

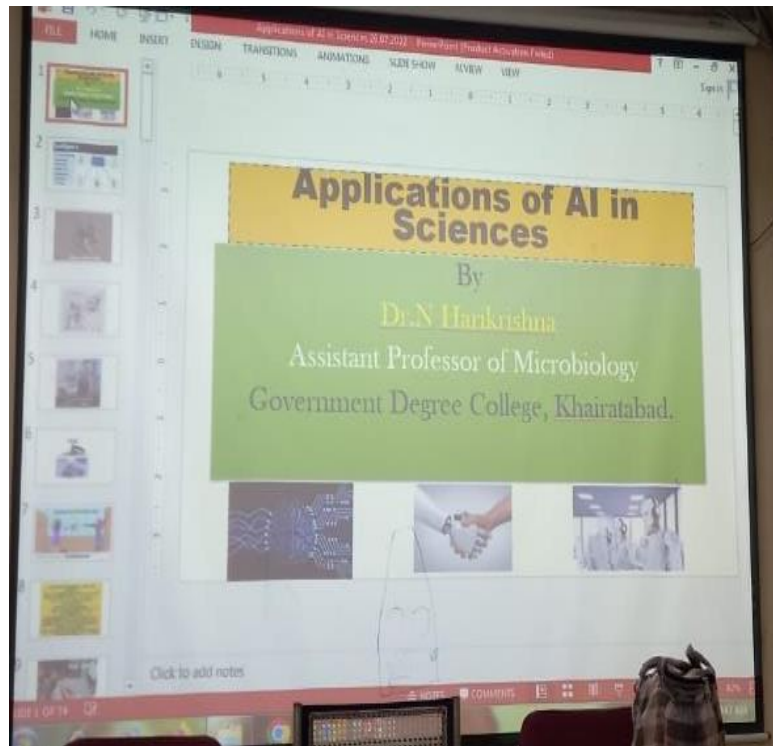


Tara Government College Sangareddy
(Autonomous)



An ISO 9001: 2015 certified college
Department of Microbiology

A brief report on



Extension lecture entitled “**Applications of artificial intelligence in Sciences**”

Organized by Department of Microbiology

Date: 26.07.2022

Report on extension lecture entitled “**Applications of artificial intelligence in Sciences**”

Organized by Department of Microbiology

Date: 26.07.2022

Introduction:

Extension lecture entitled “**Applications of artificial intelligence in Sciences**” organized by the Department of Microbiology on 27.07.2022. The invited Speaker for this extension lecture is Dr. N. Harikrishna Assistant Professor of Microbiology, Government Degree College, Khairatabad.

Aim : To create awareness about the Artificial intelligence basic concepts and applications in sciences

Objectives:

- To promote and update the existing knowledge
- To inculcate the scientific temper among the students
- To create awareness among the students about latest technological applications in daily life

Brief report:

Artificial intelligence is an emerging field that has wide applications in multifaceted industries. It has taken role in our daily life. In our mobiles phones also artificial intelligence is used. The speaker Dr. N. Harikrishna enlighten the basic components of the artificial intelligence and discussed about the various applications in the sciences especially in health care and research. He also quoted different examples spam mail you tube recommendations, facebook etc. In health care he discussed IBM Watson, Google AI eye, Babylon and virtual nurse applications for human welfare. He also shown the videos of plantix, harvest croo, farm bot artificial technology used in the agriculture field. In this program about 40 students are participated along with faculty members.

Glimpses of photographs



TARA GOVERNMENT COLLEGE SANGAREDDY

(AUTONOMOUS)

(Re-Accredited with 'B' grade by NAAC)

Sangareddy District, Telangana State, India



Certificate of Appreciation

This is to certify that Dr./Mr./Ms. N. Hari Krishna
Professor/ Associate Professor/Asst. Professor/Lecturer of Microbiology
Government Degree College, Khairatabad
has delivered an Extension Lecture/Talk on Applications of AI in sciences
for B.Sc. Microbiology Students. This Programme/
Lecture was organized by the Department of Microbiology
The Presentation is informative and Impressive. This certificate has been issued in acknowledgment
of his/her association and participation with the Extension Lecture /Programme.

Dr. K. Jyothi
In Charge

Alex. G. G. G.
Principal

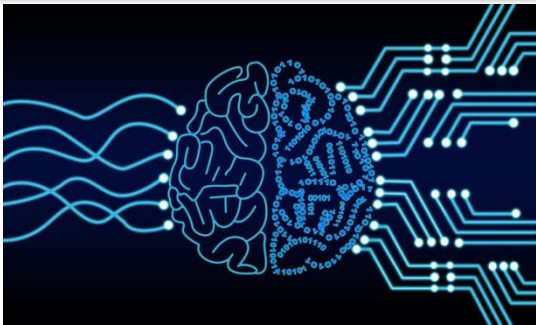
Applications of AI in Sciences

By

Dr.N Harikrishna

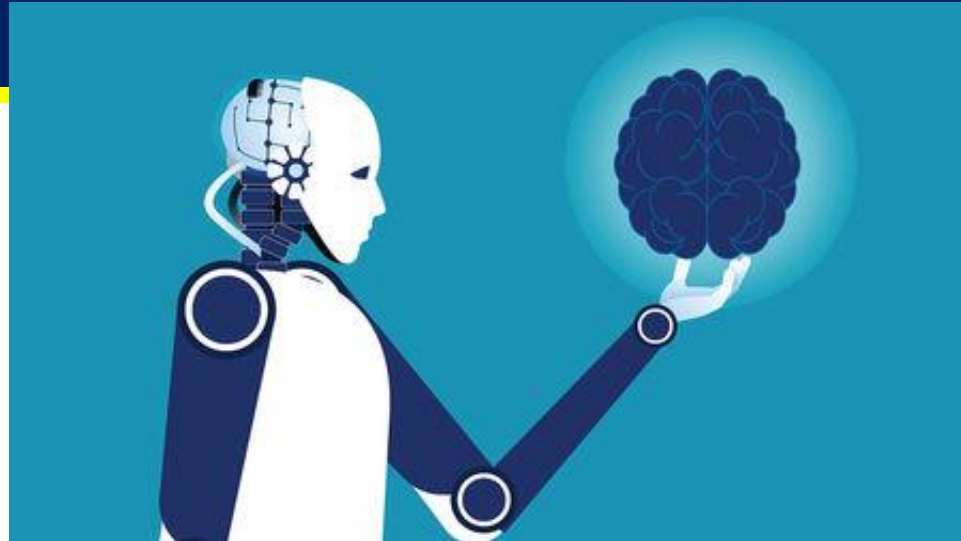
Assistant Professor of Microbiology

Government Degree College, Khairatabad.

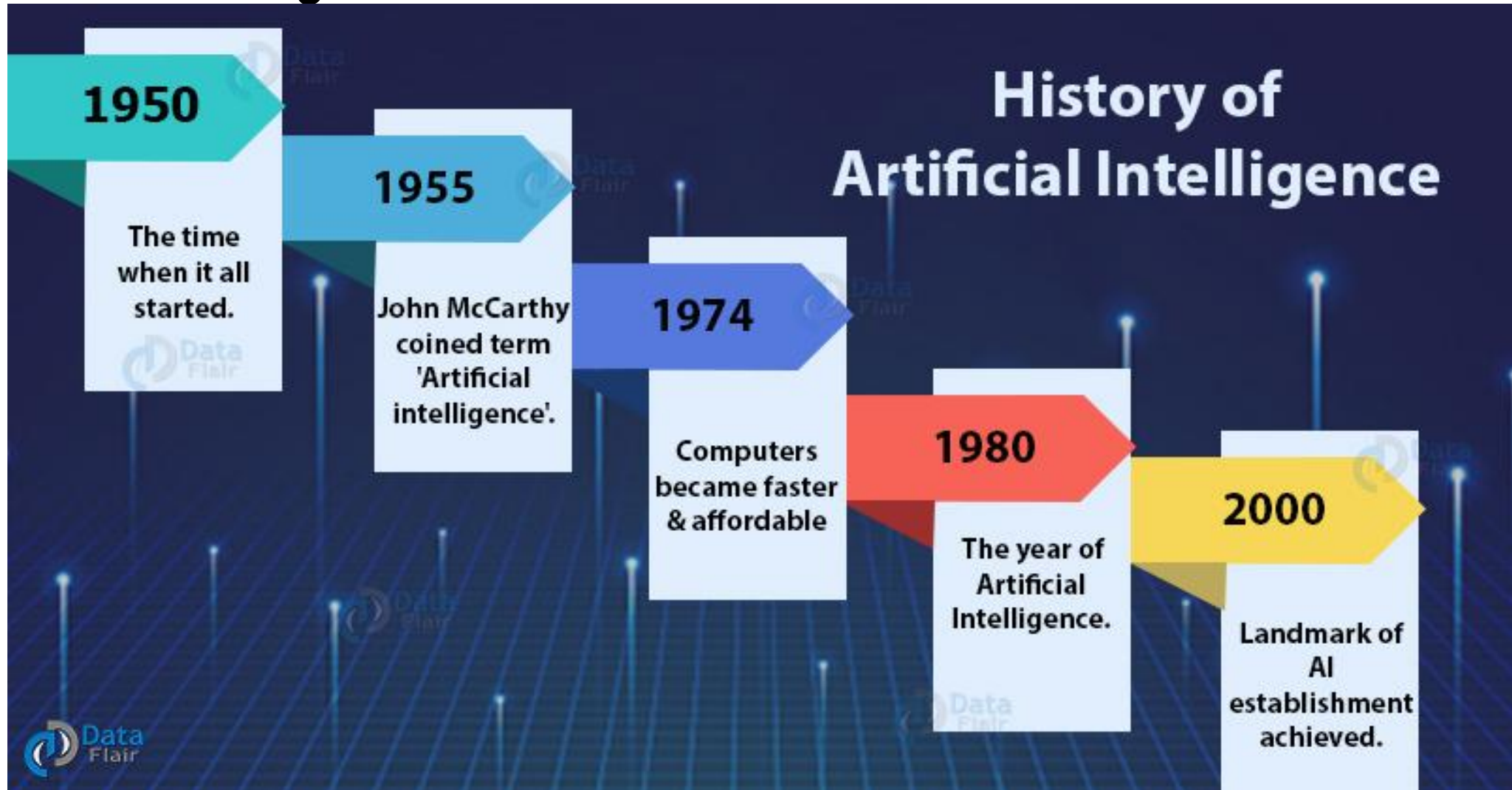


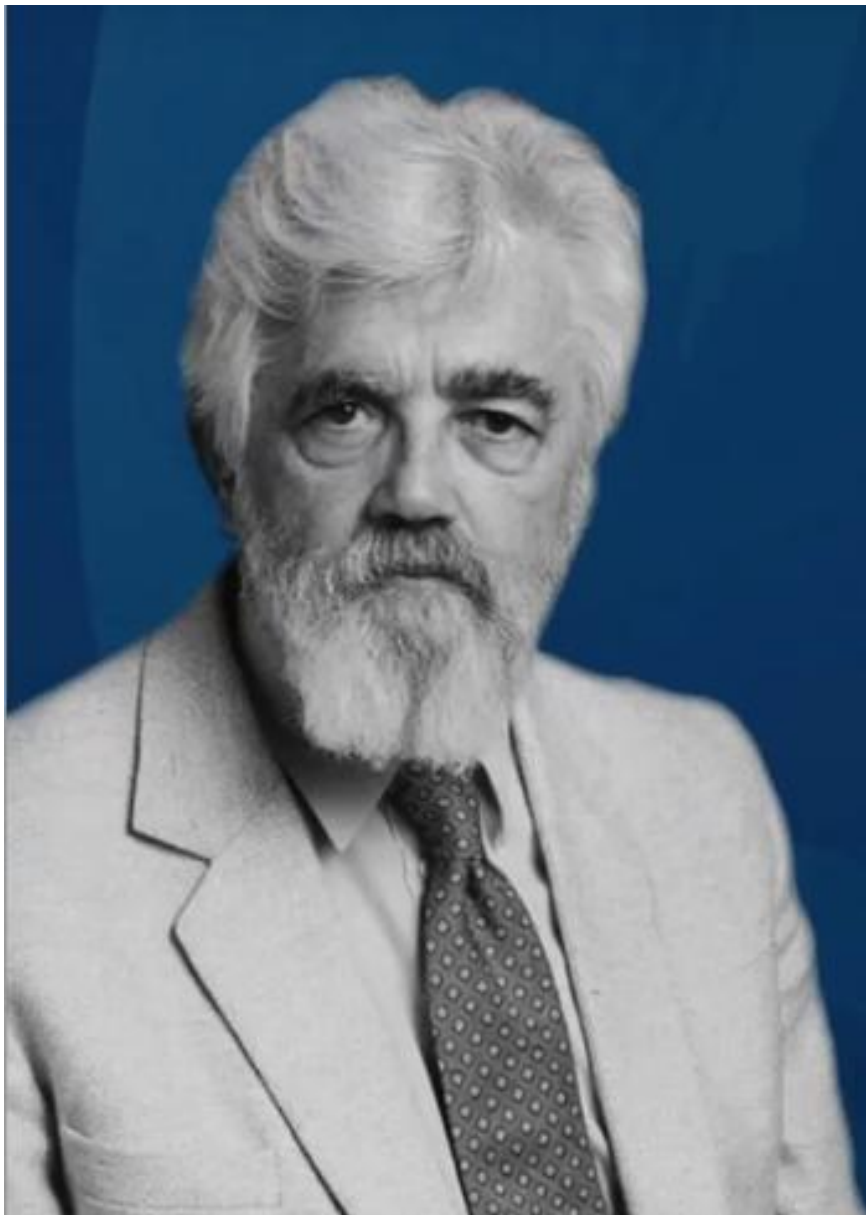
Definition

- Simulation of human intelligence by machines.
- AI is combination of Mathematics, Computer science, Psychology, Neurology, Sociology, Biology, Philosophy



History

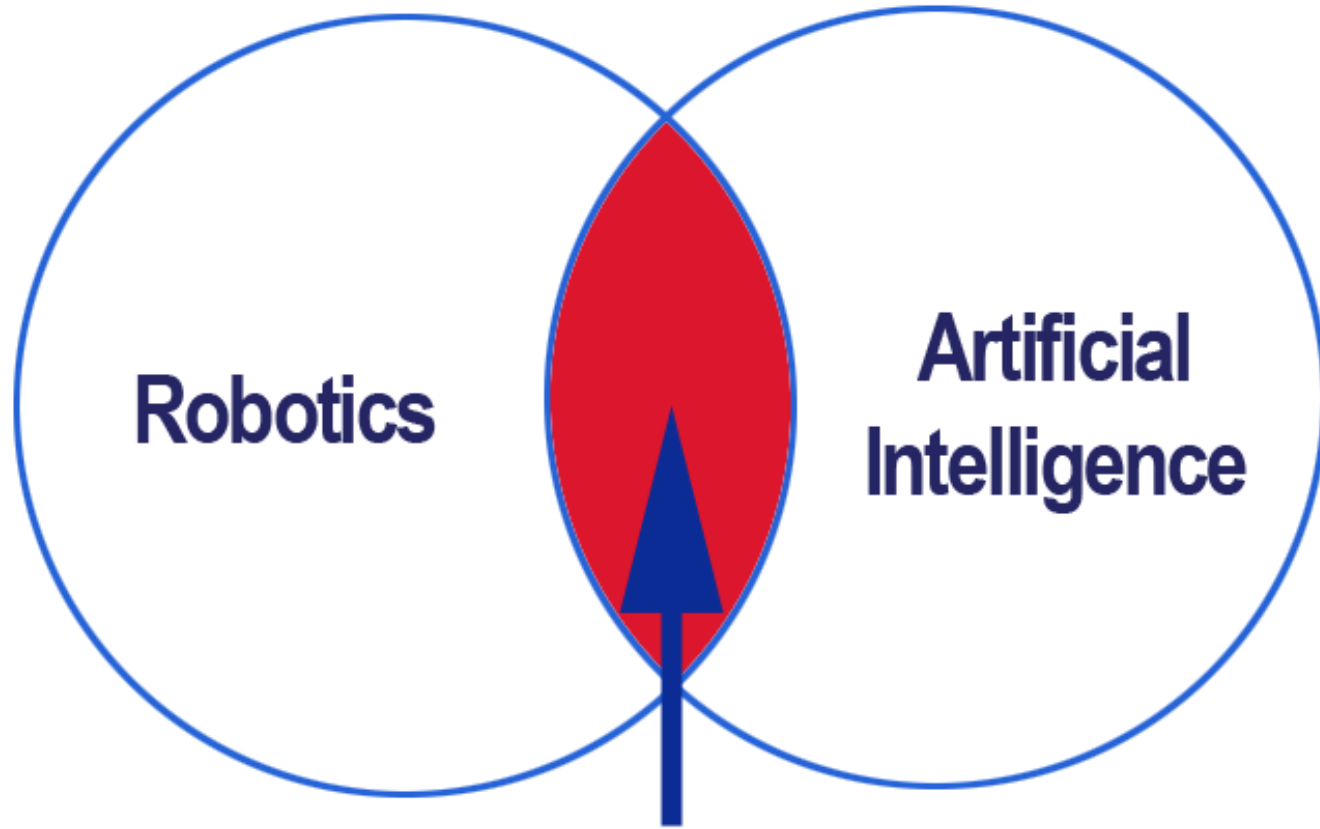




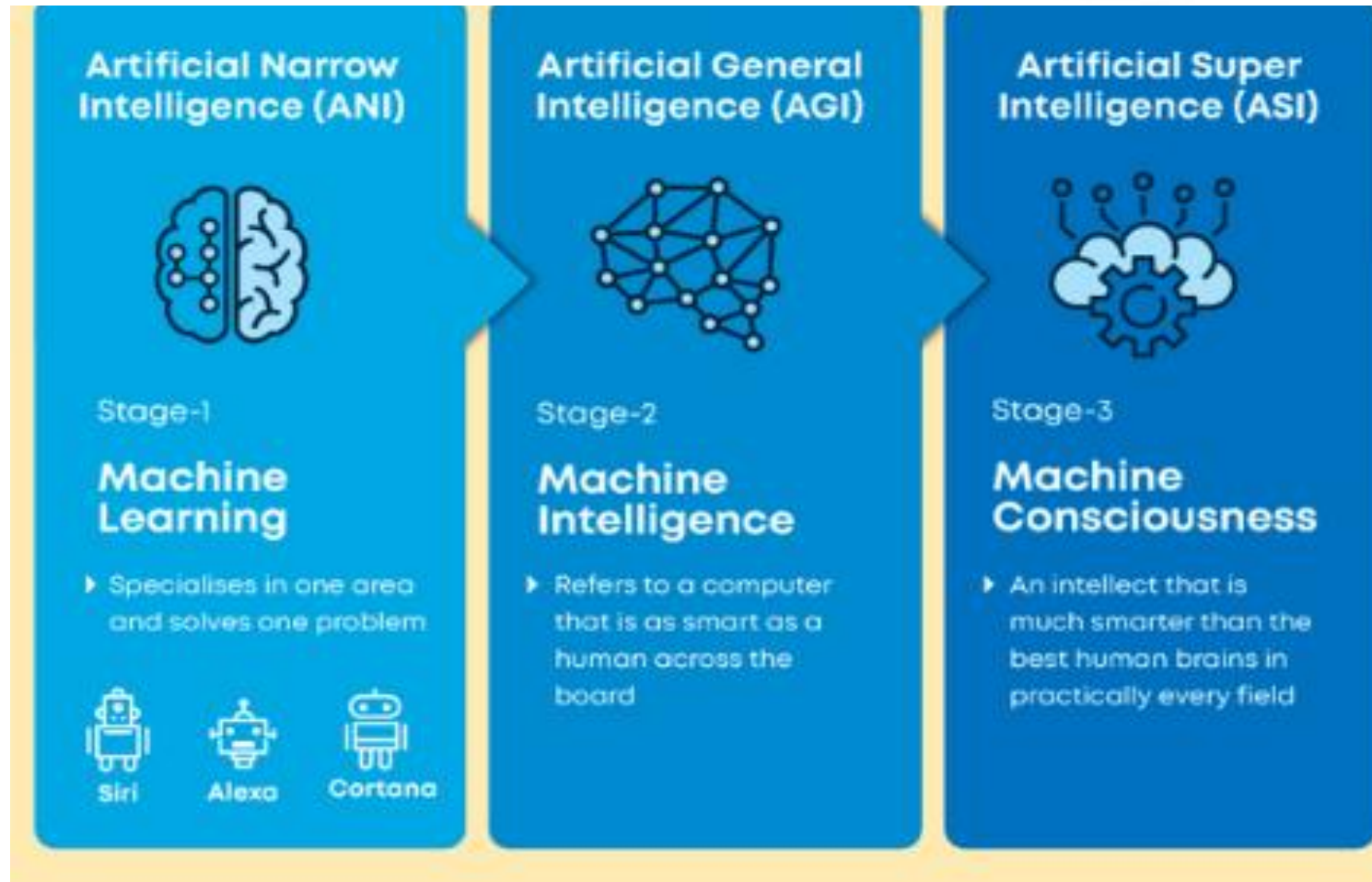
The term Artificial Intelligence (AI) was coined by John McCarthy, an American computer scientist, in 1956 at The Dartmouth Conference. He defined it as:

“Artificial Intelligence is concerned with the design of intelligence in an artificial device”

“It is the science and engineering of making intelligent machines, especially intelligent computer programs”



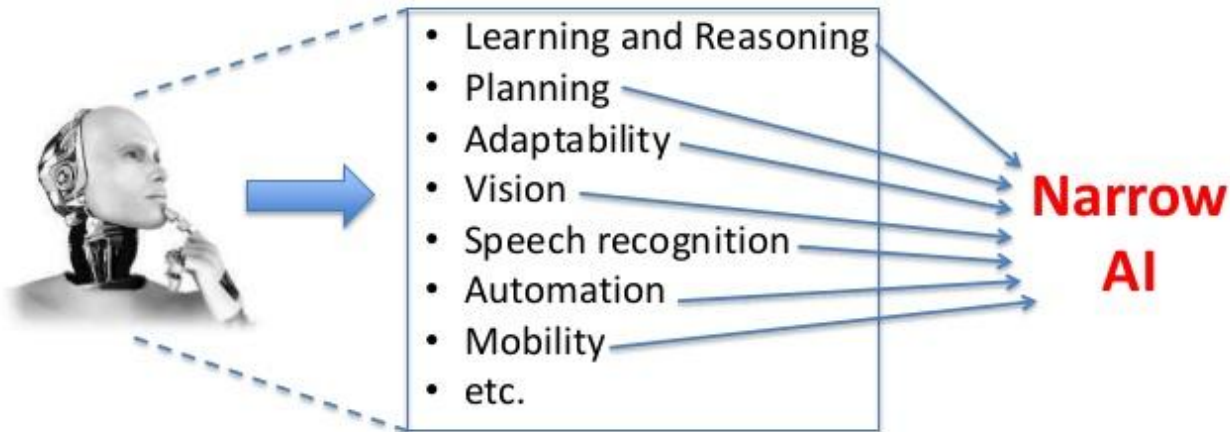
**Artificially
Intelligent
Robots**



Type-I

Artificial Narrow Intelligence

Narrow AI

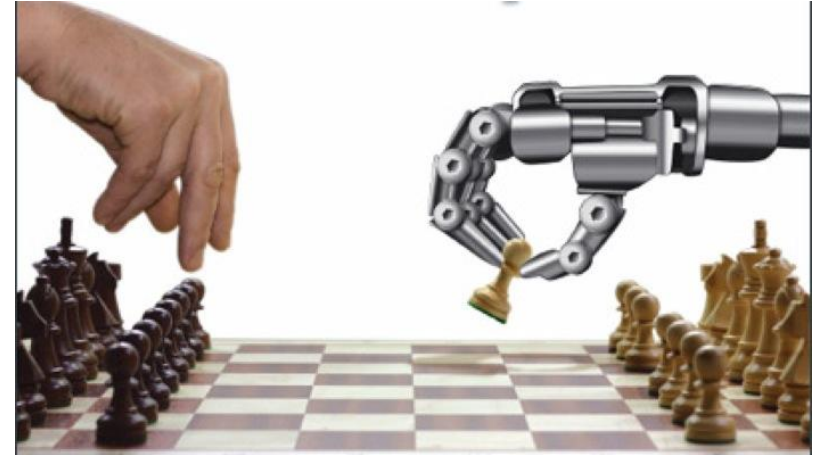


- People have been working on for the last 50 years
- This has many applications

- E.G:
1. ALEXA
 2. SOFIA ROBOT
 3. Self driving Cars
 4. SIRI
 5. ALPHAGO

Artificial General Intelligence

- ❑ AGI is Intelligence of a machine that has capacity to understand or learn any intellectual task that a human being can.
- ❑ They have strong processing units
- ❑ They can do task easily in fraction of seconds
- ❑ Unable to think and reasoning



Ex Machina (2014)



Robot and Frank (2012)



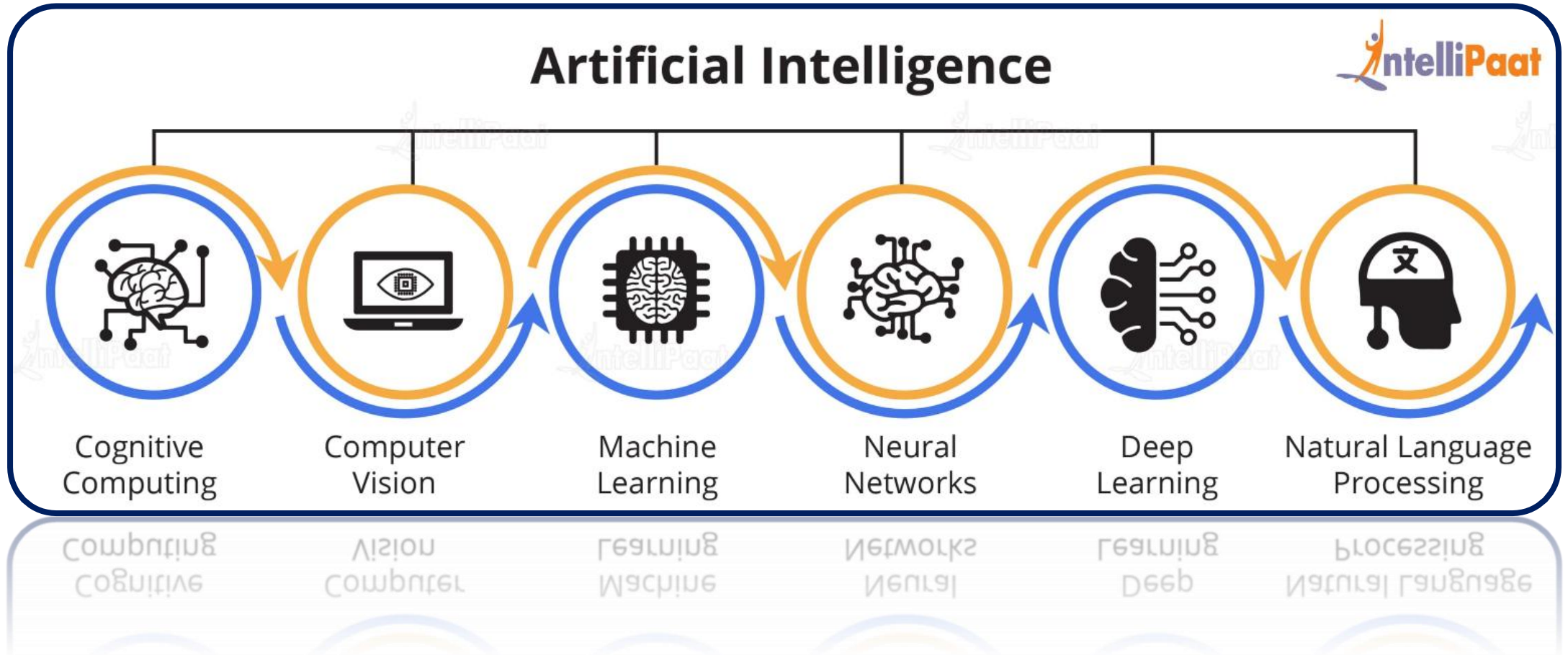
Prometheus (2012)

Artificial Super Intelligence

- They are hypothetical
- Not yet discovered
- Scientist expect them by 2040
- They can do lot of work and think more than humans with reasoning



Basic components of AI



Artificial Intelligence

Machine Learning

Deep Learning

The subset of machine learning composed of algorithms that permit software to train itself to perform tasks, like speech and image recognition, by exposing multilayered neural networks to vast amounts of data.

A subset of AI that includes abstruse statistical techniques that enable machines to improve at tasks with experience. The category includes deep learning

Any technique that enables computers to mimic human intelligence, using logic, if-then rules, decision trees, and machine learning (including deep learning)

Machine learning

- Subset of AI use to perform a specific task without using explicit instructions, relying on patterns and inference instead.
- It works based on the data
- Simply it learn from the past experience without being actually programmed i.e. without any human assistance

Machine learning

For example;

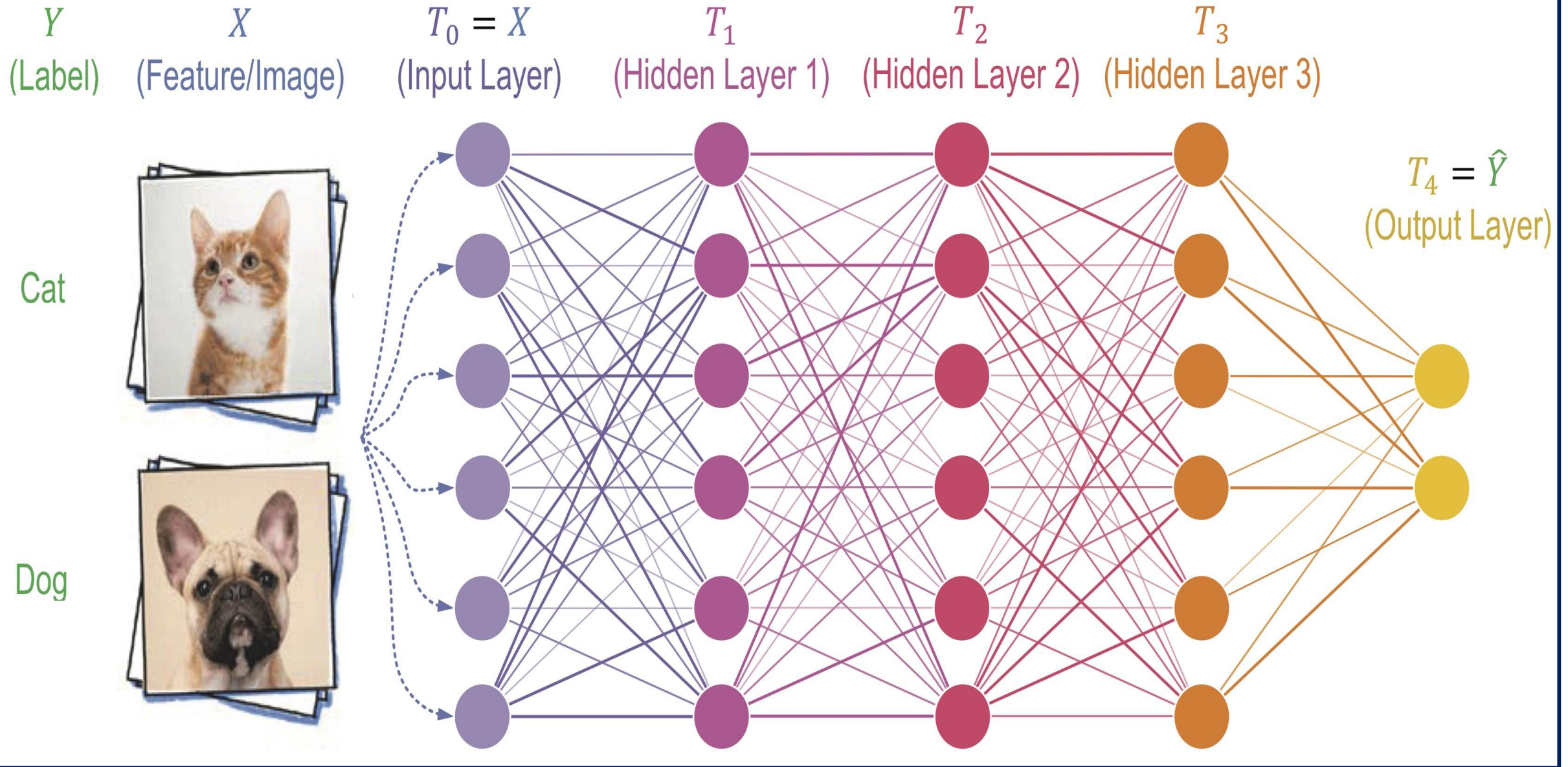
- ALEXA
- Google Maps- Traffic areas knowing
- NET FLIX- recommends the movie based on our view
- GOOGLE Search engine
- YOU TUBE

Deep learning

- **Deep Learning** is a subfield of machine learning concerned with algorithms inspired by the structure and function of the brain called **artificial neural networks**.
- It learn by itself
- It performs multiple tasks. E.g: Self driving cars

Deep learning

- Feature extraction is automatic
- It extracts all features
- It uses neural network
- Neural network has
 - a. Input layer
 - b. Hidden layer
 - c. Deep network



Examples

- Speech recognition
- Self driving cars
- Language translation
- Visual translation

Input

- Sight
- Sound
- Touch
- Smell
- Taste

These input is converted to digital format

OUTPUT

- Presented on screen,
- Paper
- Magnetic disk
- Speech
- Movement

Applications of artificial intelligence

- Fit bit watch
- Garmin watch
- Mirror fitness





Applications in Agriculture

- 18% GDP is acquired by agriculture
- Population depends on agriculture is 66%.
- Agriculture occupies 43% geographical area.

Applications in Agriculture

- Increases the yield- assesses the conditions to increase productivity
- Precision farming-
- Microsoft collaborated with Andhra Pradesh 175 farmers and suggested methods for sowing, harvesting and other procedure to increase the productivity.

Applications in Agriculture

- Stress level management by image processing.
- Images are collected by high resolution camera and sensors.
- They identify diseases by Machine learning models and computer vision.

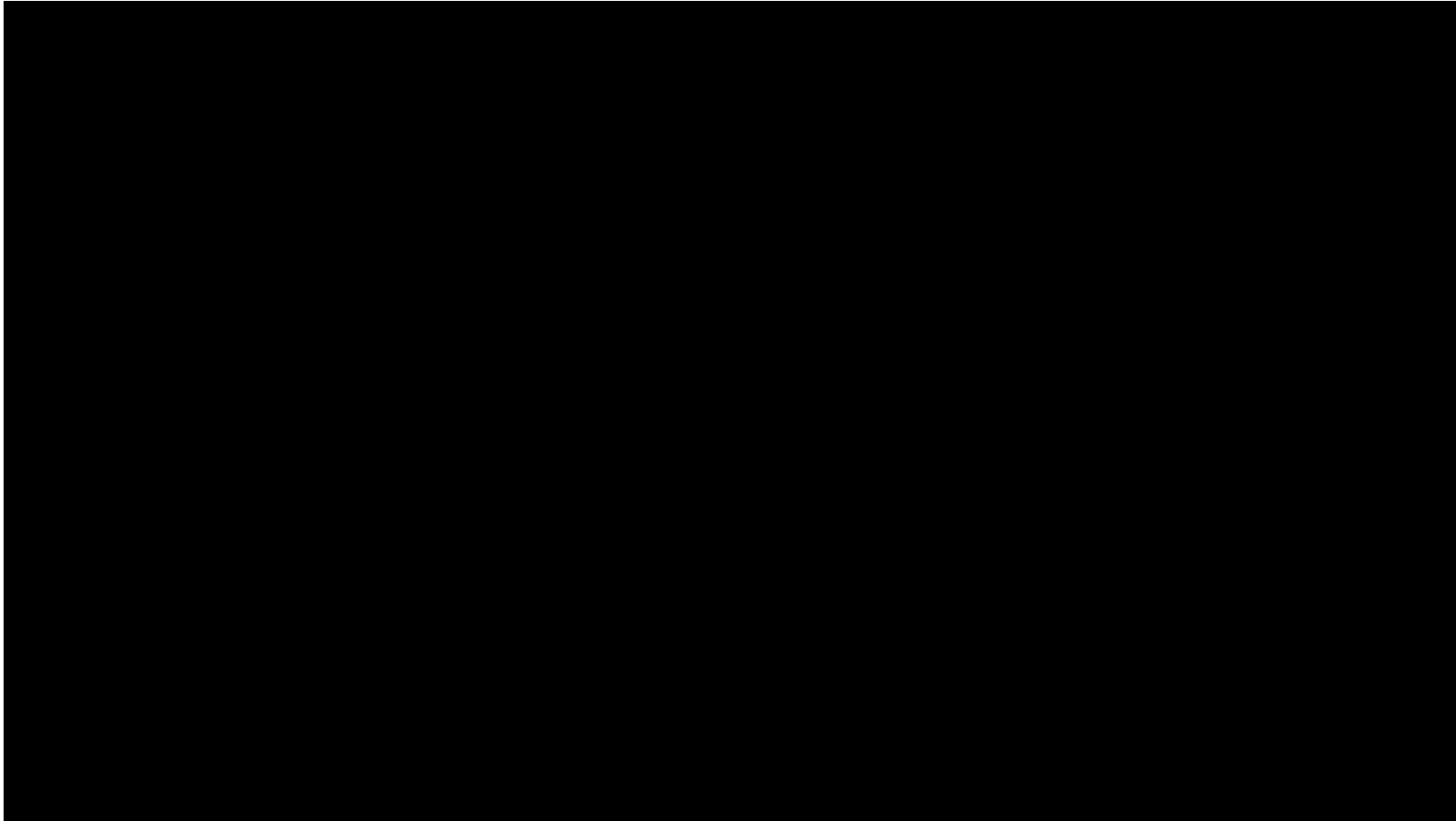
- Harvest croo
- Blue river technology
- Awhere- providing weather-based tips for smallholder farmers
- Plantix- plant disease detector by photo

- A driverless tractor -is an autonomous farm vehicle that delivers a high tractive effort at slow speeds, for the purpose of tillage and other agricultural tasks

Farm bot



Blue river technology



Harvest Croo



Plantix



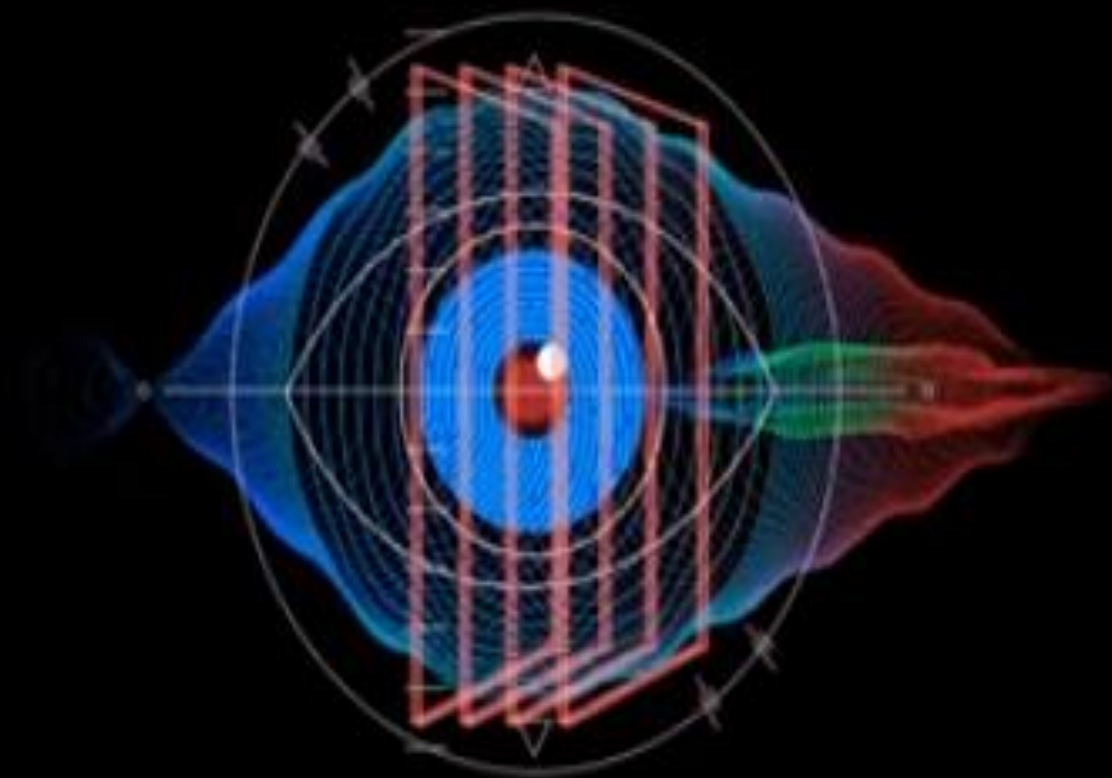
AI in Health care

- Well in 2011, the Watson competed on quiz show Jeopardy! against legendary champions Brad Rutter and Ken Jennings. Not only it performed at par to human competitors, eventually it won the first prize of \$1 million.
- Later it was applied in lung cancer treatment

IBM Watson

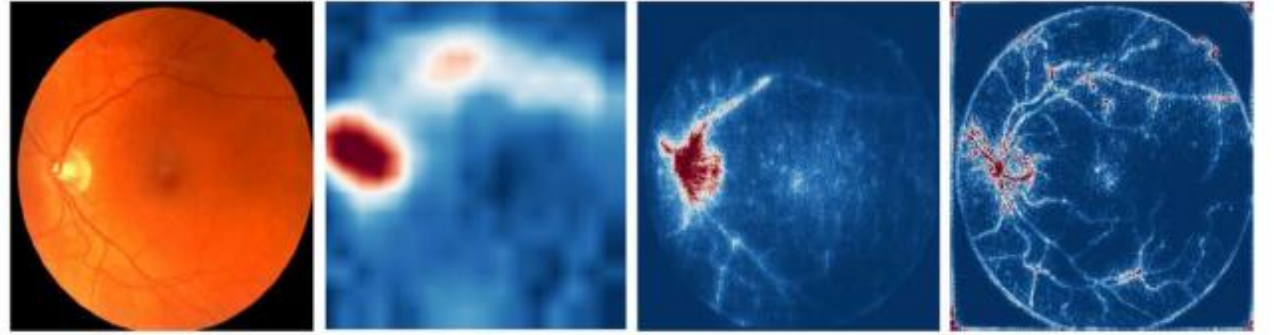
- IBM's supercomputer Watson has greatly speeded up the diagnosis of a rare form of leukemia in a patient.
- It has detected leukammina in patient by observing the 20 million recorded data in 10 min.

Google's AI Eye Doctor can examine retina scans and identify a condition called diabetic retinopathy.



Google

- Detection of anemia from retinal fundus images via deep learning“. It can quantify hemoglobin using de-identified photographs of the back of the eye and common metadata (e.g. age, self-reported sex) from the UK Biobank, a population-based study.
- Killer whale app for protection of Killer whales

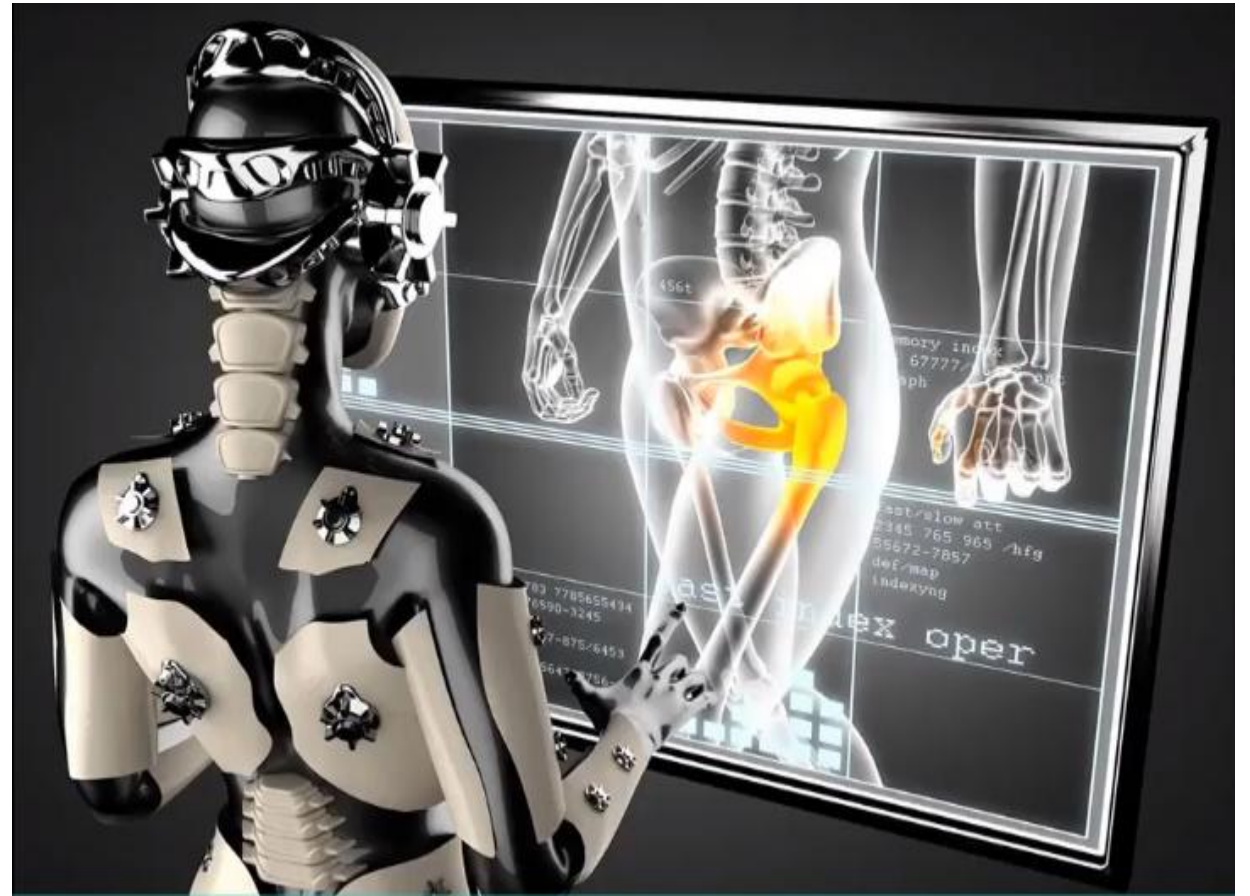


Multiple "explanation" techniques suggest that the optic disc is important for detecting anemia from images of the back of the eye.



Medical imaging

- Electronic health records
- Medical image processing – analysing X rays, CT scans, data entry, reports
- Drug discovery
- Monitors patient consultation every time visit to hospital
- Artificial intelligence medicine (AIM)



Virtual nurse



EVE robot

- Robot “Scientist” Helps Discover New Ingredient for Antimalarial Drug
- Compound commonly found in soap and toothpaste could be a new weapon in the fight against drug-resistant malaria.
- Triclosan, is used to inhibit the build-up of plaque-causing bacteria in toothpaste. It had previously been discovered to inhibit malarial growth in culture,

EVE robot

- Researchers incorrectly attributed its effectiveness to the compound's targeting of a specific enzyme, known as enoyl reductase (ENR). Yet when the researchers attempted to improve triclosan's ability to target ENR, they found it did not inhibit parasite growth.
- "Eve," researchers were able to discover that the compound actually targets another enzyme, called DHFR, already a common target of antimalarial drugs.

- Surgical robots
- AI can predict and diagnose disease at a faster rate than most medical professionals.
- **ZEBRA MEDICAL VISION *AI-POWERED RADIOLOGY ASSISTANT***
- provides radiologists with an AI-enabled assistant that receives imaging scans and automatically analyzes them for various clinical findings it has studied for diagnosis.

- BioXcel Therapeutics uses AI to identify and develop new medicines in the fields of immunology and neuroscience. Additionally, the company's drug re-innovation program employs AI to find new applications for existing drugs or to identify new patients.

BABYLON HEALTH

- [Babylon](#) uses AI to provide personalized and interactive healthcare, including anytime
- Face-to-face appointments with doctors.
- Review a patient's symptoms, then recommends either a virtual check-in or a face-to-face visit with a healthcare professional.



Providing NHS services

Ask Babylon



Talk to a doctor



1. Managing Medical Records and Other Data

- Compiling and analyzing information (like medical records and other past history).

2. Doing Repetitive Jobs

- Analyzing tests,
- X-Rays,
- CT scans,
- data entry, etc.

3. Treatment Design

- Analyze data and reports from a patient's file,
- external research,
- clinical expertise

Artificial Intelligence & Radiology



6. Medication Management

- The National Institutes of Health
- Created AiCure app
- Monitor the use of medication by a patient.

7. Drug Creation

- **Amidst**, Ebola virus program powered by AI
- was used to scan existing medicines that could be redesigned to fight the disease.
- Found two medications that may reduce Ebola infectivity in one day, when analysis of this type generally takes months or years – a difference that could mean saving thousands of lives.

8. Precision Medicine

- body scans can spot cancer and vascular diseases early and predict the health issues



AI could detect dementia before symptoms

Tom Whipple Science Editor

Artificial intelligence could be used to diagnose people with Alzheimer's disease years before symptoms appear, researchers have claimed.

By training computers to analyse brain scans, scientists showed that they were able to spot subtle signs of dementia that were missed by humans, enabling earlier diagnosis.

However, they cautioned that the sample size on which they tested the algorithms was relatively small and more work would be needed to see if it could be applied clinically.



Computers trained to analyse brain scans can detect signs of dementia
ALAMY

treat it have failed: they may simply be used too late.

The latest research, published in the journal *Radiology*, sought to find a solu-

of glucose, scar tissue less." Alzheimer's, however, is very hard for humans to see. "The way it manifests is a subtle but diffuse process. It affects all of the

Application in drug discovery

The infographic features a light orange background with a subtle grid pattern. At the top right is the logo for 'bioTechnika' with the tagline 'The Power of Learning, Accelerated'. Three orange callout boxes contain text. The central text is in a bold, dark orange font. A large callout box at the bottom right contains a paragraph of text.

bioTechnika
The Power of Learning, Accelerated

Nine out of ten candidate therapies fail - between phase I trials and regulatory approval

Treatment Development - Estimated US\$2.6 billion

How artificial intelligence is changing drug discovery

Machine learning and other technologies are expected to make the hunt for new pharmaceuticals quicker, cheaper and more effective.

- Drug targeting sites
- Drug interaction

Pfizer

IBM Watson, a system that uses machine learning, to power its search for immuno-oncology drugs.

In 2017, using the patient's DNA and its own database of tens of millions of oncological reports and studies, IBM's Watson diagnosed a Japanese woman's rare form of cancer in 10 minutes; solving a problem that the entire hospital medical staff could not solve.

OMICS

Protein structure prediction

- 1-dimensional structural properties
- Contact map
- Structure model quality assessment

Gene expression regulation

- Splice junction
- Genetic variants affecting splicing
- Sequence specificity

Protein classification

- Super family
- Subcellular localization
- Cancer

Biomedical imaging

Anomaly classification

- Gene expression pattern
- Cancer
- Alzheimer's disease
- Schizophrenia

Segmentation

- Cell structure
- Neuronal structure
- Vessel map
- Brain tumor

Recognition

- cell nuclei
- Finger joint
- Anatomical structure

Brain decoding

Biomedical signal processing

Brain decoding

- Behavior
- Emotion

Anomaly classification

- Alzheimer's disease
- Seizure
- Sleep stage

Deep Learning Applied Bioinformatics Research Avenues

Name Of the Students attended the Program

R.No	Students Name	Group	Signature
6058-19-457-001	Amsrin	B.Sc (MZC) III rd yr	Amsr.
6058-19-457-009	K. Shalini	B.Sc (MZC) 3 rd year	K. Shalini
6058-19-457-014	N. Anitha	B.Sc (MZC) 3 rd year	N. Anitha
6058-19-457-025	S. Vyshnavi	B.Sc (MZC) 3 rd year	S. Vyshnavi
6058-19-457-022	P. Madhavi	B.Sc (MZC) 3 rd year	P. Madhavi
6058-19-457-028	U. Kavya Sree	B.Sc (MZC) 3 rd year	Kavya Sree
6058-19-457-029	Urooj Ummisa	B.Sc (MZC) 3 rd year	Urooj
6058-19-457-030	V. Keerthana	B.Sc (MPC) 3 rd year	Keerthana
6058-19-341-002	B. Sandeep	B.Sc (MBZ) 3 rd year	B. Sandeep
6058-19-341-004	M. Raghuvaram	B.Sc (MBZ) 3 rd year	Raghuvaram
6058 21-581-004	S. Sindhuja	B.Sc (MbCCS) 1 st year	S. Sindhuja
6058-21-581-003	M. Ssavarithi	B.Sc (MbCCS) 1 st year	M. Ssavarithi
6058-21-457-024	T. Kalpara	B.Sc (MZC) 1 st year	T. Kalpara
6058-21-450-007	V. Anusha	B.Sc (MBZCS) 1 st year	Anusha
6058-21-591-001	Shirisha	B.Sc [MBZPIY] 1 st year	Shirisha
6058-21-457-012	K. Maheshwari	B.Sc (MZC) 1 st year	K. Maheshwari
6058-21-579-002	T. Manasa	B.Sc [Mbpcys] 1 st year	T. Manasa
6058-21-457-016	P. Karthik	B.Sc [Mbzc] 1 st year	P. Karthik
6058-21-487-003	MD. Arifur Rahman	B.Sc [Mbzc] 1 st year	Arif
6058-21-457-024	T. Kalpana	B.Sc [Mbzc] 1 st year	Kalpana
6058-21-448-001	G. Sobhanya	B.Sc [Mbzb] 1 st year	Sobhanya
6058-21-487-006	S. Vaishnavi	B.Sc [Mbcbt] 1 st year	Vaishnavi