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TCS 421

INTRODUCTION TO COURSE – FUNDAMENTAL OF STATISTICS AND AI

Name of Department:- Computer Science and Engineering

1. Subject Code: TCS 421 Course Title: Fundamental of Statistics and AI
2. Contact Hours: L: 3 T: 1 P: 2
3. Semester: IV

4. Pre-requisite: TMA101, TMA201

5. Course Outcomes: After completion of the course students will be able to

1. Demonstrate knowledge of statistical and exploratory data analysis data analysis techniques utilized in decision making.
2. Apply principles of Data Science to the analysis of business problems.
3. To use Machine Learning Algorithms to solve real-world problems.
4. To provide data science solution to business problems and visualization.
5. To learn the basic concepts and techniques of AI and machine learning.
6. To explore the various mechanism of Knowledge and Reasoning used for building expert system.

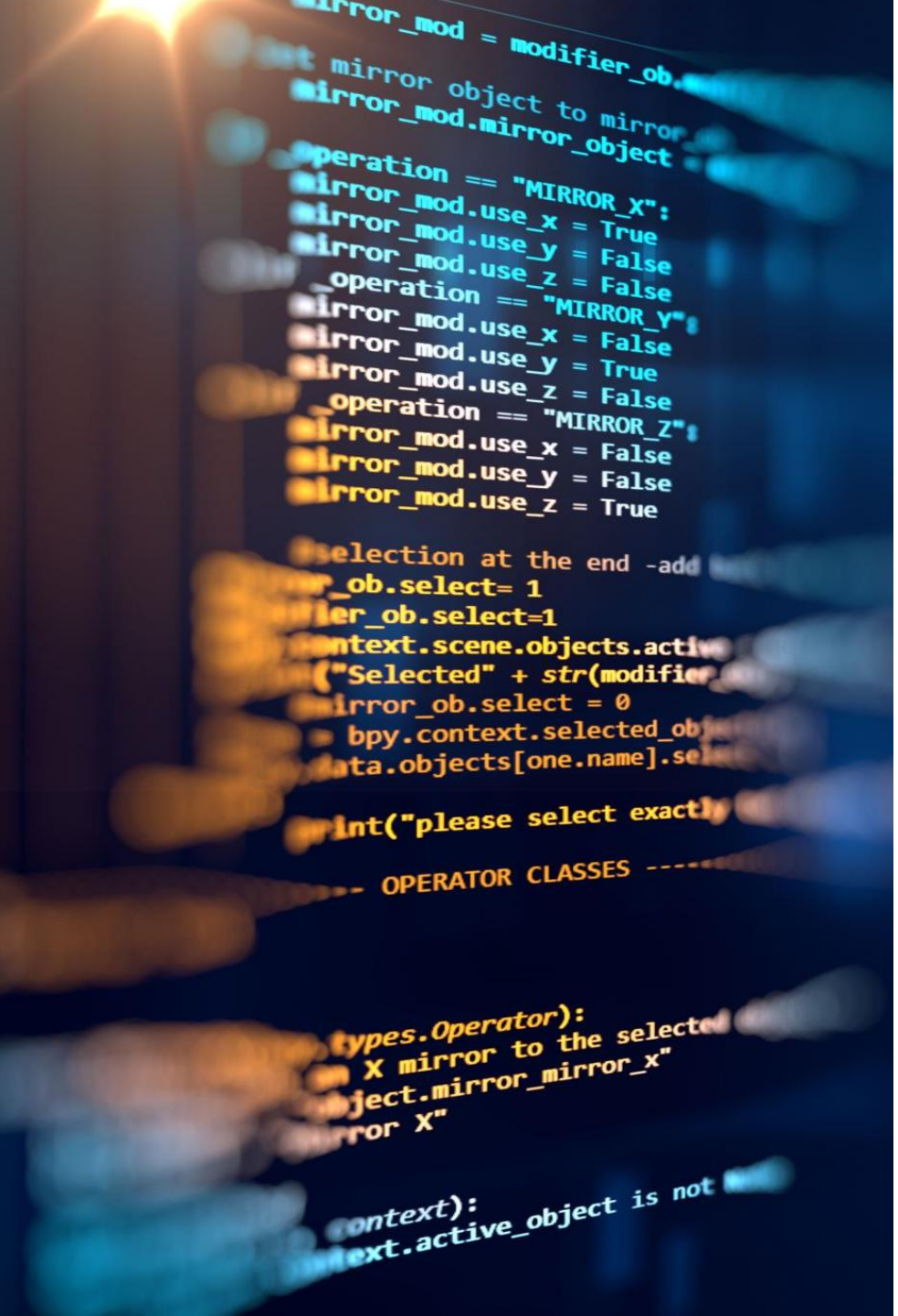
6.Detailed Syllabus

Sl. No.	Contents	Contact Hours
1	**Introduction to AI** Definition, Problem, State space representation. Intelligent Systems: Categorization of Intelligent System, Components of AI Program, Foundations of AI, Applications of AI, Current trends in AI, Intelligent Agents: Anatomy, structure, Types.	10
2	**Problem solving** Solving problem by Searching: Problem Solving Agent, Formulating Problems, Uninformed Search Methods: Breadth First Search (BFS), Depth First Search (DFS), Depth Limited Search, Depth First Iterative Deepening (DFID), Informed Search Methods: Greedy best first Search, A* Search, Memory bounded heuristic Search. Local Search Algorithms and Optimization Problems: Hill climbing search Simulated annealing, Local beam search.	9
3	**An Introduction to Data Science** Definition, working, benefits and uses of Data Science, Data science vs BI, The data science process, Role of a Data Scientist.	9
4	**Statistical Data Analysis & Inference** Populations and samples, Statistical modelling, probability distributions, fittings a model, Statistical methods for evaluation, Exploratory Data Analysis, Getting started with R, Manipulating and Processing data in R, working with function in R, Working with descriptive Statistics, Working with graph plot in R.	9
5	**Statistical Applications** Basic Statistical operations, Linear Regression Analysis, Logistic and Exponential Regression, Time Series Analysis, Probability Distribution, ANOVA, Correlation and Covariance.	8
	Total	**45**

Text/ Reference Books:

1. Tom M. Mitchell. "Machine Learning" McGraw-Hill, 1997.
2. "Statistical programming in R", Oxford University Press 2017

Syllabus, COs



Topics Covered

- History of AI
- What is AI
- AI Applications
- Types of AI
- Programming language for AI

History of AI

Under Greek Era, the concept of machines and mechanical men were well thought of.

Example – “Talos”

1950 – one of the very important year for the introduction of Artificial Intelligence, a paper was published by Alan Turning speculating about possibilities of machine can think intelligently like human beings. No machine was able to fulfil all the cases of Turing test.

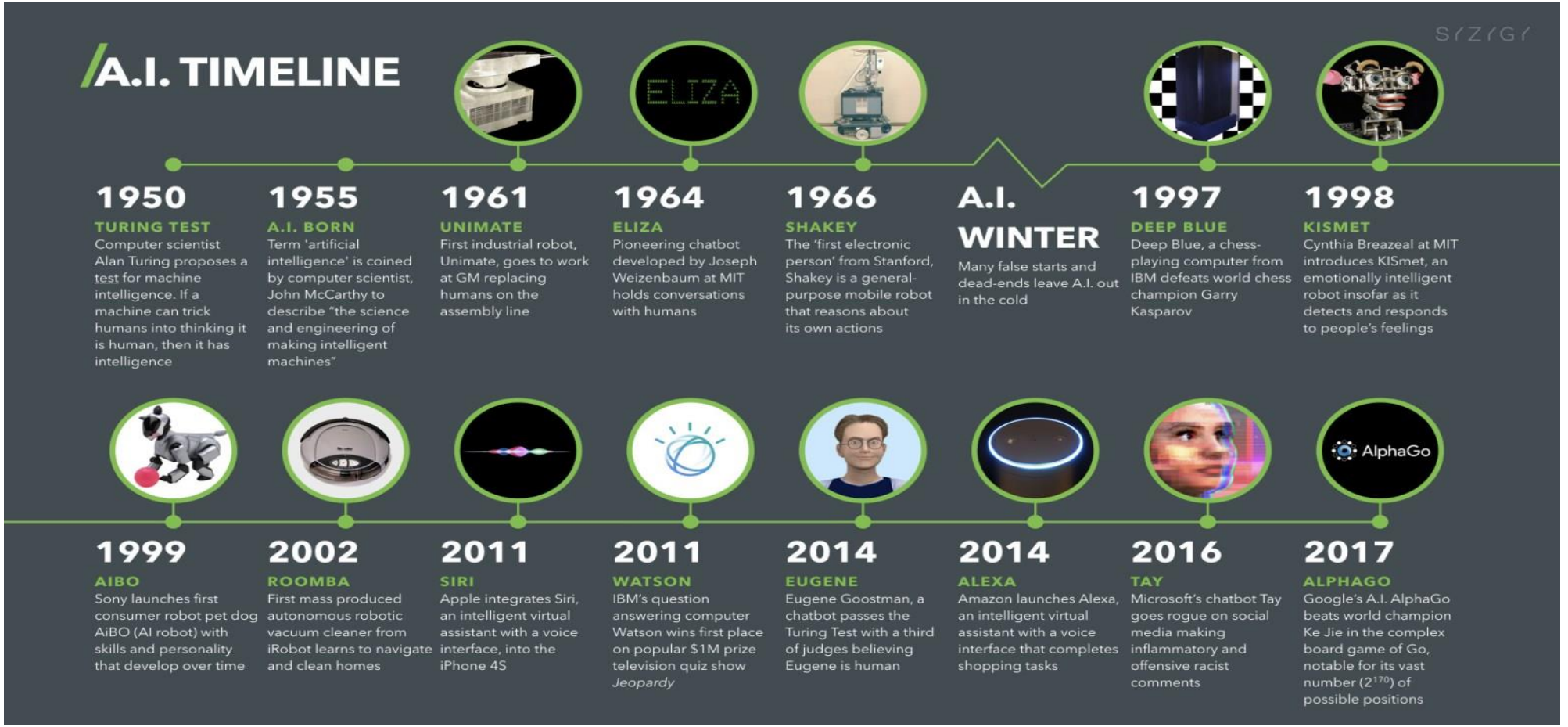
1951 – Game AI, wherein games like chess is made for two player keeping one as machine.

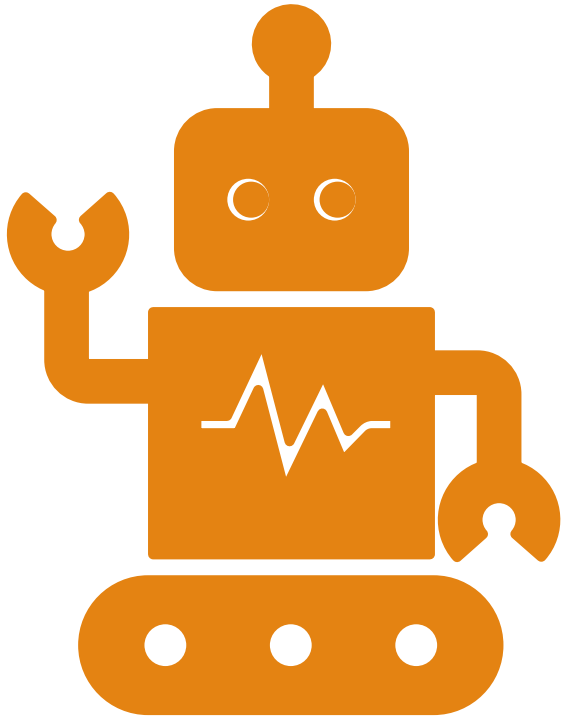
1955 – Birth year of term “Artificial Intelligence”, coined by John McCarthy.

1959 – Research Era of AI, MIT Lab for AI setup.

1961 – Chatbot Developed by IBM.

AI History on Timeline





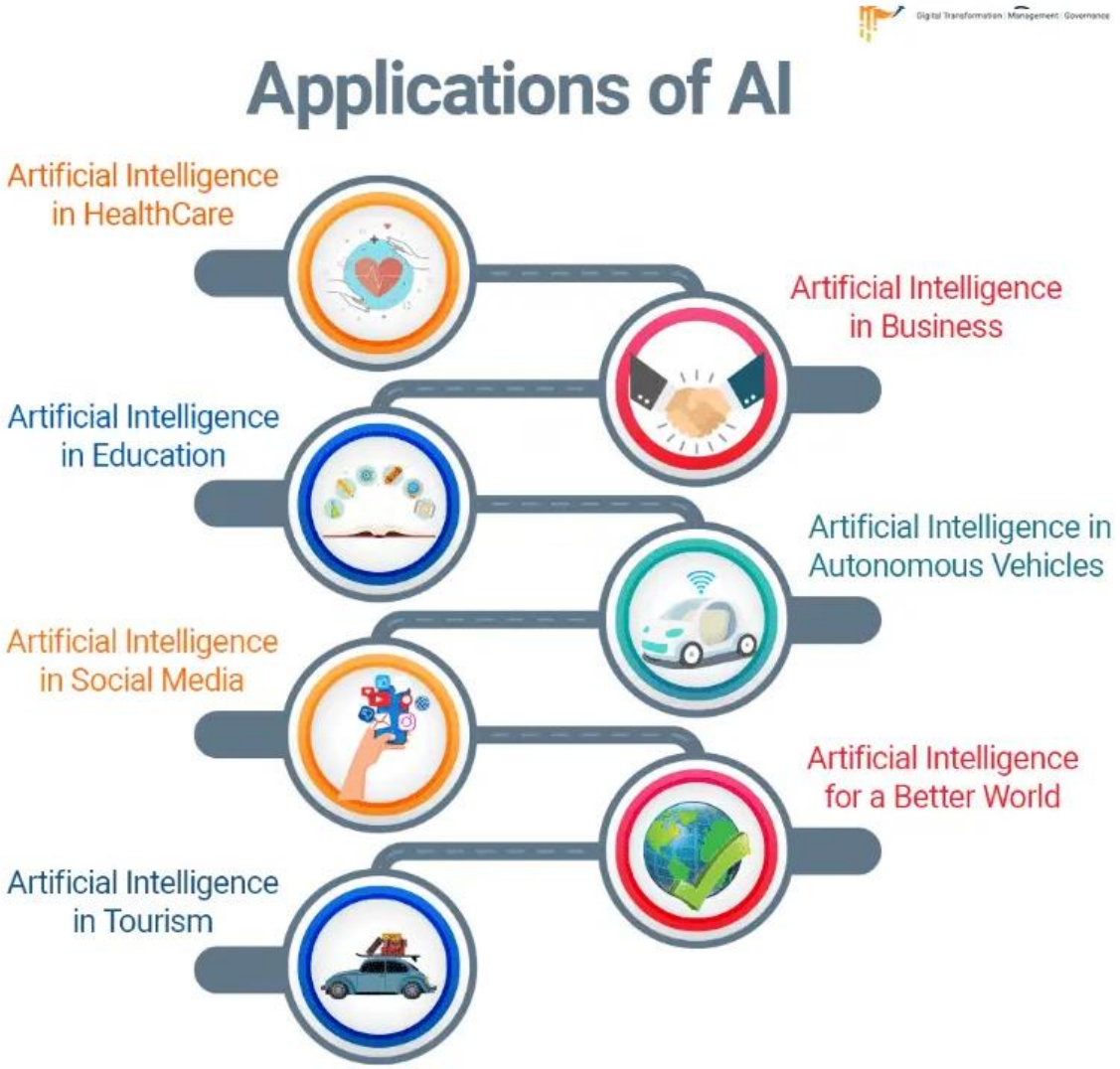
What is AI?

AI is a technique that enables machines to mimic human behavior.

Artificial Intelligence is the theory and development of computer systems able to perform tasks normally requiring human intelligence, such as

- visual perception
- speech recognition
- decision-making
- translation between languages.

AI is the simulation of human intelligence done by machines programmed by humans.



AI Applications

Development of Knowledge Bases

Development of Expert Systems

Deep Learning

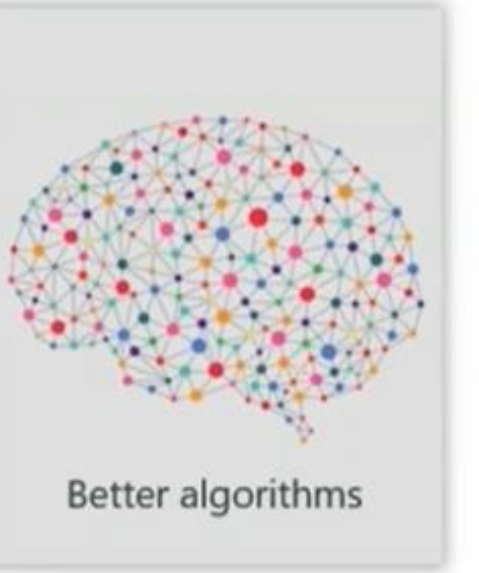
Computer Vision

Machine Learning

Natural Language Processing

More Computational Power

More Data



Better algorithms

Broad Investment

Reason for Demand in AI

Types of AI/ Stages of AI

- Artificial Narrow Intelligence
- Artificial General Intelligence
- Artificial Super Intelligence

01

It is also called as weak AI.

02

This involves applying AI only to a specific tasks or a narrow problem.

03

Example – Alexa, Google Search Engine, Sophia-The humanoid, etc.

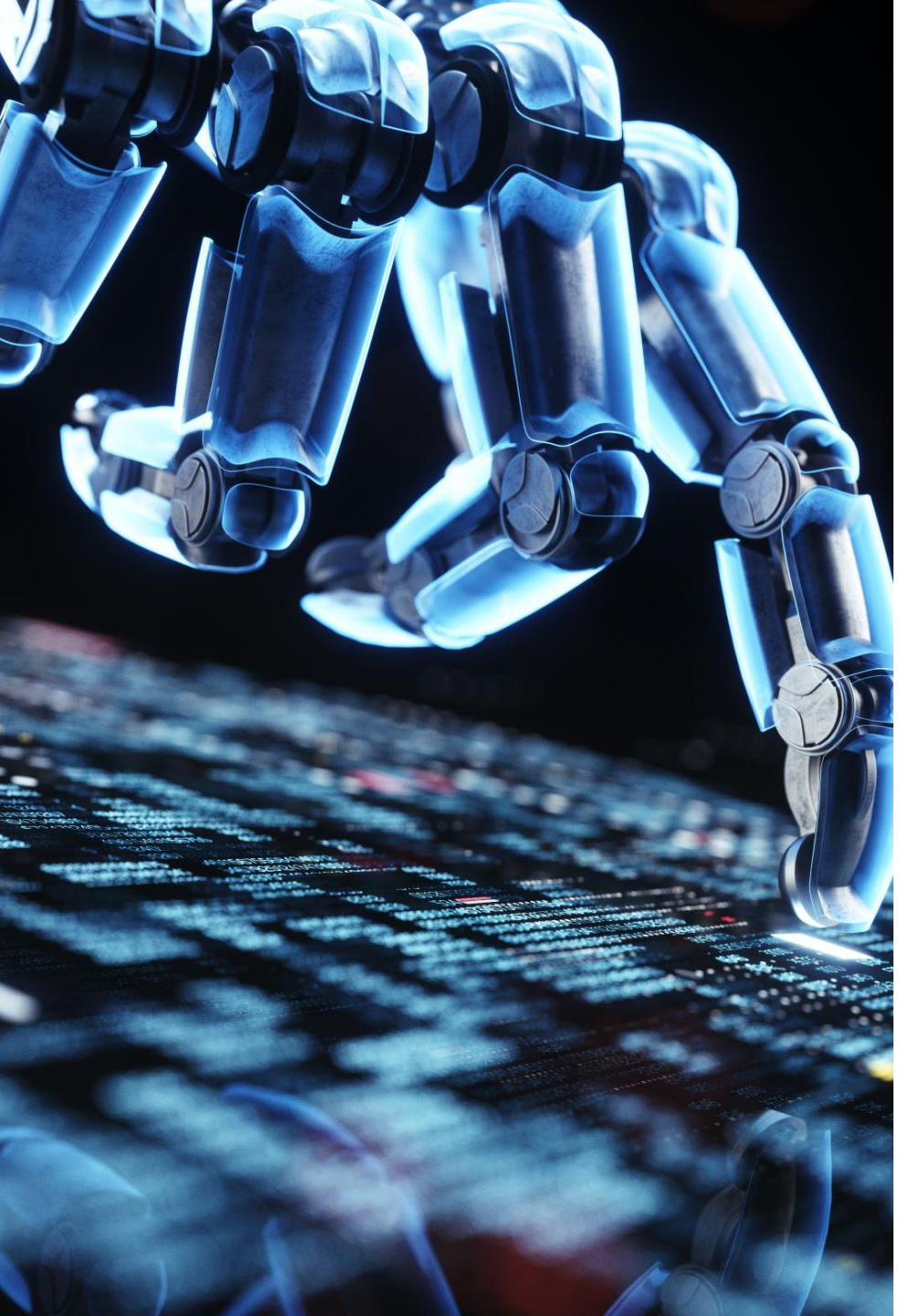
Artificial Narrow Intelligence(ANI)

It is also called as strong AI.

This involves machines that possess the ability to perform any intellectual task that a human being can.

No machine is developed yet to be called as an AGI.

Artificial General Intelligence(AGI)



Artificial Super Intelligence(ASI)

- It is a term referring to the time when the capability of computers will surpass humans.
- A hypothetical situations currently can be seen in si-fictions.

Programming languages for AI