Artificial Intelligence and the Future of Medicine

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How would you define a skilled physician?
Are the courses we study in the university suitable for the future medicine?

You would have been living under a rock if you did not know how artificial intelligence is set to affect jobs in 2024-2030.

Hello Future

A Future where machines think

Understand human feelings

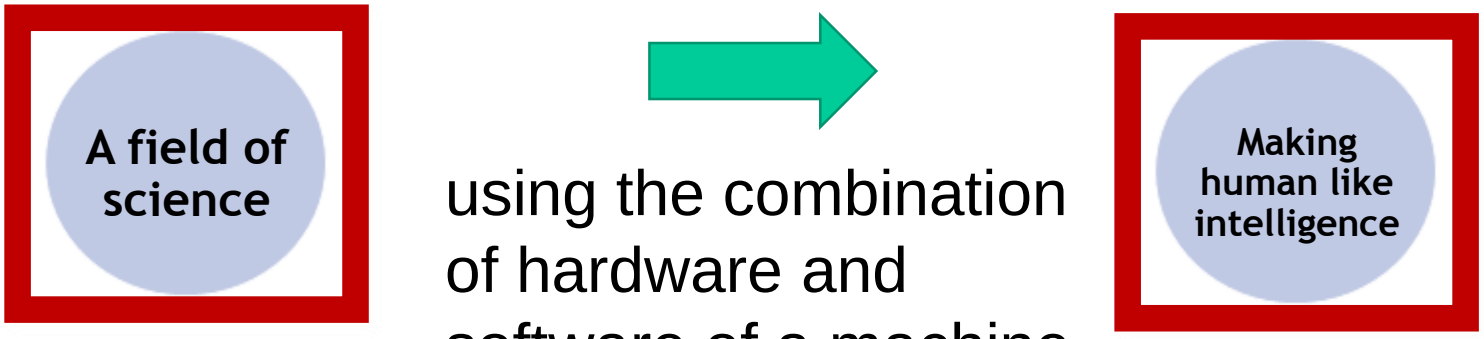
Help plan your next trip

Save lives

History of Artificial Intelligence (AI)

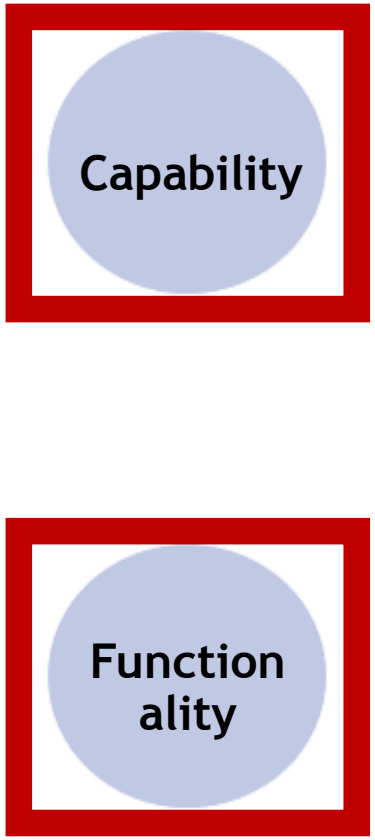
- 1943: **Warren McCulloch** and **Walter pits** proposed artificial neuron.
- 1949: **Donald Hebb** proposed updating rule for modifying the connection strength between neurons.
- 1955: **Allen Newell** and **Herbert Simon** created the first program which used AI.
- 1956: The word "Artificial Intelligence" first adopted by **John McCarthy** at the Dartmouth Conference.
- 1966: **Joseph Weizenbaum** created a Computer Program for the Study of Natural Language Communication between Man and Machine.
- 2002: For the first time, AI entered the home in the form of Roomba, a vacuum cleaner.
- 2006: Companies like Facebook, Twitter, and Netflix also started using AI.

What is Artificial Intelligence (AI)?



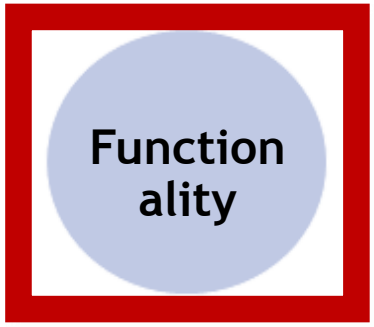
Learn from experience,
Adjust to new inputs,
Perform human-like tasks

Types of Artificial Intelligence



- **Weak AI**: lacks the ability to think and make decisions like humans.
- **General AI**: has the ability to think and make decisions, just like humans.
- **Super AI**: They will be able to think, reason, solve the problem, make judgments, plan, learn, and communicate on their own.

Types of Artificial Intelligence

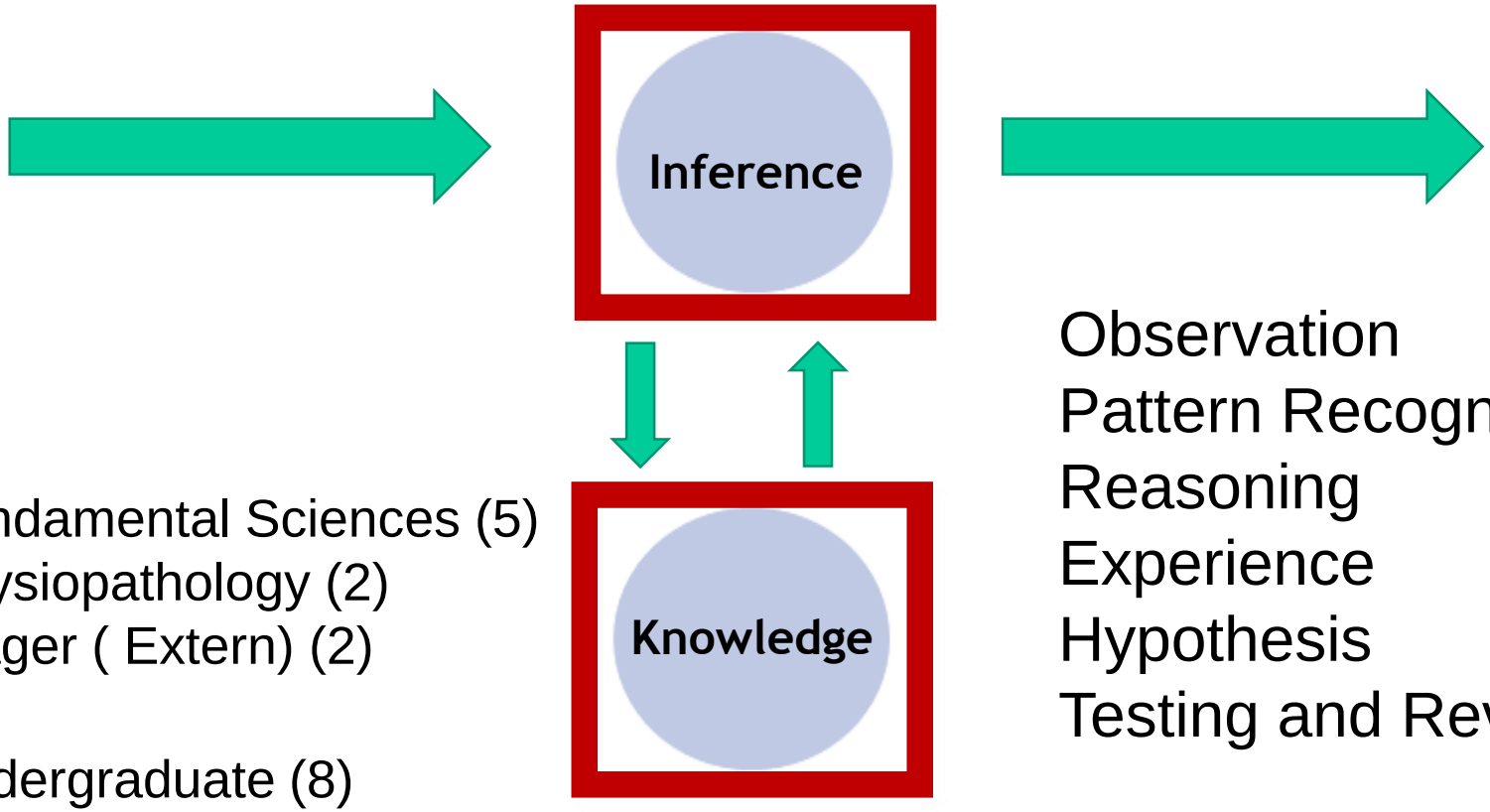


- **Reactive Machines** AI: Does not store memories or past experiences for future operations.
- **Limited Memory** AI: Can store past experiences for a short period of time.
- **Theory Of Mind** AI: Will understand human emotions, beliefs, and be able to interact socially like humans.
- **Self-aware** AI: Will be extremely intelligent and have their own feelings, and self-awareness.

How do physicians (Humans) think and perform on a task?

Intern(3)
After graduate Experience

Residency (6-16)
After graduate Experience



Observation
Pattern Recognition
Reasoning
Experience
Hypothesis
Testing and Revision

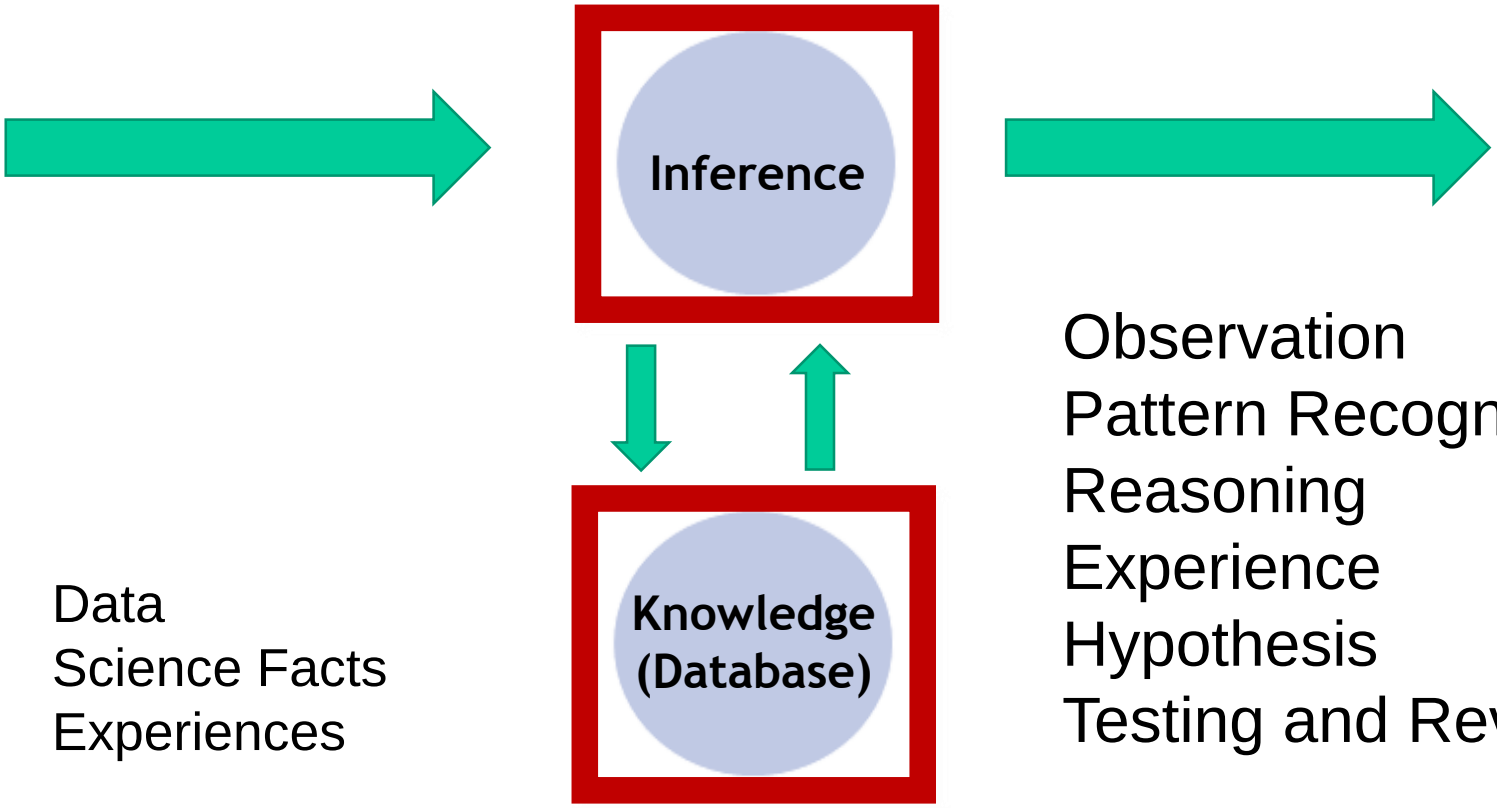
Fundamental Sciences (5)
Physiopathology (2)
Stager (Extern) (2)

Undergraduate (8)
Medical School (8)

How does AI think and perform on a task?

Artificial Intelligence

ANN
FUZZY Thinking
Experiences after using



Observation
Pattern Recognition
Reasoning
Experience
Hypothesis
Testing and Revision

Data
Science Facts
Experiences

It is very fast.

Artificial intelligence (AI) promises to revolutionize medicine, giving us a better understanding of health and disease and the ability to make more and better decisions.

Meltzer, MD, dean of the Medicine of USC:
“It’s that the physician who uses AI will replace the physician who does not use AI.”

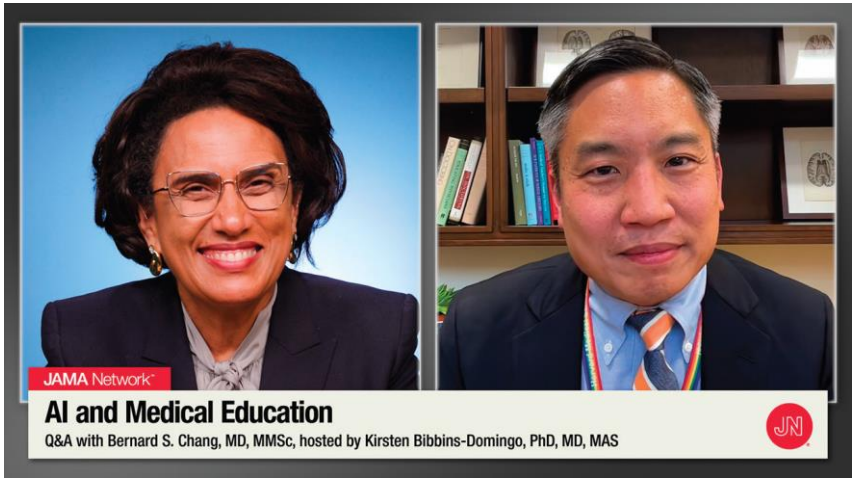
Bernard S. Chang, MD, dean of the Medical school at Harvard:
“AI Will—and Should—Change Medical School.
I think this is about to be a major inflection point in medical education. We want to train our students to be the physicians of the future who are going to be AI-enabled physicians”

- Forget to memorize everything.
- Doing even higher levels of cognitive analysis, higher levels of understanding the individual patient nuance with AI.
- Students can move more quickly from the basics to more advanced levels of reasoning and communication, knowing that they'll be supported by AI in the future to do the fundamentals of decision analysis and communication.
- Change MCAT (Medical College Admission Test) strategies from basic to reasoning including AI. (528) (7:30)
  - Section 1 - Biological and Biochemical Foundations of Living Systems (BBLS)
  - Section 2 - Chemical and Physical Foundations of Biological Systems (CPBS)
  - Section 3 - Psychological, Social, and Biological Foundations of Behavior (PSBB)
  - Section 4 - Critical Analysis and Reasoning Skills (CARS)

- Challenging point:

How do faculty members to be the faculty of the future?

- **Embrace lifelong learning**
- **Develop soft skills**
- **Be agile**
- **Specialize**
- **Generative**



Physicians who knows artificial intelligence are really going to be working at the top of their game in clinical medicine.

How AI will change the world?
Will AI help the world or hurt it?

How will AI affect future medicine?

McKinsey global institute says:
AI will deliver additional global economic activity of around $13 trillion in the foreseeable future and by 2030, or about 16% higher cumulative GDP compared with today.

The same report went on to say that By 2030, the average simulation shows that some 70% of medicine will have embraced the AI revolution.

How many jobs will AI replace by 2030?

Forbes says that according to an MIT and Boston University report, AI will replace as many as two million jobs by 2025.

AI could replace the equivalent of 300 million full-time jobs, a report by investment bank **Goldman Sachs** says.

Which jobs will not be replaced by AI until 2030?

- **Lawyers and Judges**
- **Directors, Managers, and CEOs**
- **Psychologists**
- **Surgeons**
- **Computer System Analysts**
- **Artists and writers**

What jobs are most likely to be replaced by AI?

- **Traditional Teachers**
- **Receptionists**
- **Accountants/Bookkeepers**
- **Salespeople**
- **Research and analysis**
- **Warehouse work**
- **Insurance underwriting**
- **General Physicians, Family Physicians, …**
- **Designers (Building, Industries…)**
- **Dentists**
- **Drug Stores**

How to embrace AI and learn skills to take advantage of this new technology?

- **Embrace lifelong learning**
- **Develop soft skills**
- **Be agile**
- **Specialize**

The Artificial Intelligence in Medicine (AIM), newly developed at Harvard Medical School:

Will enable future academic, clinical, and government leaders to rapidly transform patient care, improve health equity and outcomes, and accelerate precision medicine by creating new AI technologies that reason across massive-scale data and knowledge.

Artificial Intelligence-Based Data-Driven Strategy to Accelerate Research, Development, and Clinical Trials of COVID Vaccine.

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