Artificial intelligence in Health Care

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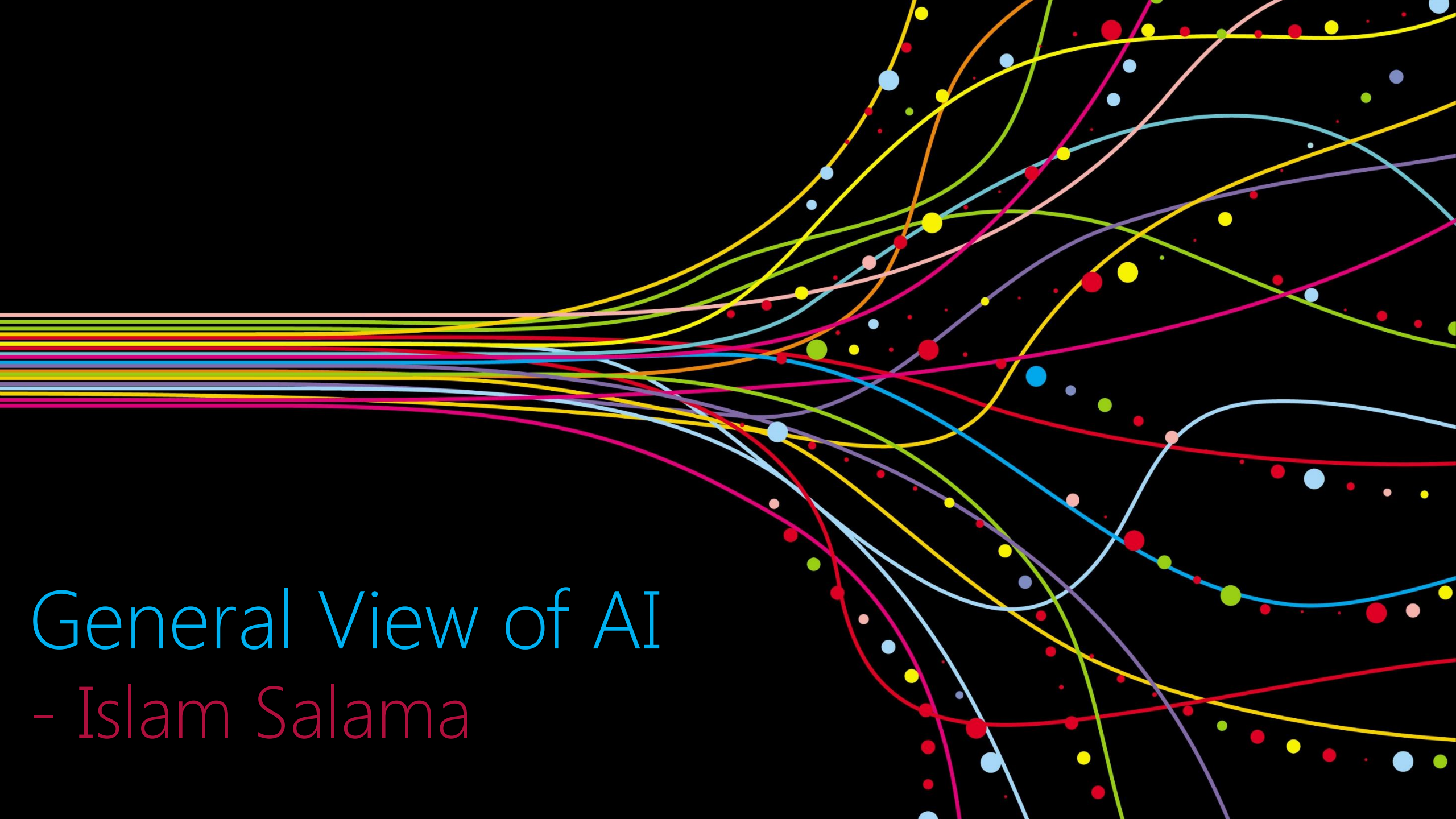
Objectives

1. General View of Artificial Intelligence
2. Artificial Intelligence in Health Care
3. Artificial Intelligence in Dentistry



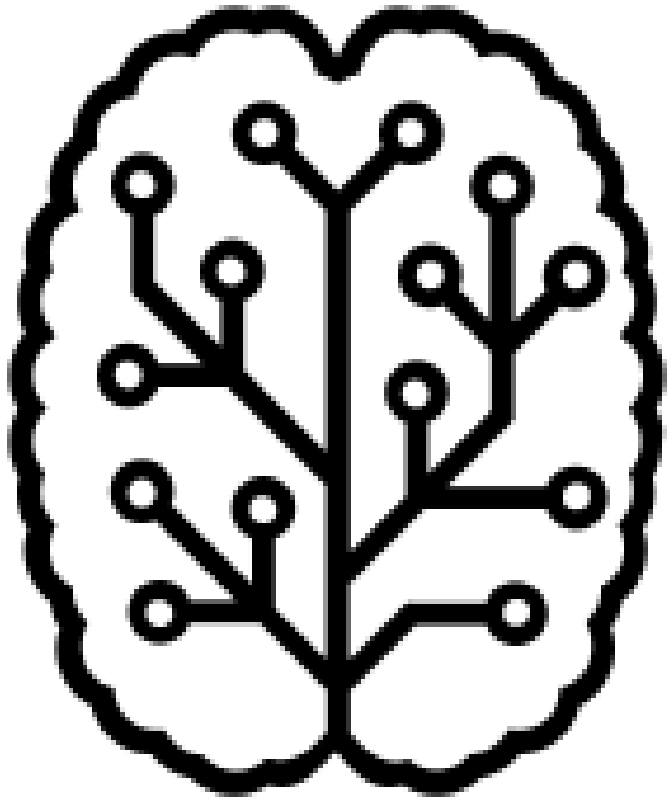
General View of AI

- Islam Salama

DANGER OF ARTIFICIAL INTELLIGENCE

So , What is the AI ?

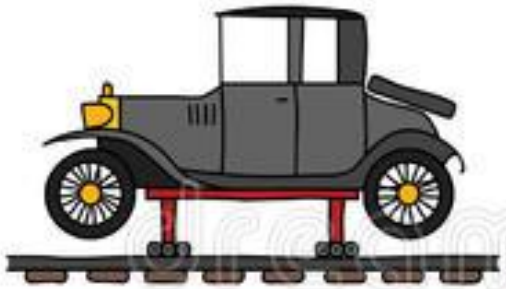
The theory and development of a computer systems that is able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, translation between languages ,and concept making .



AI Revelation

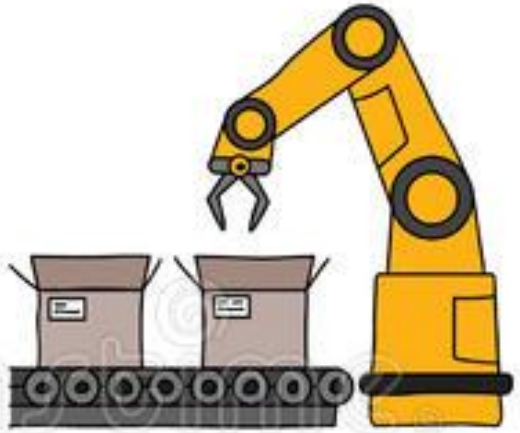
Industry 1.0

The Industrial Revolution begins. Mechanization of manufacturing with the introduction of steam and water power



Industry 2.0

Mass production assembly lines using electrical power



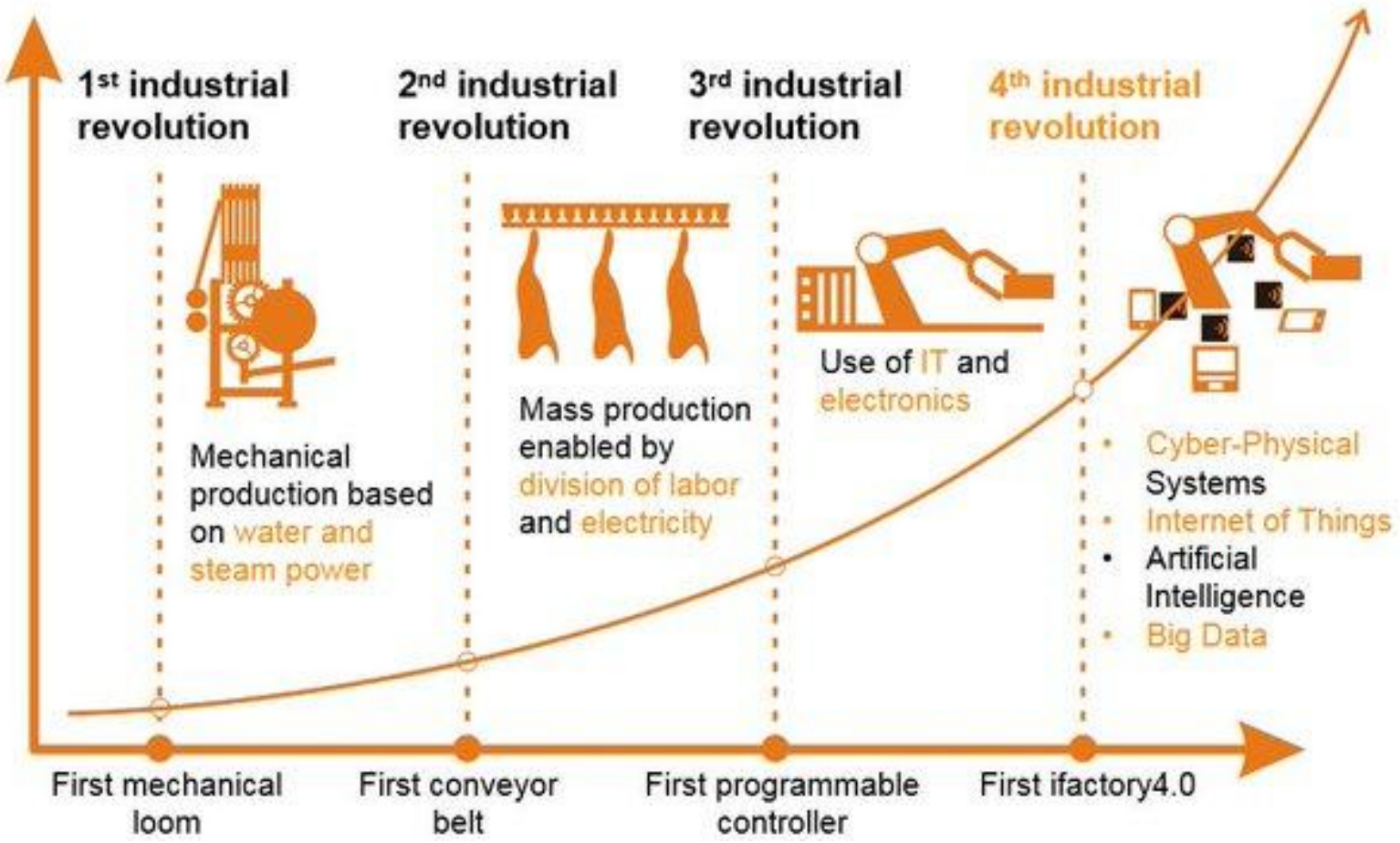
Industry 3.0

Automated production using electronics, programmable logic controllers (PLC), IT systems and robotics

Industry 4.0

The 'Smart Factory'. Autonomous decision making of cyber physical systems using machine learning and Big Data analysis. Interoperability through IoT and cloud technology.

AI Revelation



Human Conscious Levels

1. Information's
2. Believe
3. Ideas
4. Thinking
5. **Conscious**

Classification of AI :

1. Strong AI
2. Weak AI

Strong AI

Artificial general intelligence a multitask system or machine with **skillful** and **flexible** as humans do and with ability to apply intelligence to any problem, rather than just one specific problem

IBM Watson

- **-Watson** is a question answering computer system capable of answering questions posed in **natural language**, developed in **IBM**'s DeepQA project.
- -Won 2011 Jeopardy

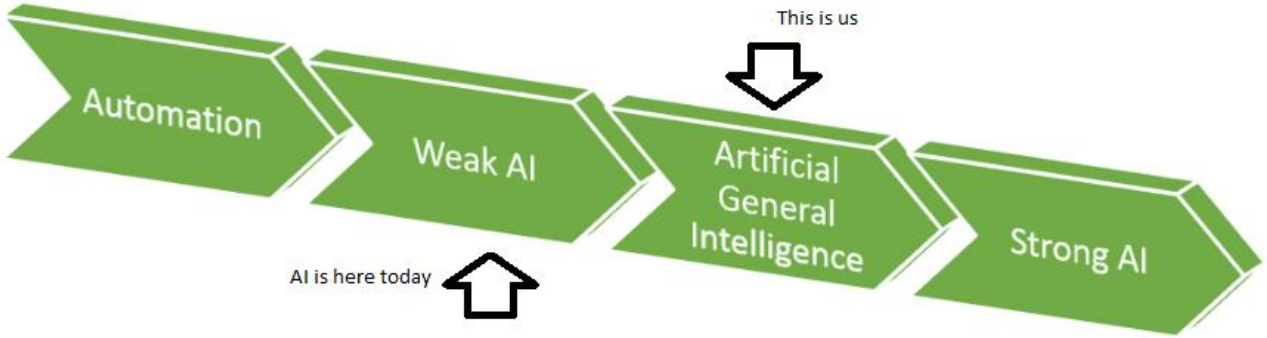
Google Deep Mind

- Company in UK now under alphabet group
- mimics the short-term memory of the human brain
- Won in Go Game " **Alfa Go** " 2016

Weak AI “Narrow AI”

is artificial intelligence that is focused on one narrow task. **Weak AI** is defined in contrast to either.

All currently existing systems considered artificial intelligence of any sort are weak AI at most.



e.g: Weak AI “Narrow AI”

Intelligence levels of machines

1. **Optimal AI** = good at his application e.g: scaning method can scans every letter.
2. **Super Strong** = better than other humans.
3. **Strong** = at his app not all people but some of them = face rec. and self driving cars .
4. **Sub-Human** = lower than other human .

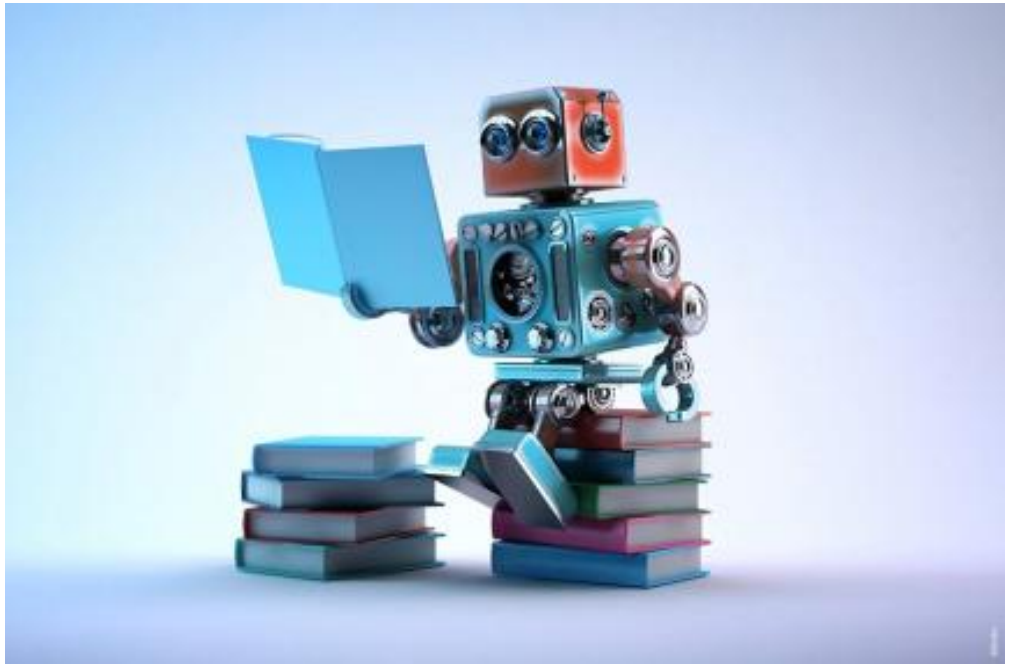
Most Sub-fields of AI

1. Neural Networks
2. Natural Language Processing
3. Speech recognition
4. Computer Vision & Face Recognition
5. Deep Learning
6. Machine Learning

Deep Learning

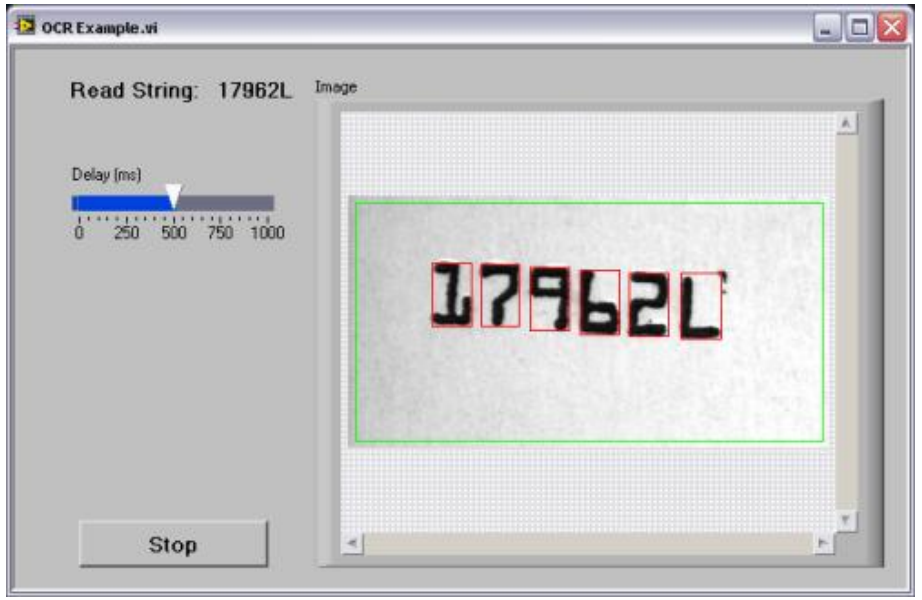
Artificial Intelligence (AI)

Deep Learning : the ability of machine or system to learn new concepts and benign better from it’s mistakes with more information's and analysis based on algorithms.



e.g: Deep Learning

ReCaptcha

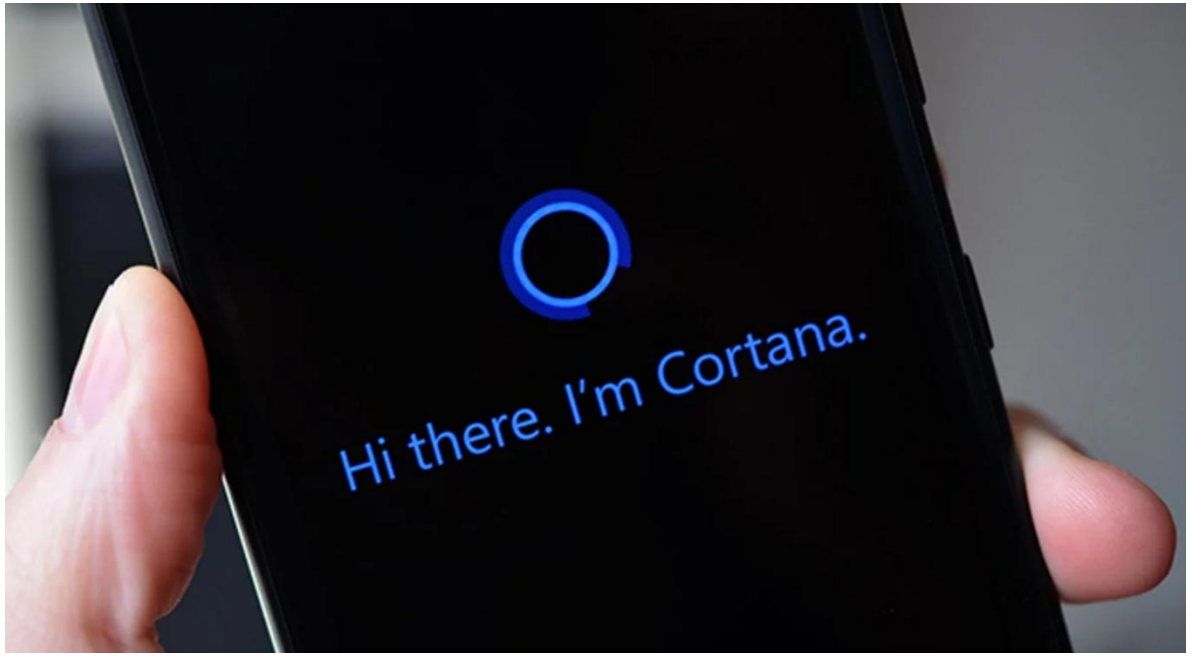


Optical Character Recognition

Speech recognition

recognition and translation of spoken language into text by computers. It is also known as "**automatic speech recognition**" (ASR), "**computer speech recognition**", or just "**speech to text**" (STT)

e.g: Speech recognition

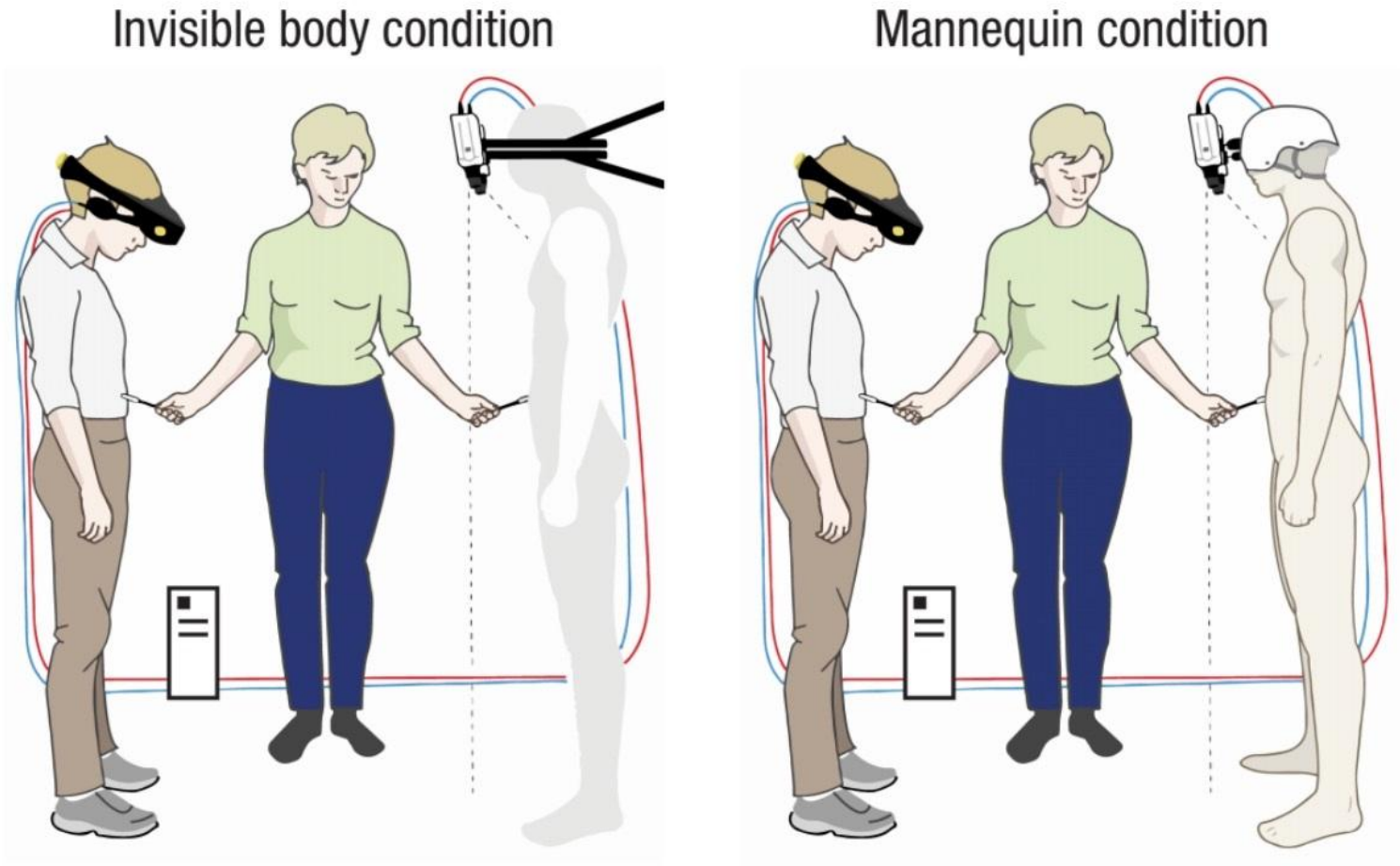


Microsoft Cortana

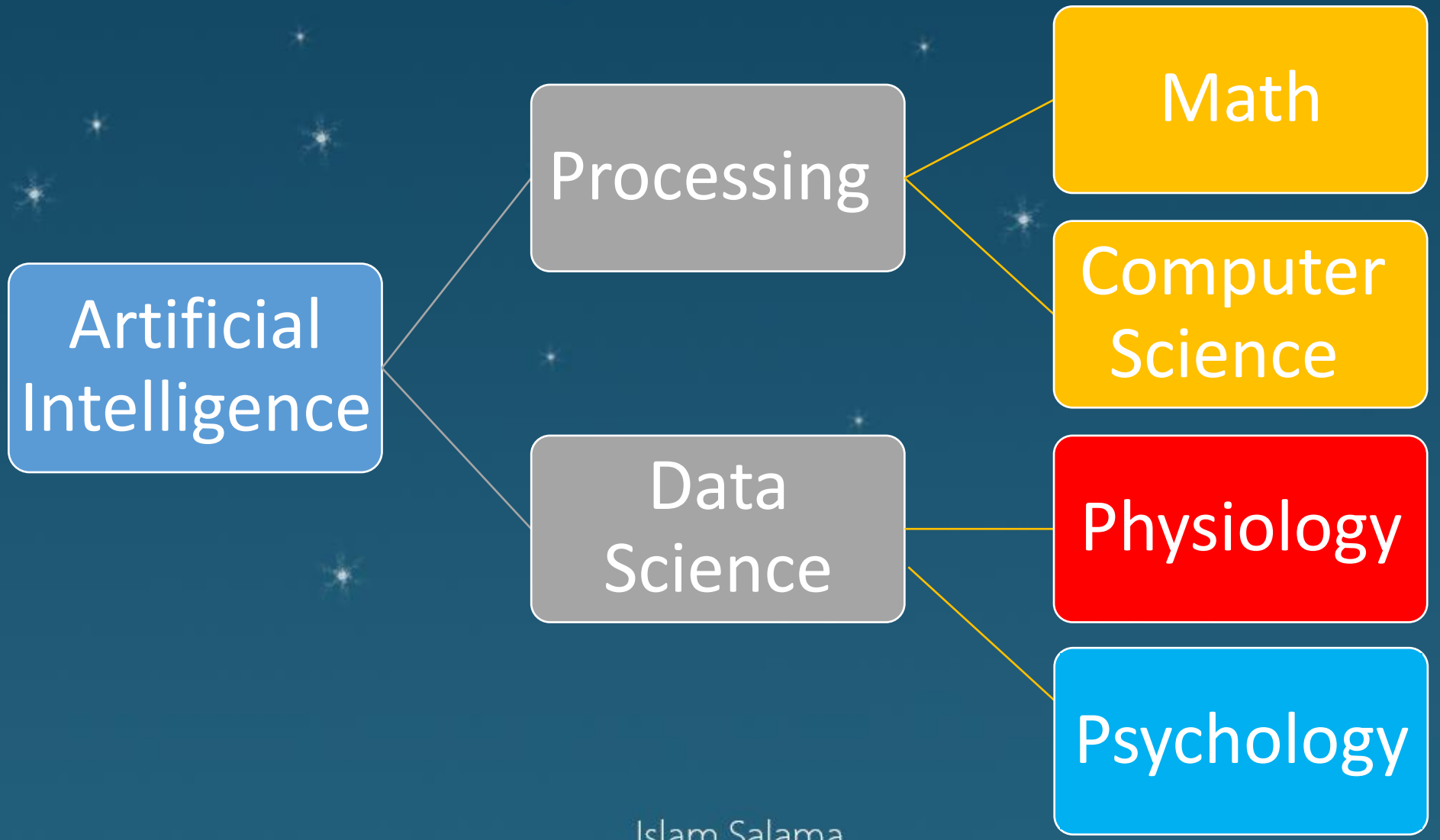
Amazon Alexa

e.g: Face Recognition

Using Virtual Reality in Medicine



Parent disciplines of AI:



Compartment BTN Human Brain & Super Computers

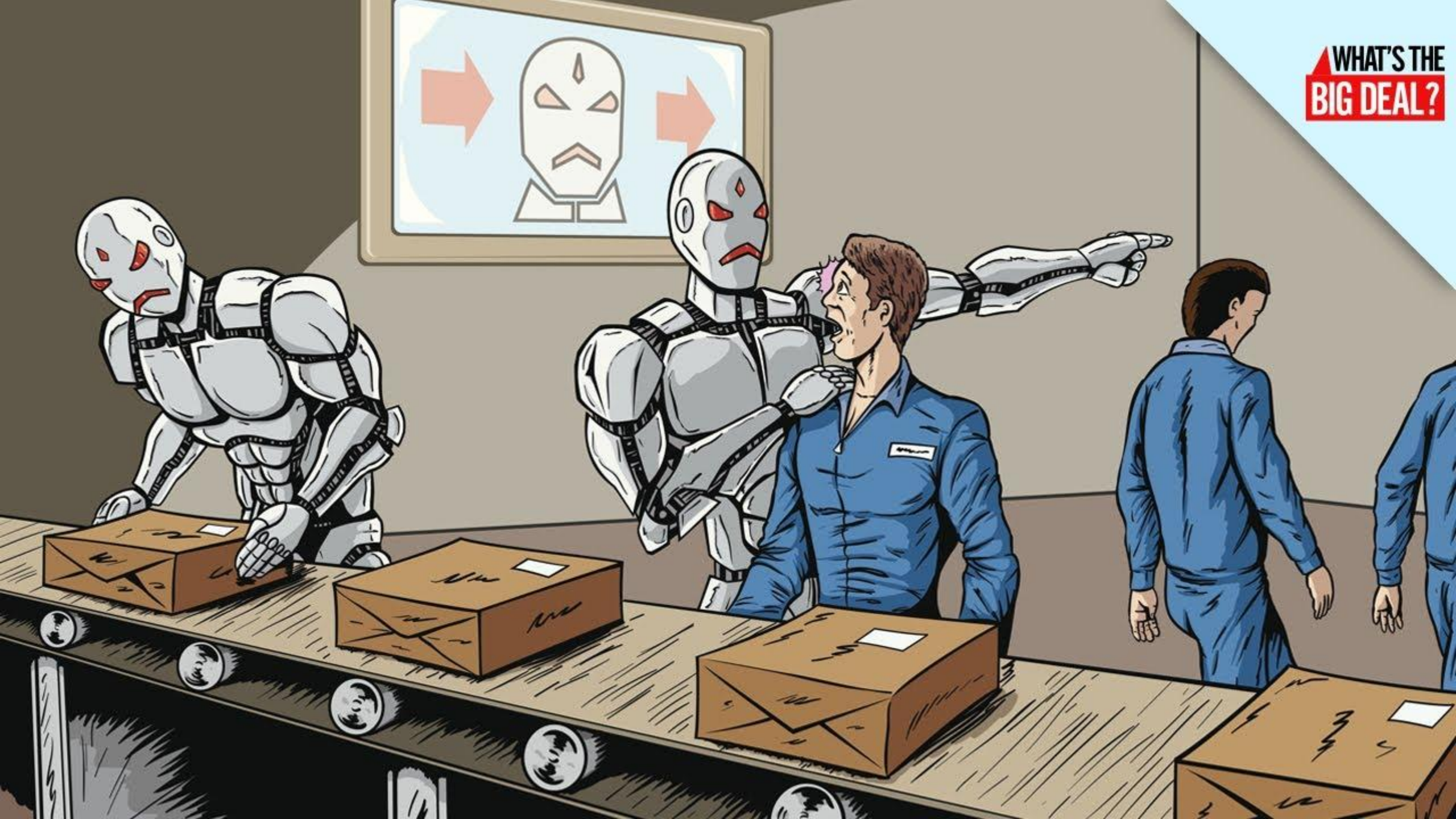
Human Brain	Super Computers
Neuron 10 ^ 12	transistors 10^ 8
many more synapses (10^ 14) connecting these neurons	supercomputer: hundreds of CPUs, 10^12 bits of RAM
cycle time: 10 -3 seconds (1 millisecond)	cycle times: order of 10 -9 seconds

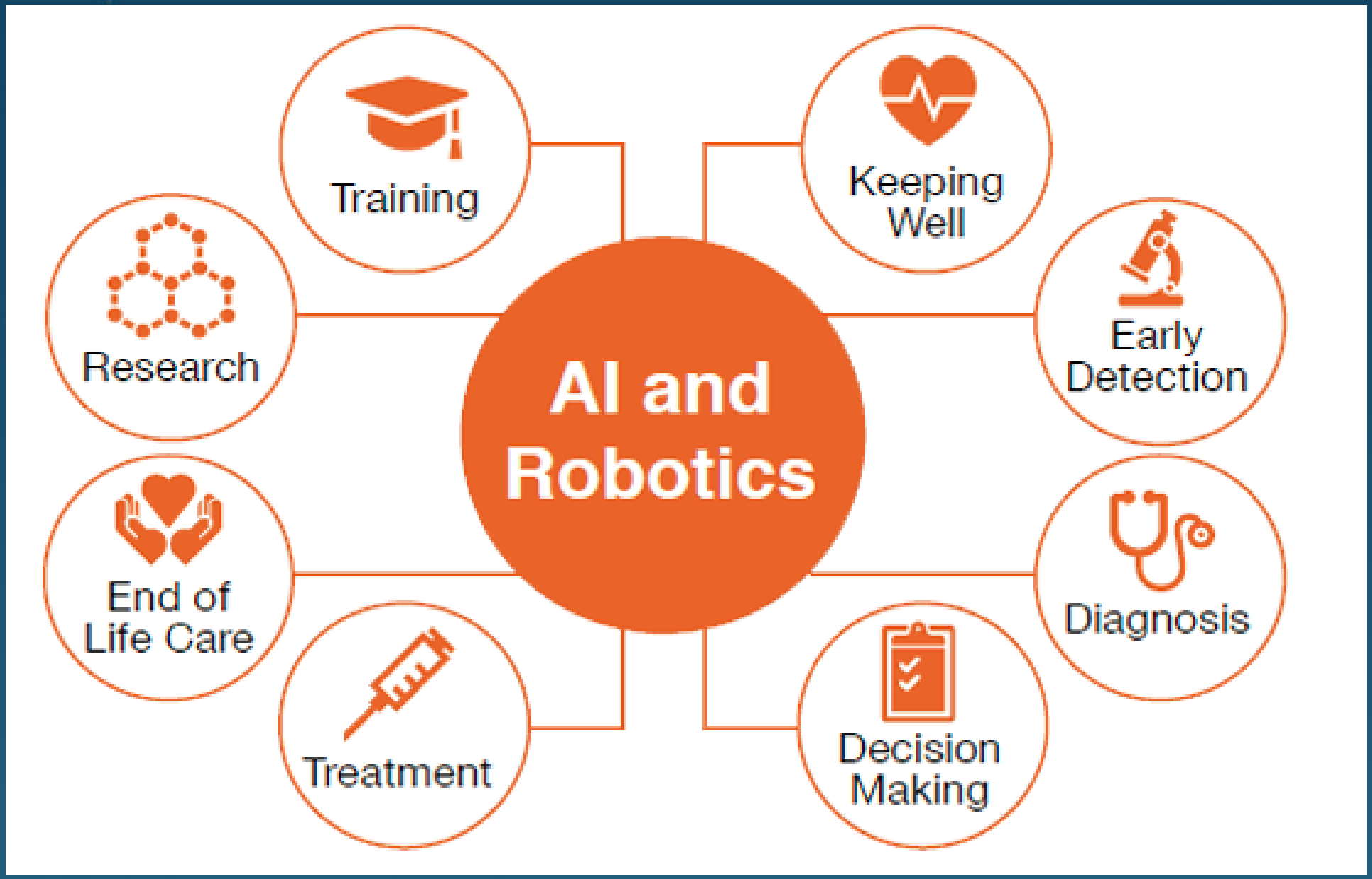
Big Data

AI Today

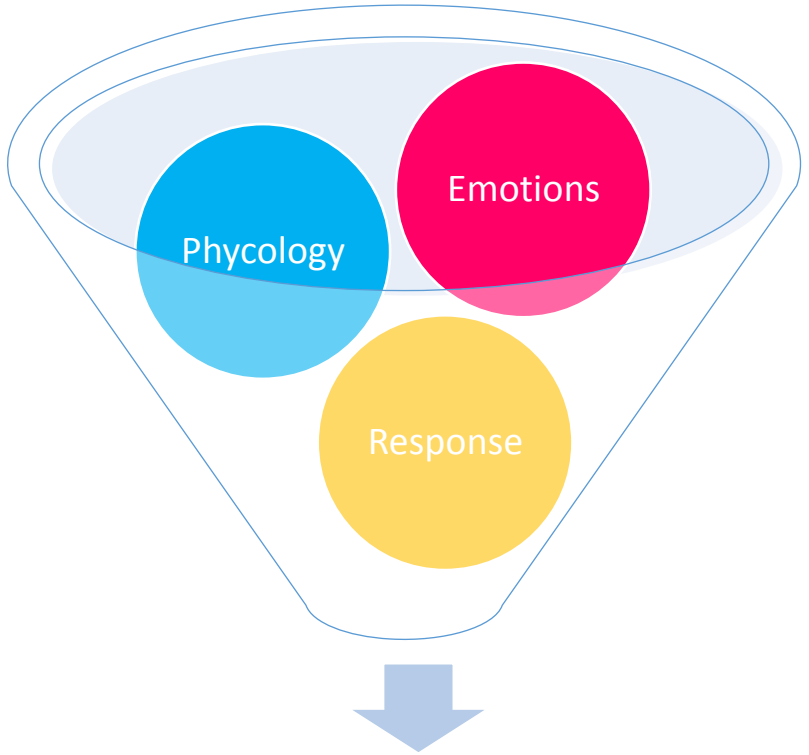
Will AI replace humans jobs ?

Researches in Oxford university said that AI Can replace 50% of humans jobs in the next 45 years..


WHAT'S THE
BIG DEAL?


AI and Robotics
Training
Keeping Well
Research
Early Detection
End of Life Care
Diagnosis
Treatment
Decision Making

AI In Medical side based on Psychology of Humans



Artificial Intelligence Response

AI in health care

Artificial intelligence (AI) in healthcare uses algorithms and software to simulate human cognition in the analysis of complex medical data.

The main aim of health-related AI applications is to analyze relationships between prevention or treatment techniques and patient outcomes.

AI in health care

AI programs have been developed and applied to practices such as:

1. Diagnosis processes
2. Treatment protocol development
3. Drug development
4. Personalized medicine and patient monitoring and care, etc...

AI in Diagnosis

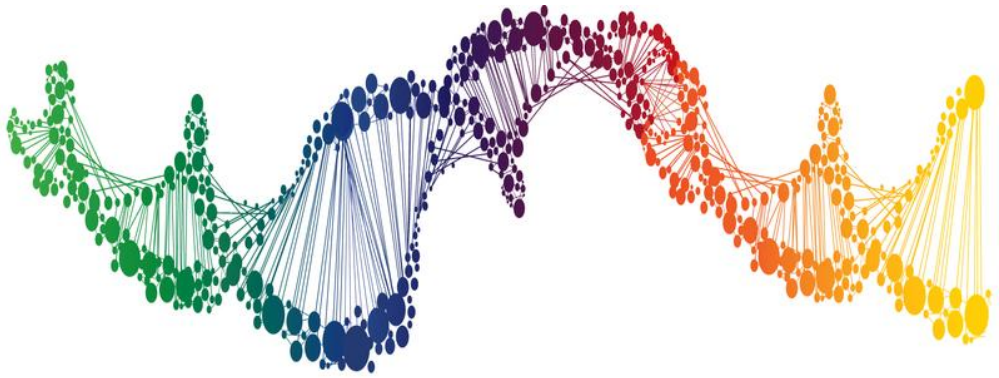
Algorithms and systems based on Big-Data Analysis , machine learning and diagnostic tools
It becomes more accurate with bigger data bases , more patients profiles and more methods of AI parts such as face and images recognition .

AI In Diagnosis

- Experts say that technological innovation will ultimately improve and **broaden access to dental care**.
- As A.I. **continue to evolve Data** including your age, medical and dental health history, EVEN you GENETICS! Will allow the A.I to Develop an accurate opinion on your susceptibility on certain oral diseases

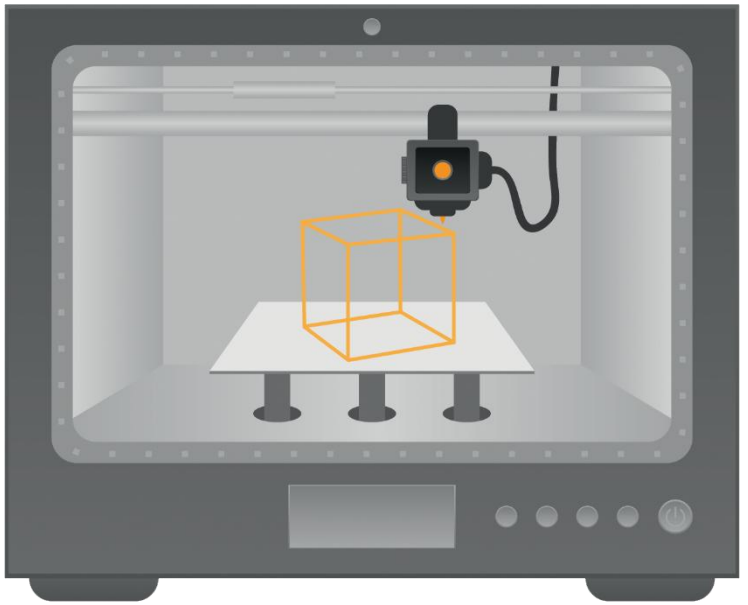
AI In Diagnosis

Whole Genome Sequencing:
Researchers are using Deep learning to identify patterns within high volume genetic data sets. These patterns are then translated to computer models which may help predict an individual's probability of developing certain diseases or help inform the design of potential therapies.

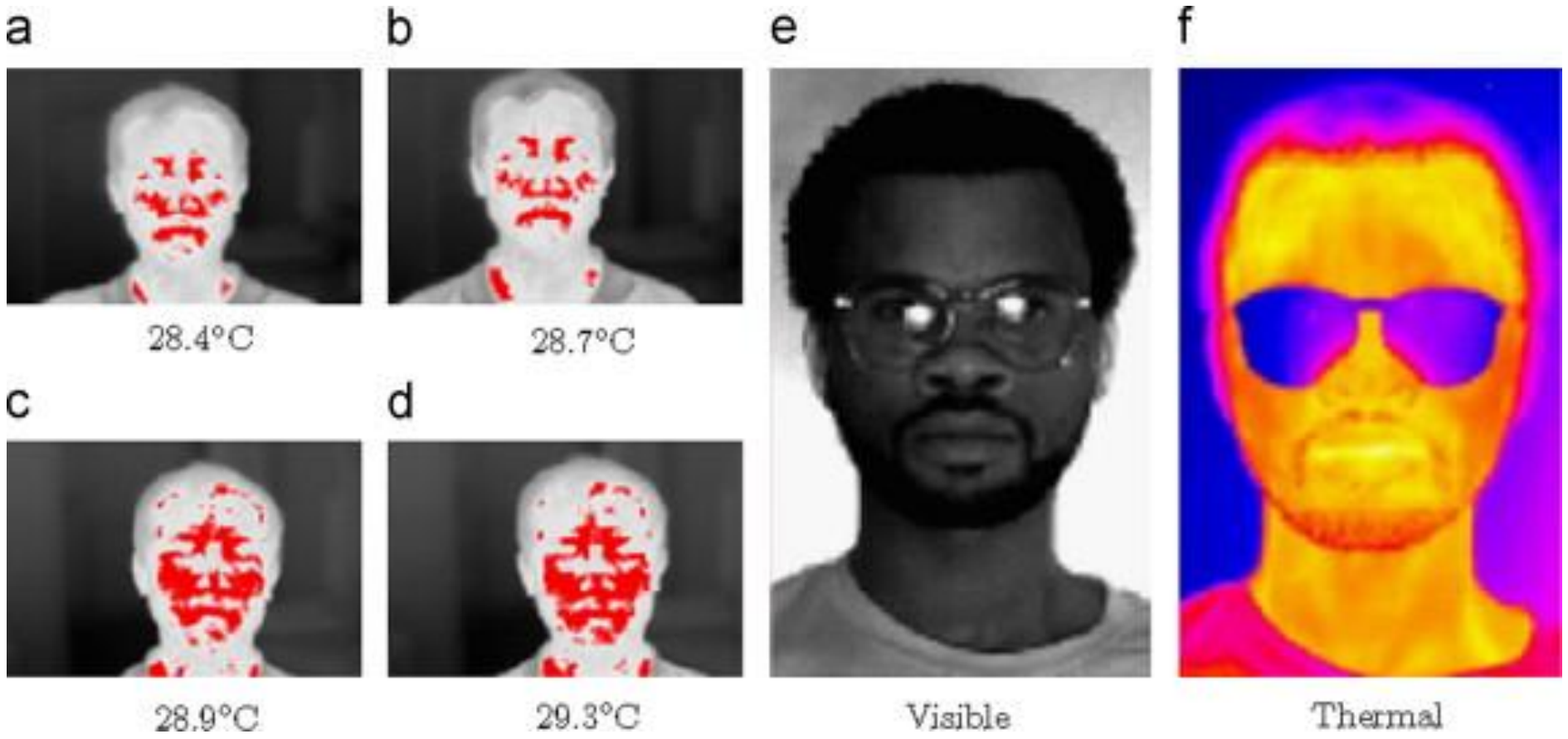


AI In Diagnosis

- this revolution will allow A.I to **develop diagnostic Tools** to analyze collect and store data with inhumanly precision
- **These data's are obtained** from advanced technology like digital imaging ex face recognition , laser toothbrushes , the “S-Ray,” ultrasonically maps both teeth and gums in 3-D to find cavities and diseases

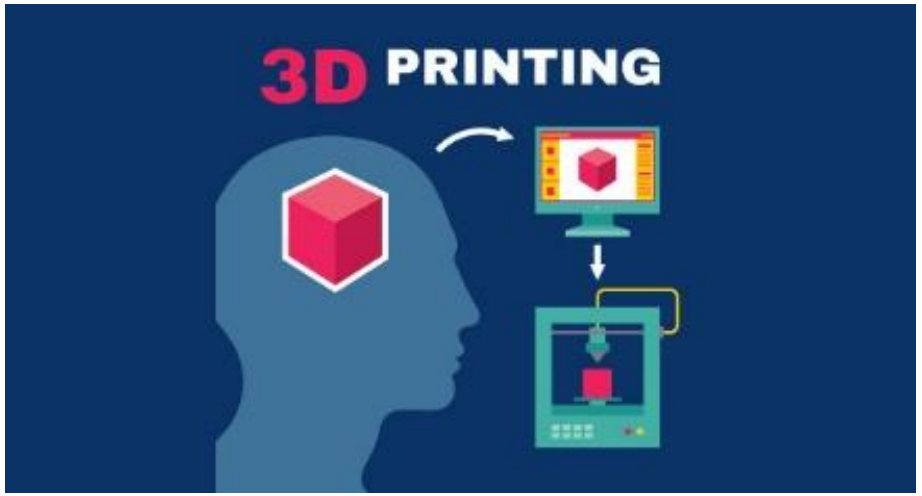


Auto Diagnose of body using Thermal Sensors

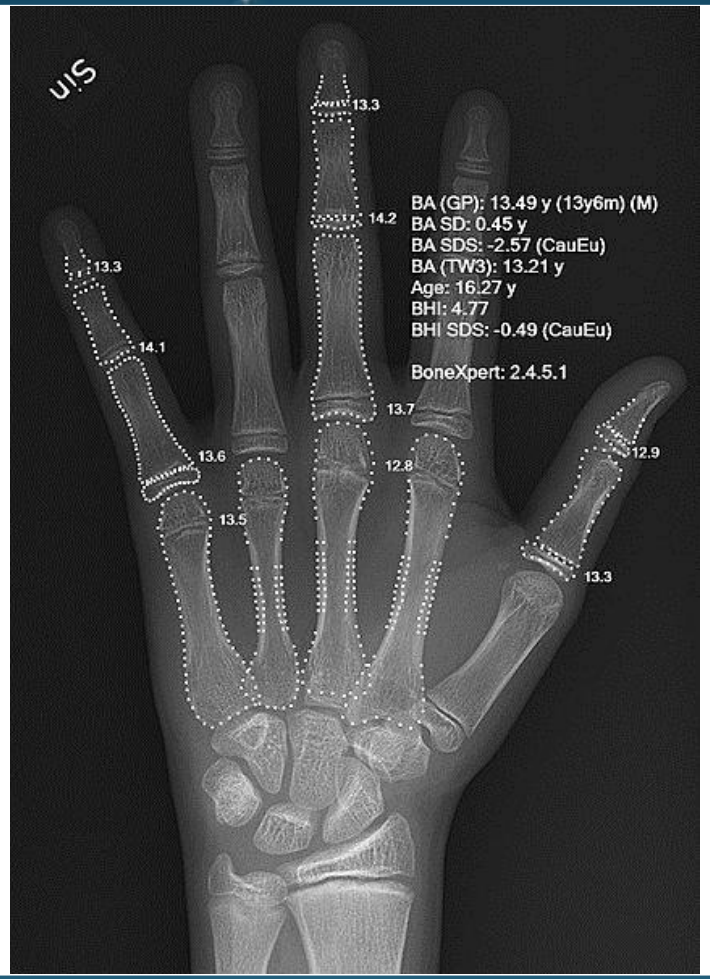


AI In Diagnosis

- here comes the interesting function of A.I. in diagnosing when obtaining these data **by the feature of Deep learning it** will reach several or all data bases and compare theses findings and form a very narrow to percise opinion on the case

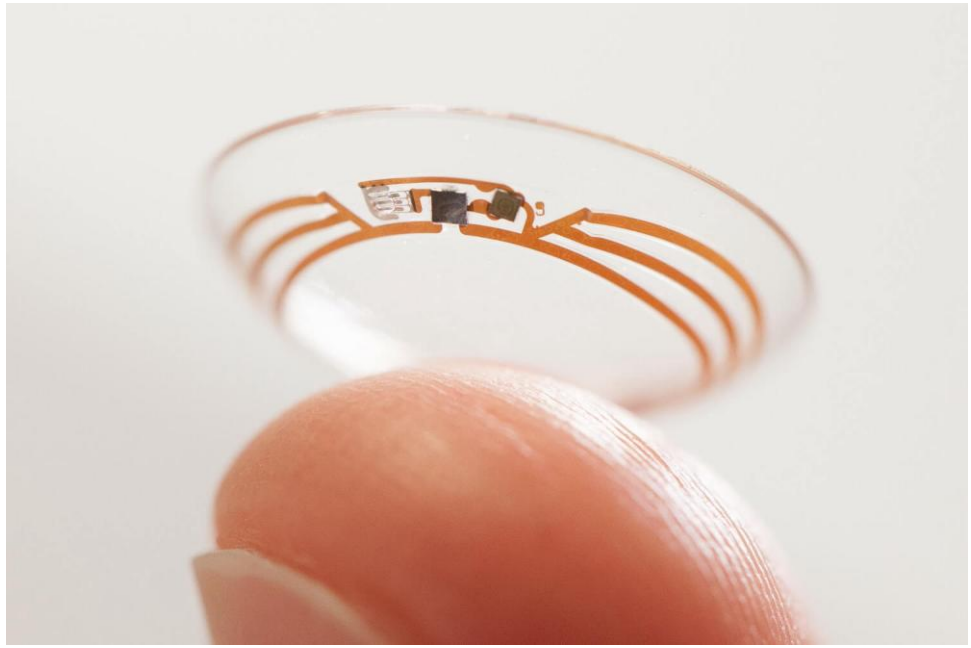


X-ray of a hand with automatic bone age calculation



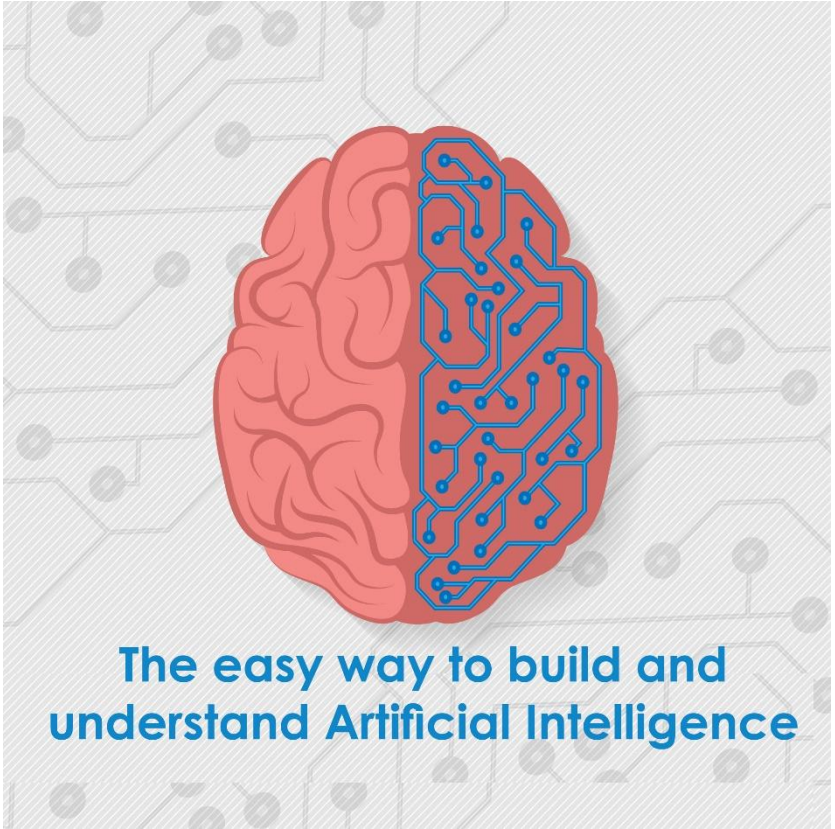
AI In Diagnosis

digital contact lens are sensors used to measure blood sugar levels. Many studies report that diabetes is a risk factor for gingivitis and periodontitis and it is more severe with poor glycaemic control .The risk of developing periodontitis in patients with diabetes has been reported to be three times higher than the general population.



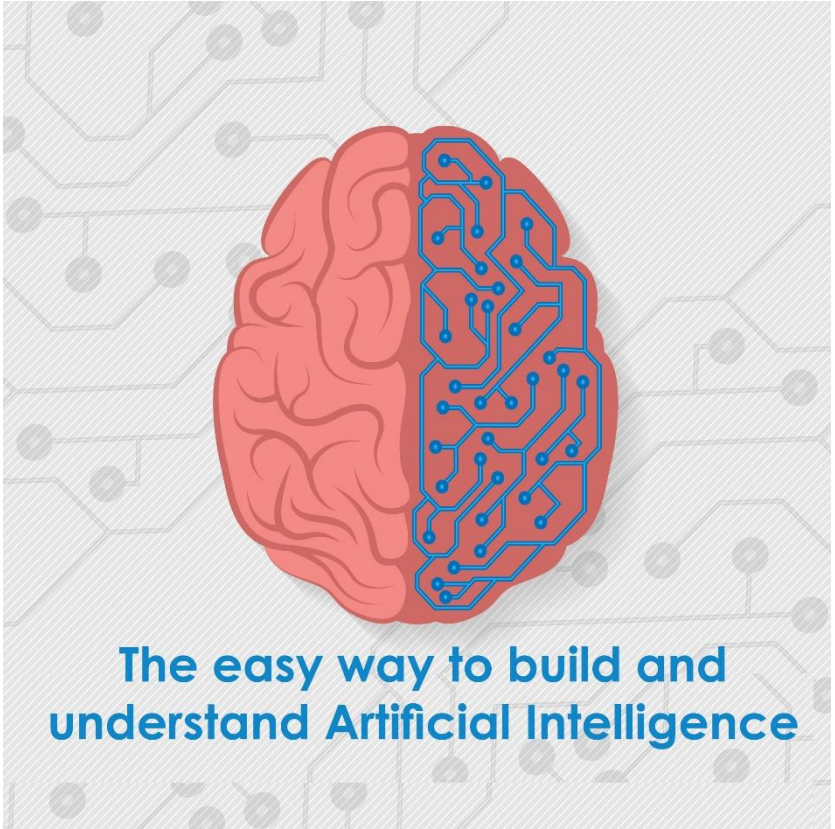
AI In Case Reports Analysis

Modern cases statists and reports are reviewed not by human but with software's based on A.I using Data analysis and machine learning concepts for review every case and compare it with other case's signs and symptoms to find new treatments and the best specific drugs for these cases .



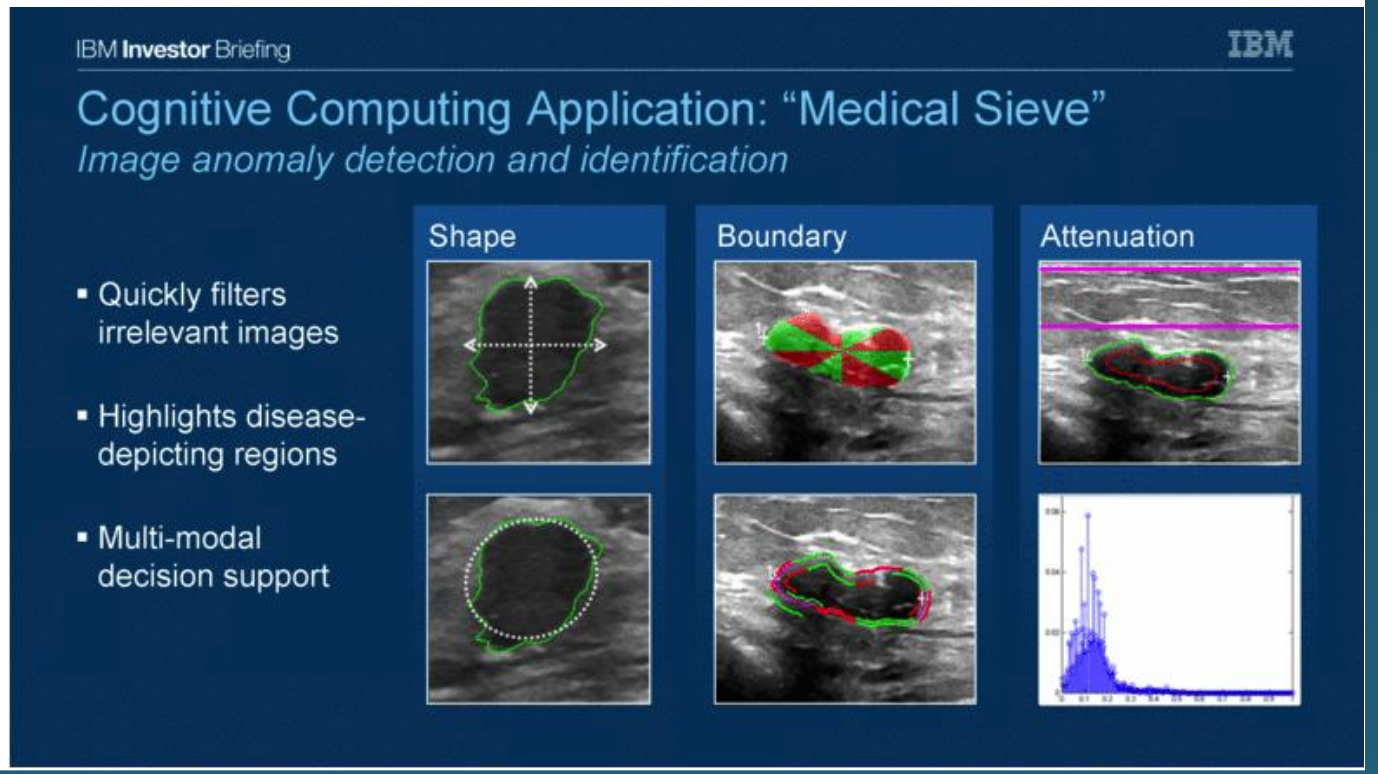
AI In Case Reports Analysis

This idea actually is not that faraway or impossible , there are many researches about cure some types of malignant tumors by use of A.I cases analysis



AI In Treatment

For e.g **IBM Watson** developed an A.I. that helps oncologists , from the previous diagnosis and obtained data to determine the most convenient and effective treatment plan

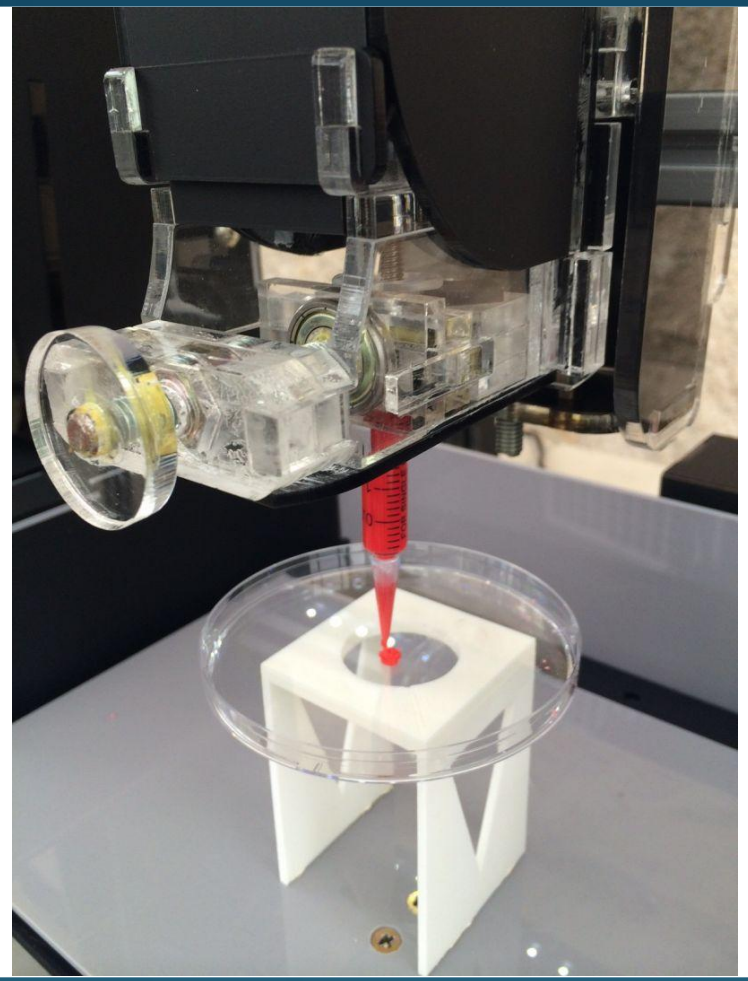


AI In Treatment

AI in treatment ANI likely help in health care move from traditional “ *One Size Fits All* “ medical solution , towards more related and uniquely composed drugs, in tow words “ Precision medicine “

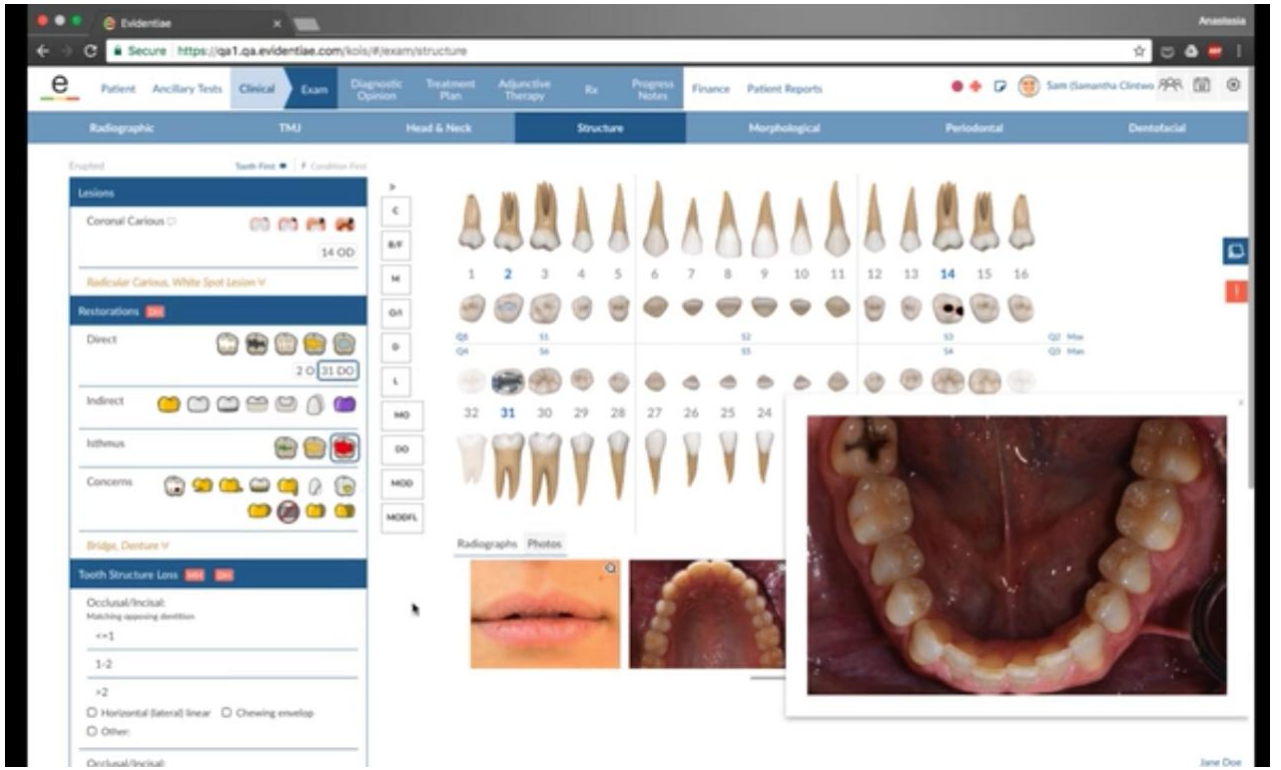
Using of Extra Tools

- Bio-printing is the next phase and soon is going to be more familiar among dentistry. the A.I. will manufacture 3D prints of the most suitable restoration and caps using current technologies such as CAD/CAM



Super Diagnose of Oral Cavity

Since dentistry is now directed more towards prevention rather than treatment the **A.I. will incorparate** itself in peoples home and smart devices allowing them to make better decisions concerning their oral-health



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Evidentiae

Evidentiae's algorithm is designed to pull information from medical and dental histories as well as from charted exam findings to generate a comprehensive overview of your patient's dental health. It develops an extensive diagnostic opinion for periodontal concerns, biomechanical parameters, functional decision making and dentofacial alterations.

So , In Dentistry !

- A.I **will better** the dentist and patient **lives**
- It **will reduce** the costs and be **timely effective** on the patient by eliminating any unnecessary procedures due to misdiagnoses
- It **will better the outcome** of the dentist and be also timely effective by handling repetitive tasks
- **It will increase patients satisfaction rate**
- increased volume and availability of health-related data from personal and healthcare-related devices

Big World In AI !

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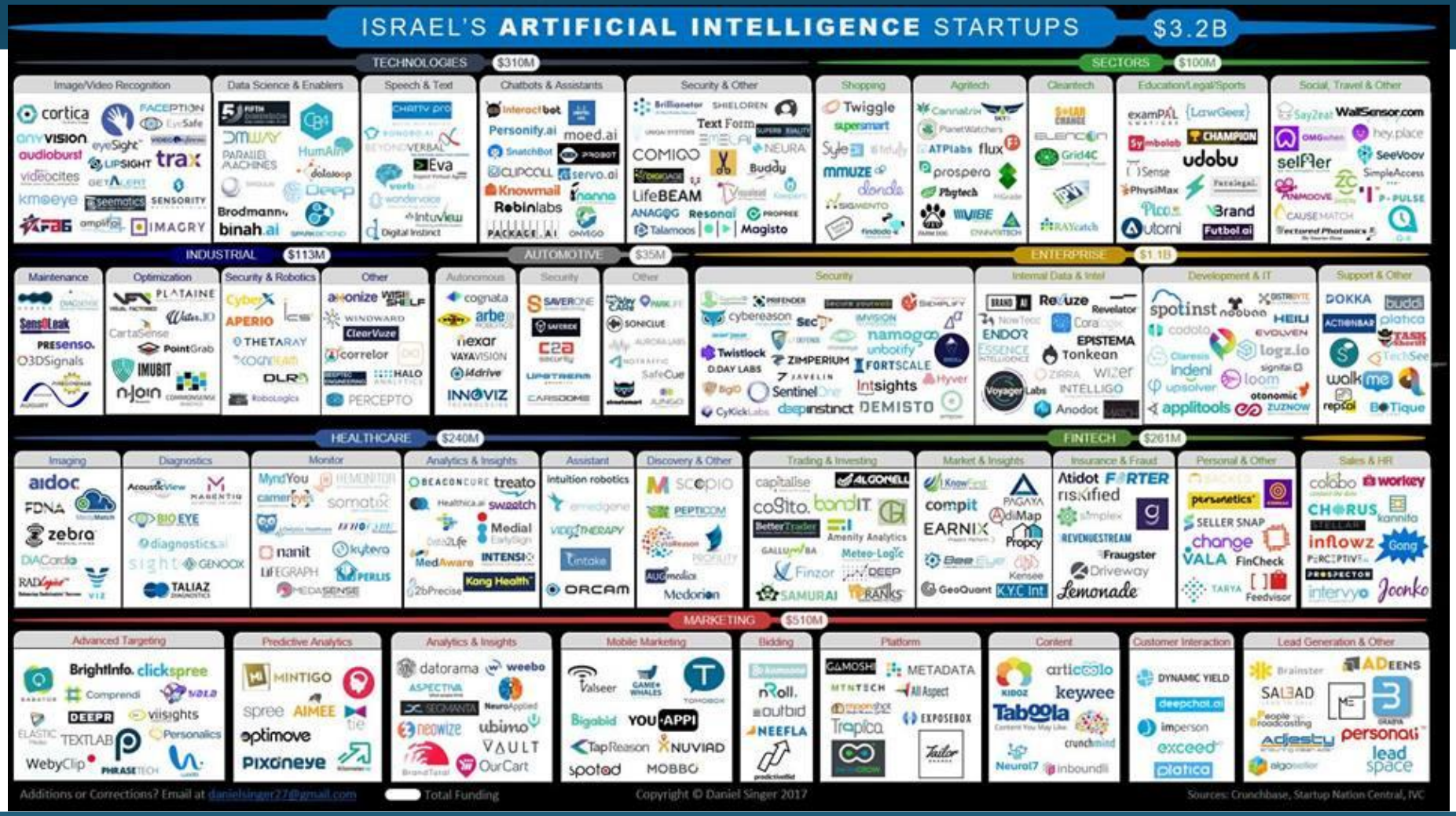
AI Startup Companies



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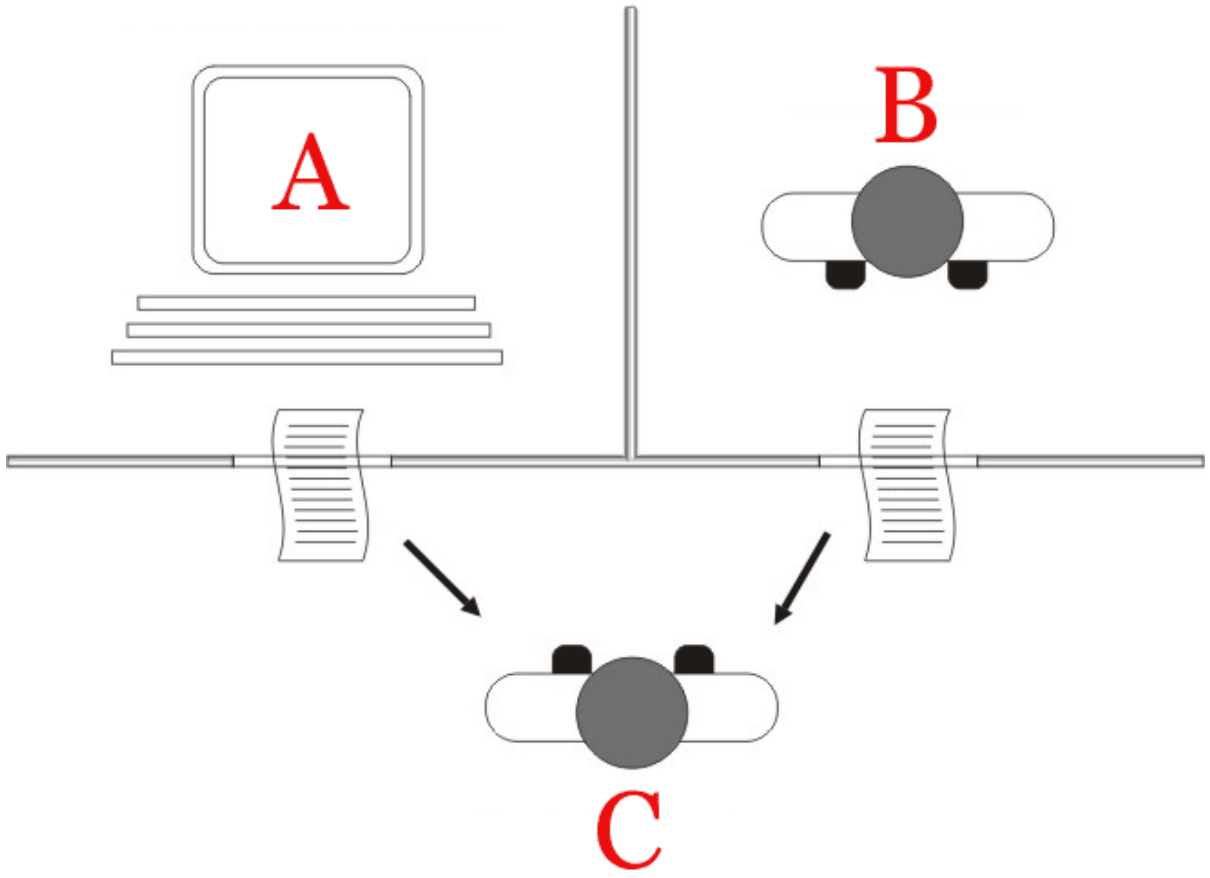
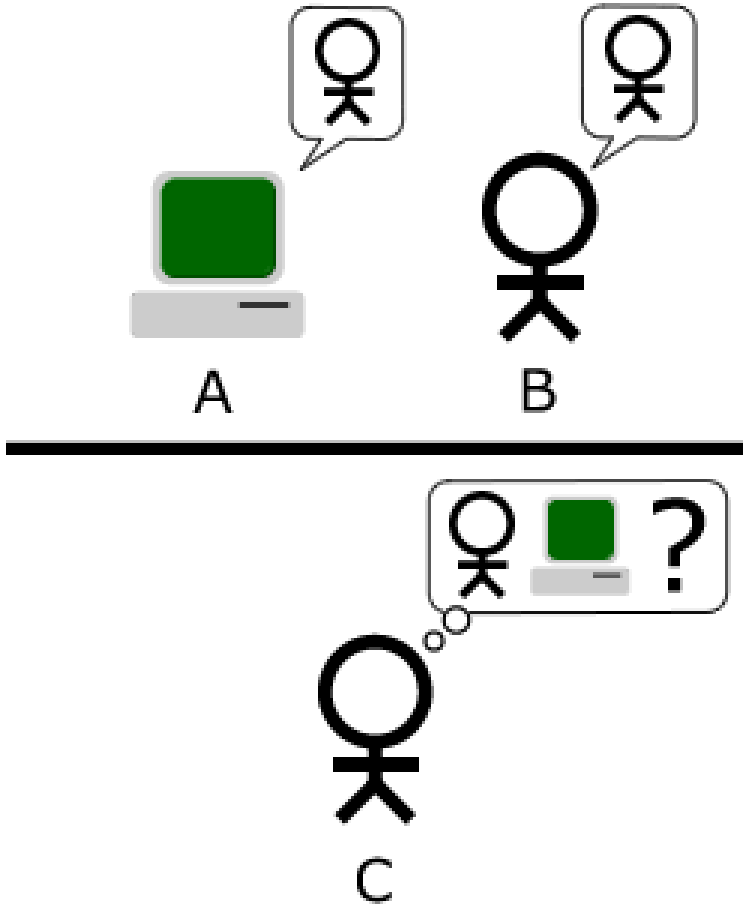
Nerror Technology

60 Years Ago

Turing test



Turing test



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Thank You !

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