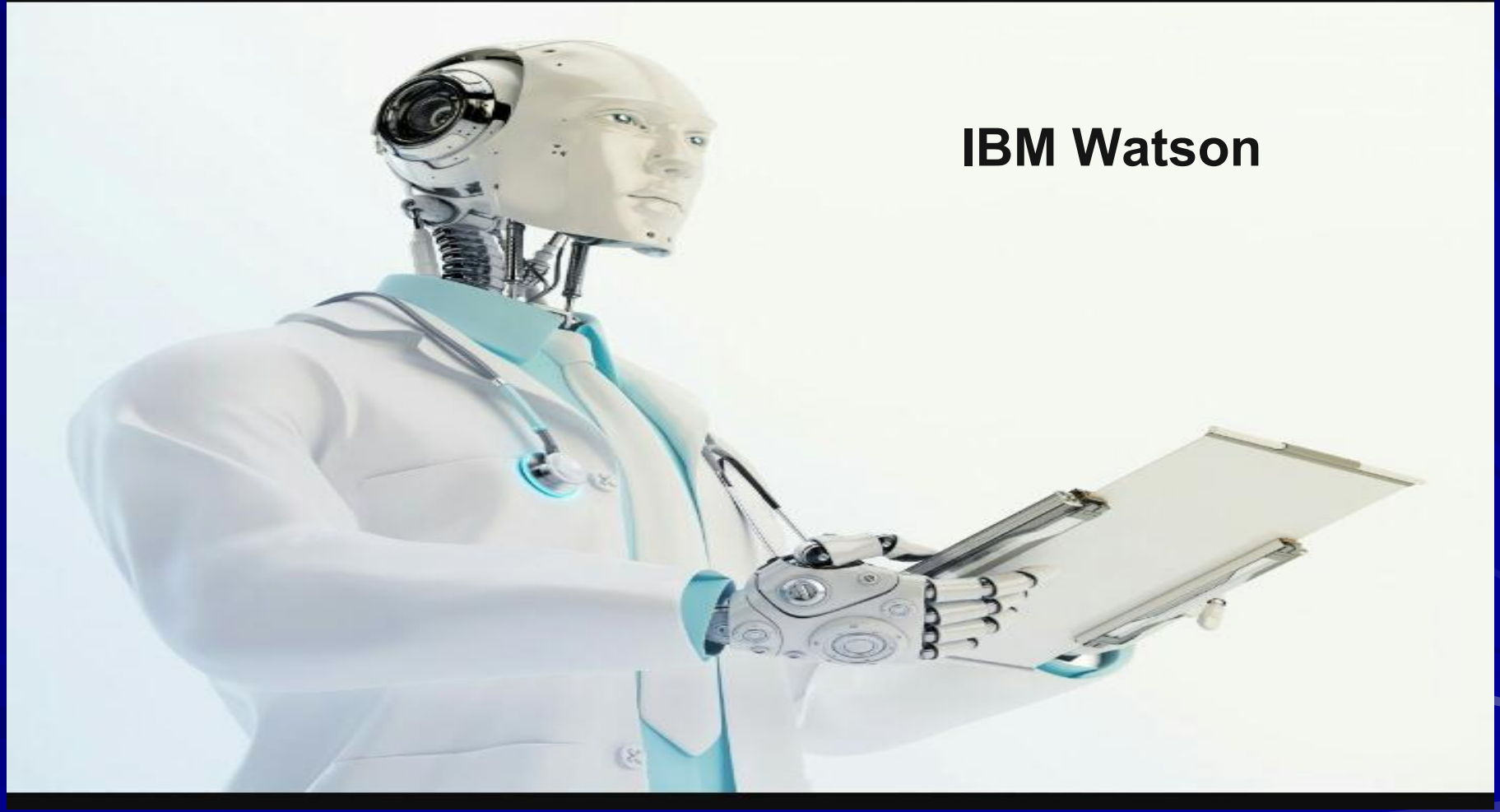
HPS

AI in medicine

- Major disease area that use AI tools include
  - cancer
  - neurology
  - cardiology

- IBM Watson for oncology – reliable AI system for assisting diagnosis of cancer
- AI to control movement in quadriplegic patient
- AI to diagnose cardiac disease through images

IBM Watson



IBM Watson

Watson's avatar, inspired by the IBM "smarter planet" logo

Watson is a question-answering computer system capable of answering questions posed in natural language, developed in IBM's DeepQA project by a research team led by principal investigator David Ferrucci Watson was named after IBM's first CEO, industrialist Thomas J. Watson.

IBM Watson

The computer system was initially developed to answer questions on the quiz show *Jeopardy!* and, in 2011, the Watson computer system competed on *Jeopardy!* against legendary champions Brad Rutter and Ken Jennings winning the first place prize of $1 million.

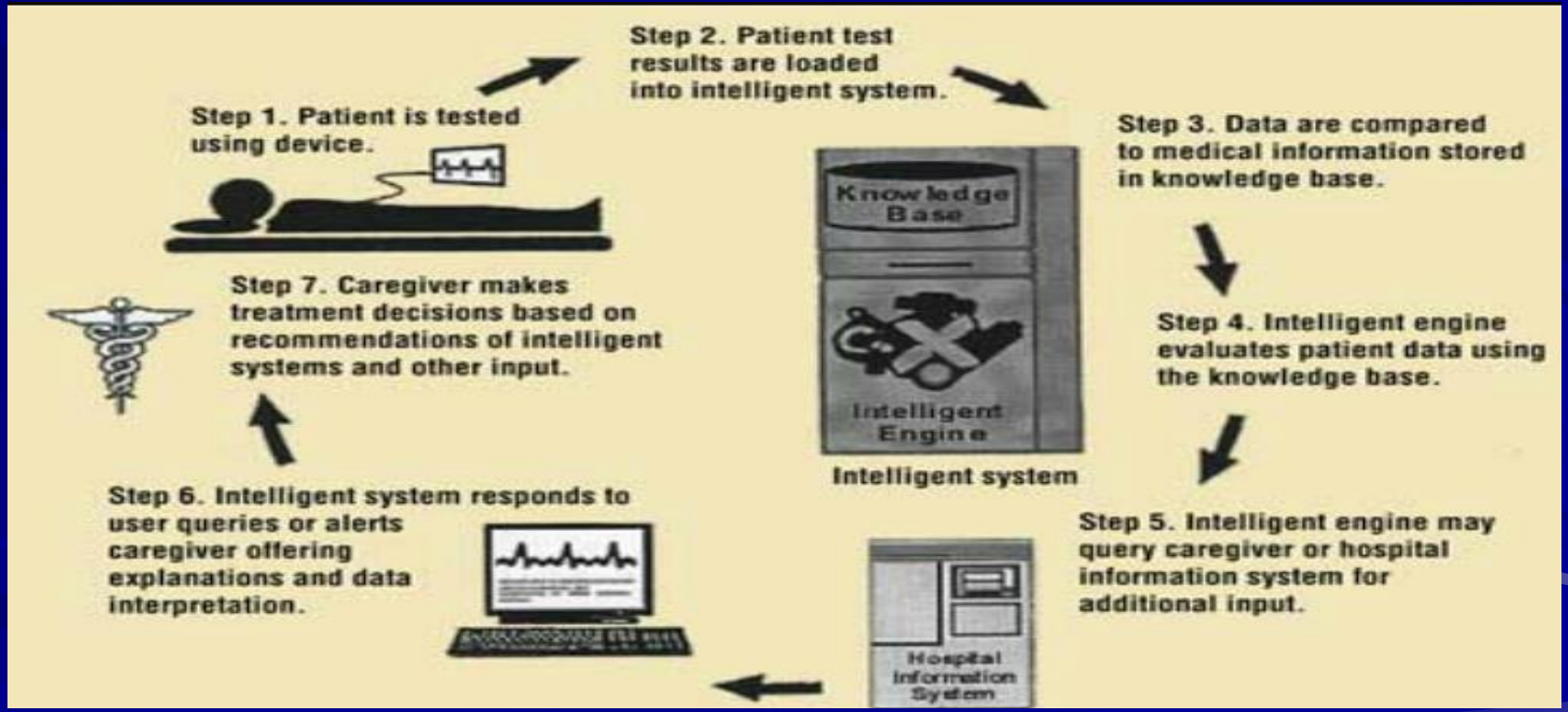
Watson(computer)

IBM Watson

In February 2013, IBM announced that Watson software system's first commercial application would be for utilization management decisions in lung cancer treatment at Memorial Sloan Kettering Cancer Center, New York City, in conjunction with health insurance company WellPoint.

- IBM Watson ..How it works

AI in medicine



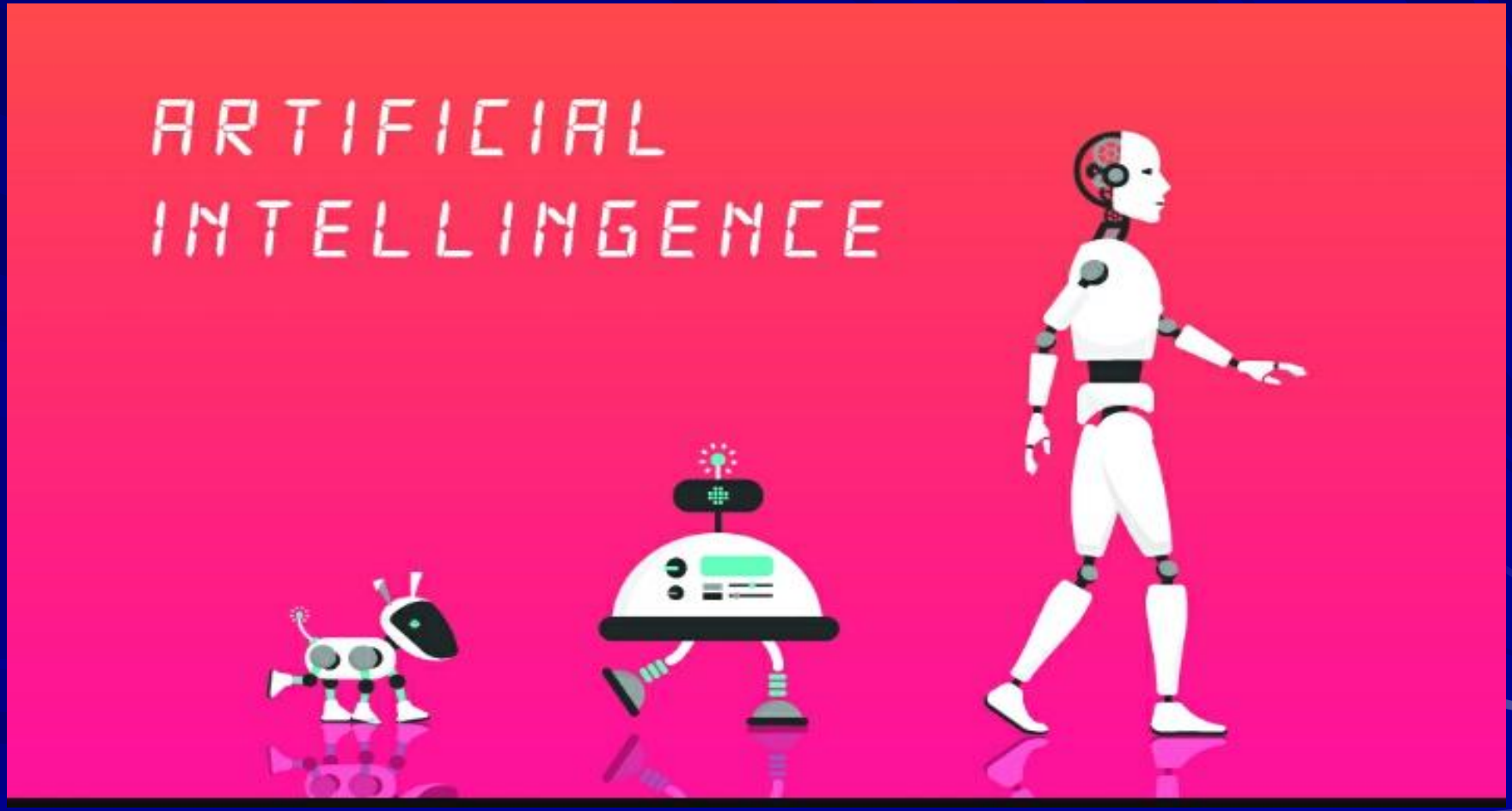
- AI in other words…. Computer vision

- Computer vision is poised to gain a foothold in screening medical images for clinician analysis.

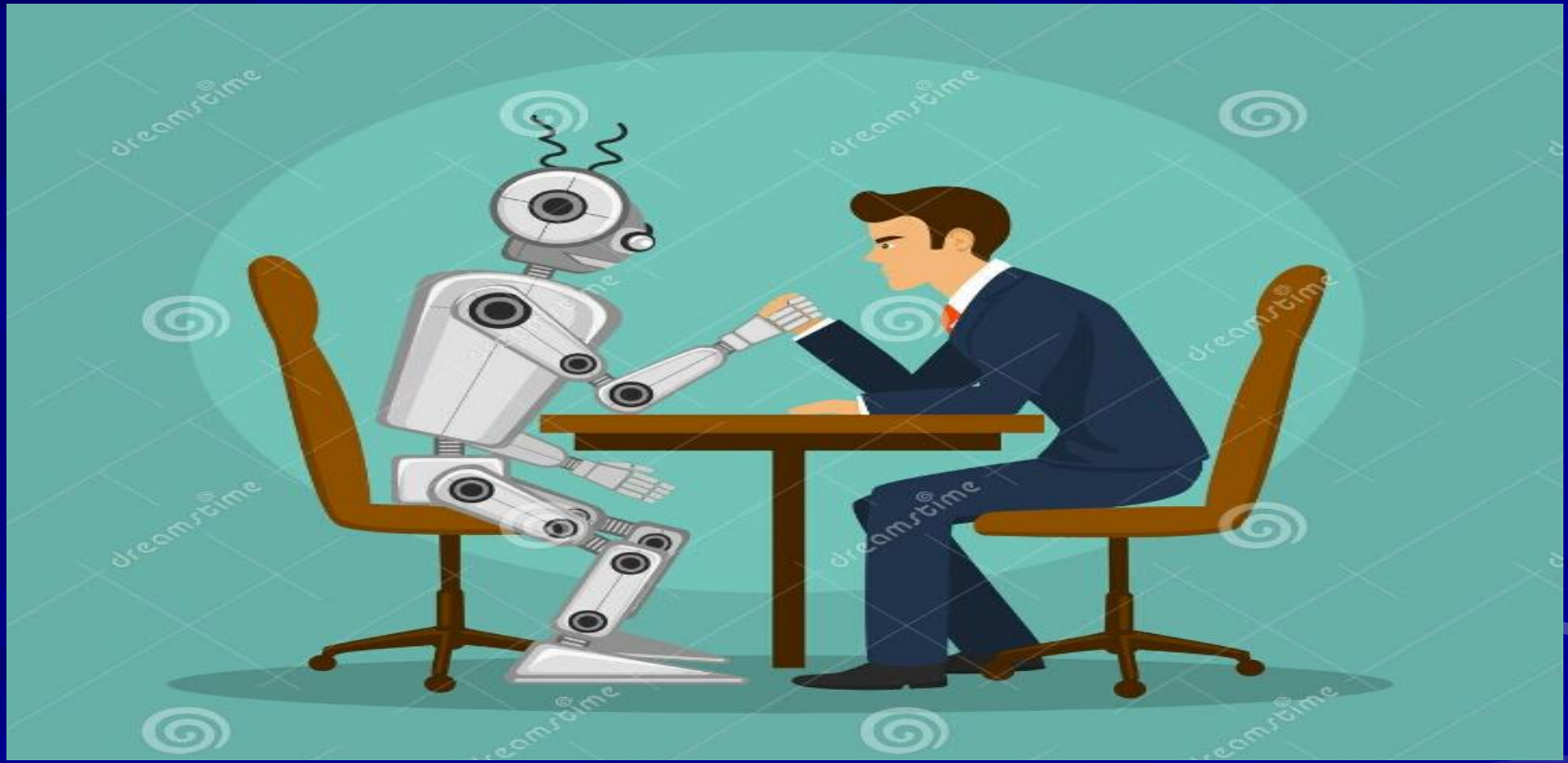
- A recent study found that computer vision performed on par with 21 board-certified dermatologists in classifying digital images of benign and malignant skin lesions

- Now, researchers from Stanford's engineering and medical schools, Lucile Packard Children's Hospital (LPCH), and Intermountain LDS Hospital are collaborating on a hospital unit–wide deployment of computer vision to discern real-time clinician behaviors.

- Hand hygiene compliance
- Progress of patient mobility in ICU


ARTIFICIAL
INTELLIGENCE

Human Intelligence Vs Artificial Intelligence



Human Intelligence Vs Artificial Intelligence

Human Intelligence VS Artificial Intelligence

Pros

Human Intelligence

- Intuition, Common sense, Judgement, Creativity, Beliefs etc
- The ability to demonstrate their intelligence by communicating effectively
- Plausible Reasoning and Critical thinking

Artificial Intelligence

- Ability to simulate human behavior and cognitive processes
- Capture and preserve human expertise
- Fast Response. The ability to comprehend large amounts of data quickly.

Human Intelligence Vs Artificial Intelligence

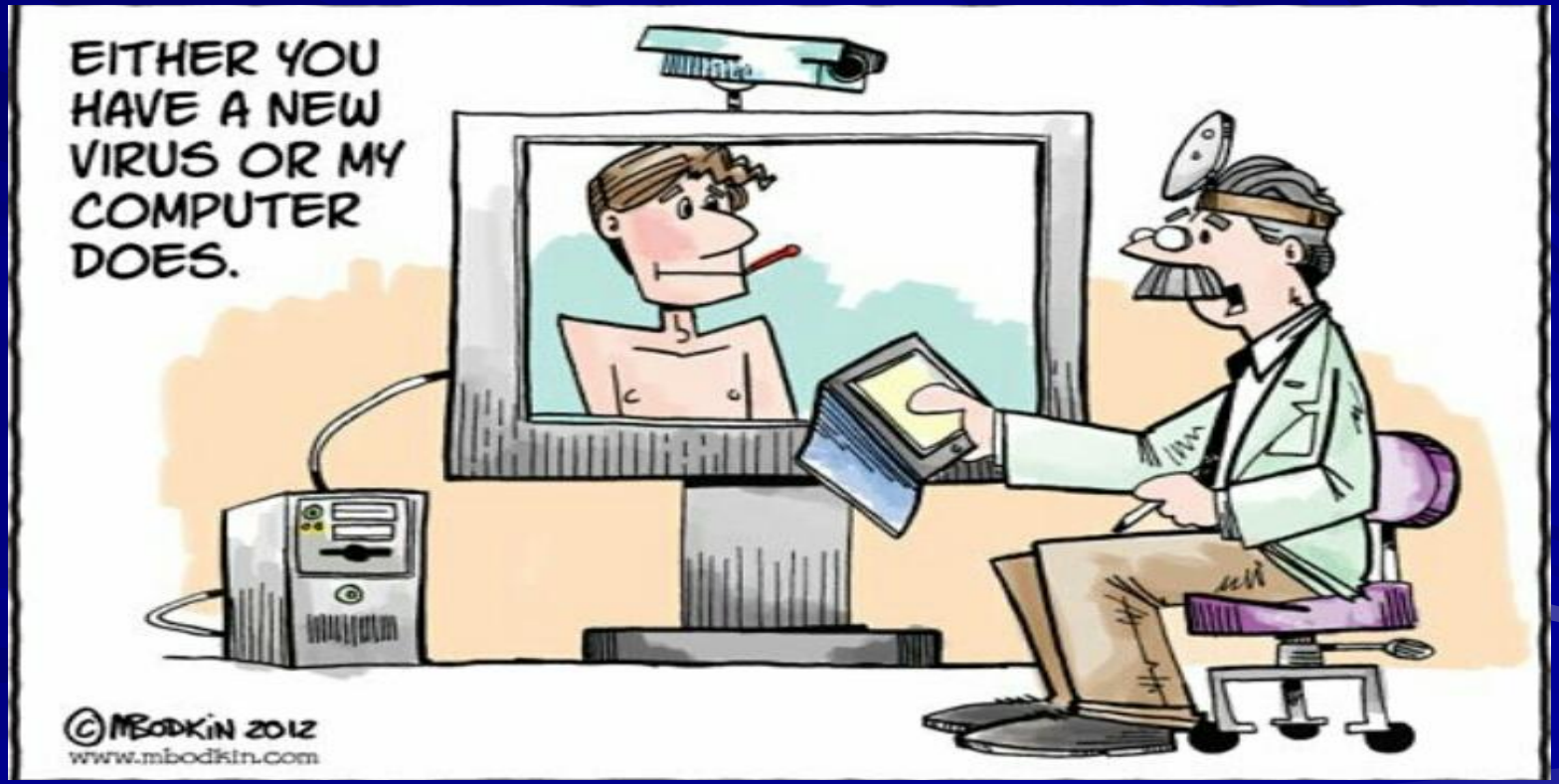
Human Intelligence Vs Artificial Intelligence

Human Intelligence VS Artificial Intelligence

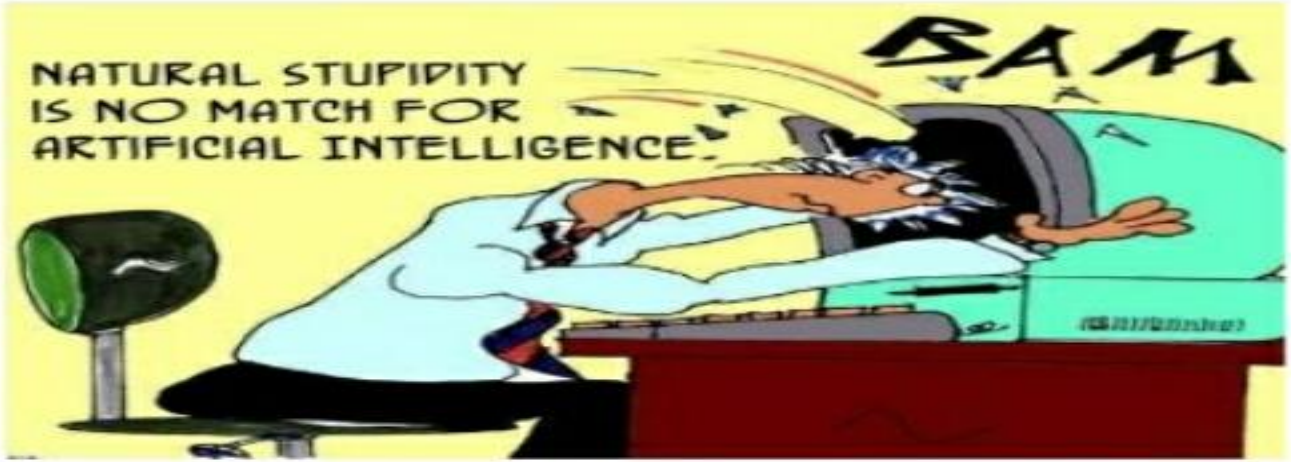
Cons

Human Intelligence	Artificial Intelligence
• Humans are fallible • They have limited knowledge bases • Information processing of serial nature proceed very slowly in the brain as compared to computers • Humans are unable to retain large amounts of data in memory.	• No "common sense" • Cannot readily deal with "mixed" knowledge • May have high development costs • Raise legal and ethical concerns

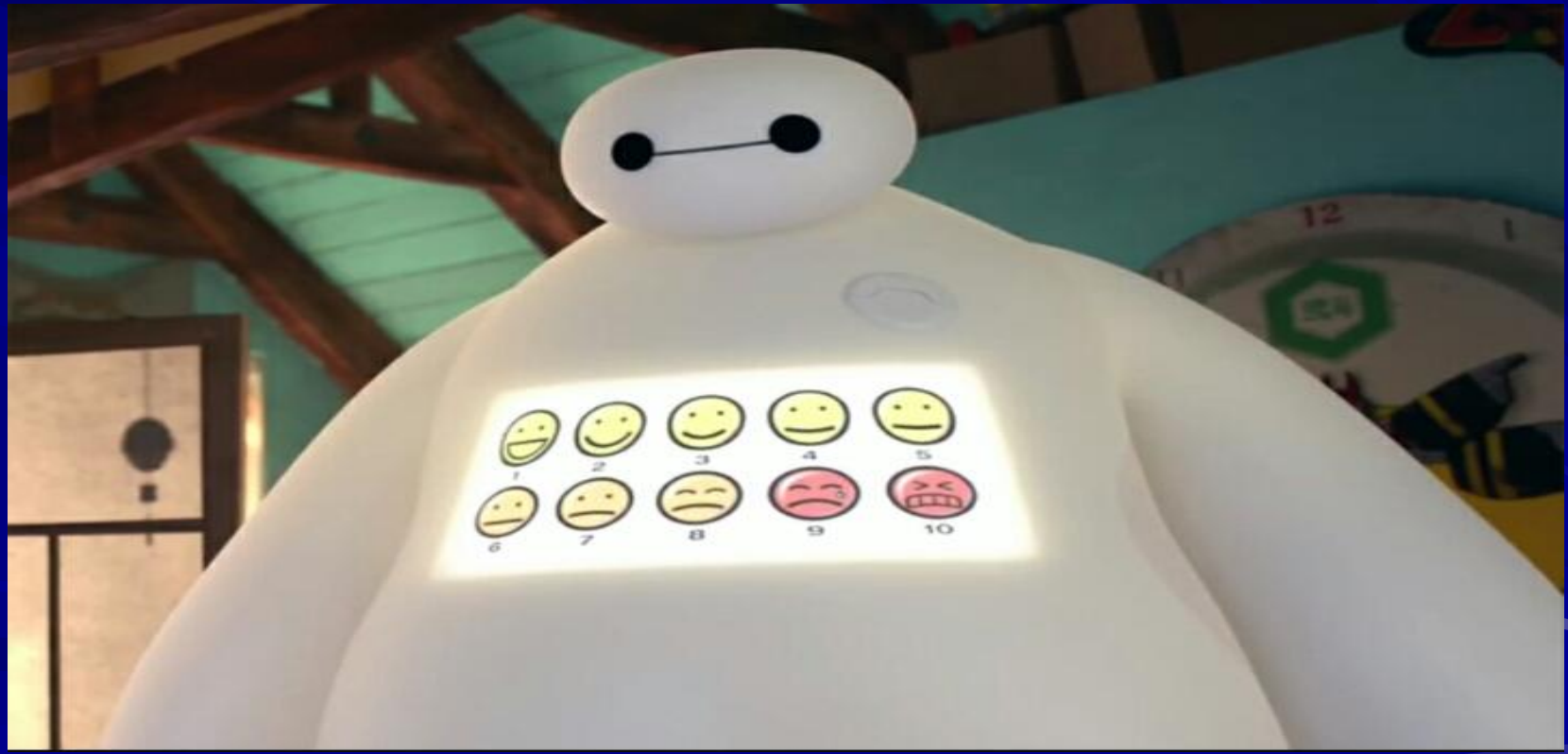
Human Intelligence Vs Artificial Intelligence



Human Intelligence VS Artificial Intelligence



We achieve more than we know. We know more than we understand. We understand more than we can explain (Claude Bernard, 19th C French scientific philosopher)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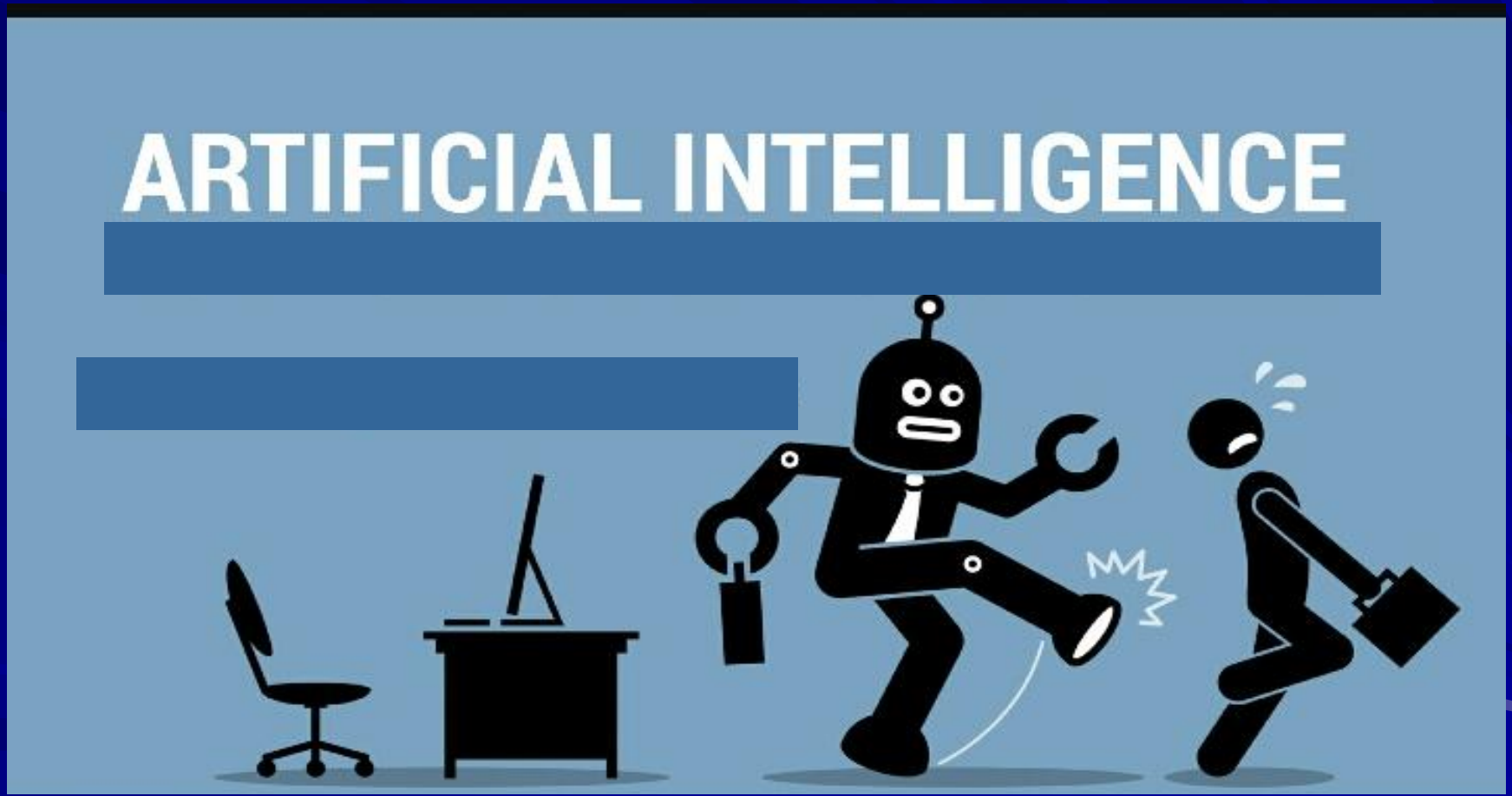
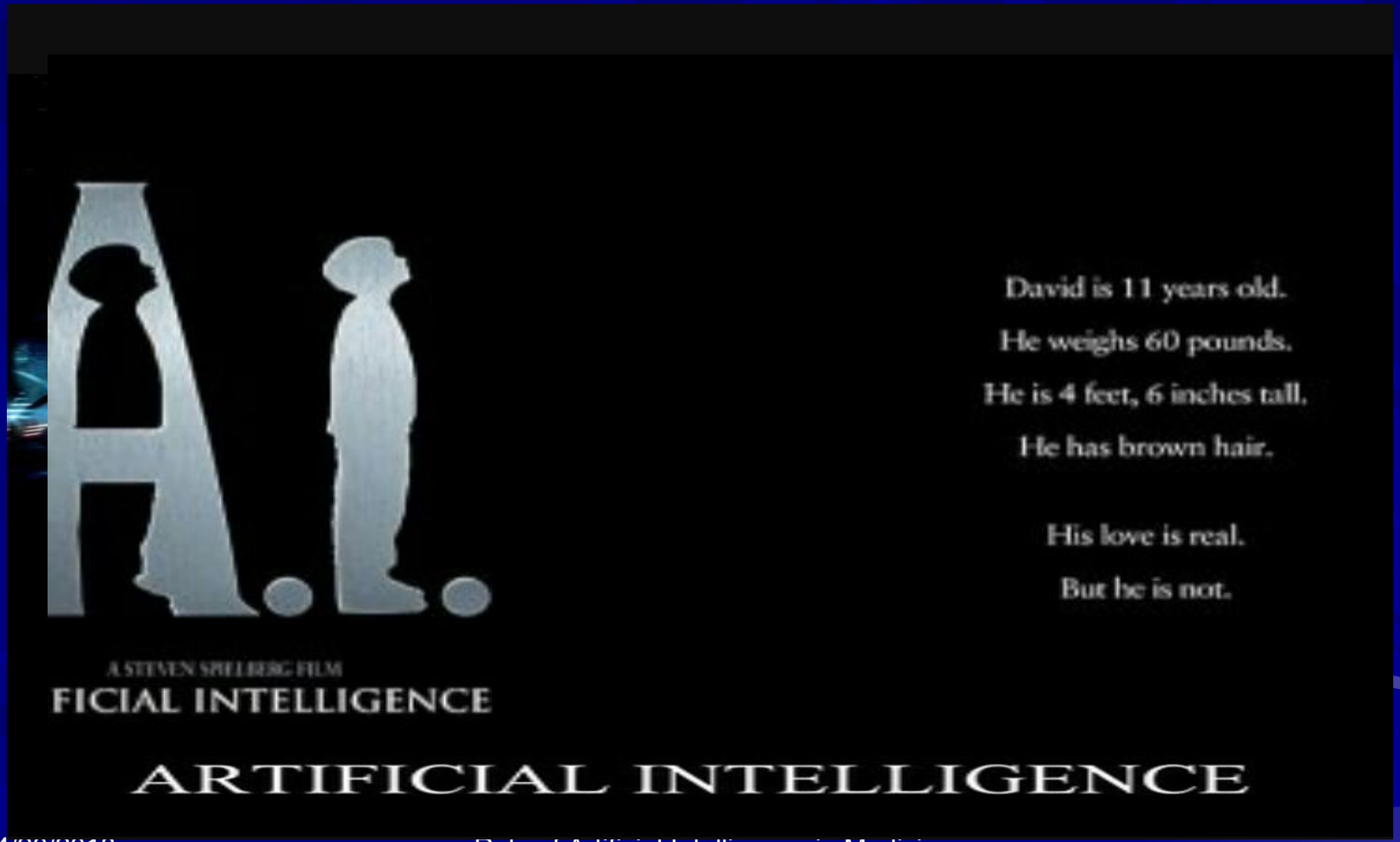
- Will AI replace doctors?


ARTIFICIAL INTELLIGENCE

- Future

Artificial intelligence
is a tool, not a threat.
Rodney Brooks


A.I.
A STEVEN SPIELBERG FILM
FICIAL INTELLIGENCE
David is 11 years old.
He weighs 60 pounds.
He is 4 feet, 6 inches tall.
He has brown hair.
His love is real.
But he is not.
ARTIFICIAL INTELLIGENCE

Take home message

CHANGE and MAINTAIN

THANK YOU