



# **SNS COLLEGE OF ENGINEERING**

Kurumbapalayam (Po), Coimbatore – 641 107

**An Autonomous Institution**

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A' Grade  
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

## **DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**COURSE NAME : Artificial Intelligence**

III YEAR /V SEMESTER

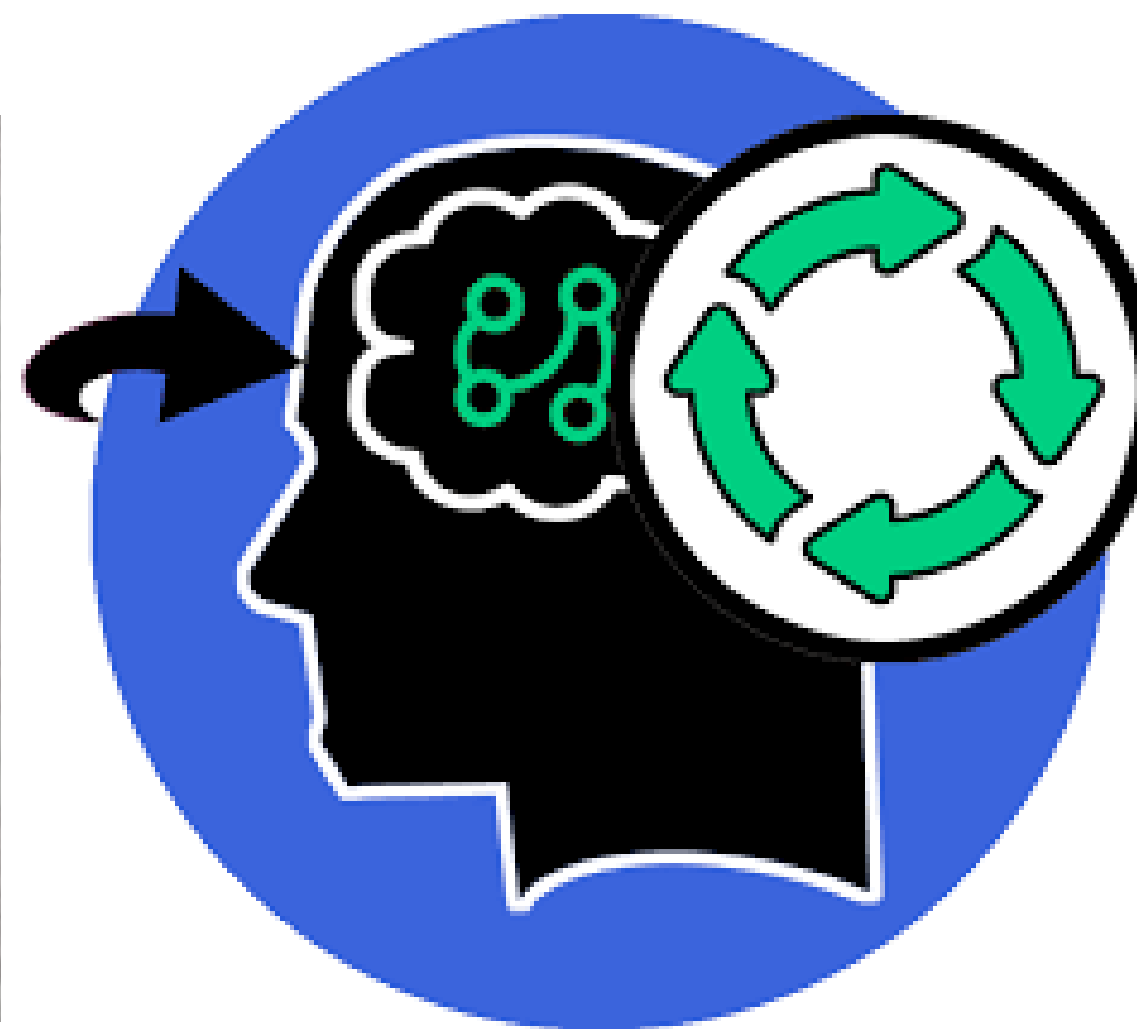
Unit 1- INTRODUCTION

Topic 2 : Definition

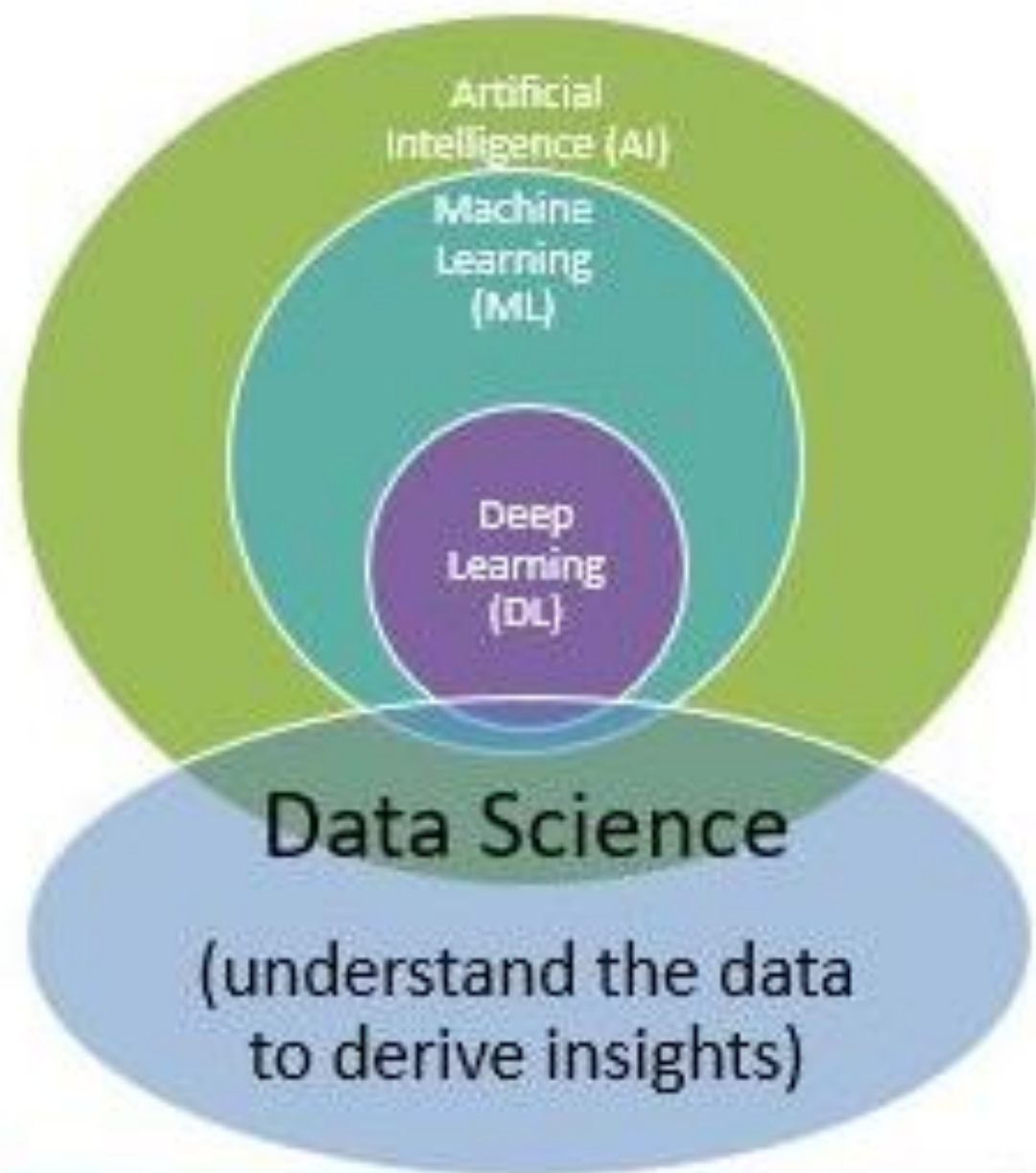
Definition/Artificial Intelligence/ MR.K.BALAJI/CSE/SNSCE



# RECALL

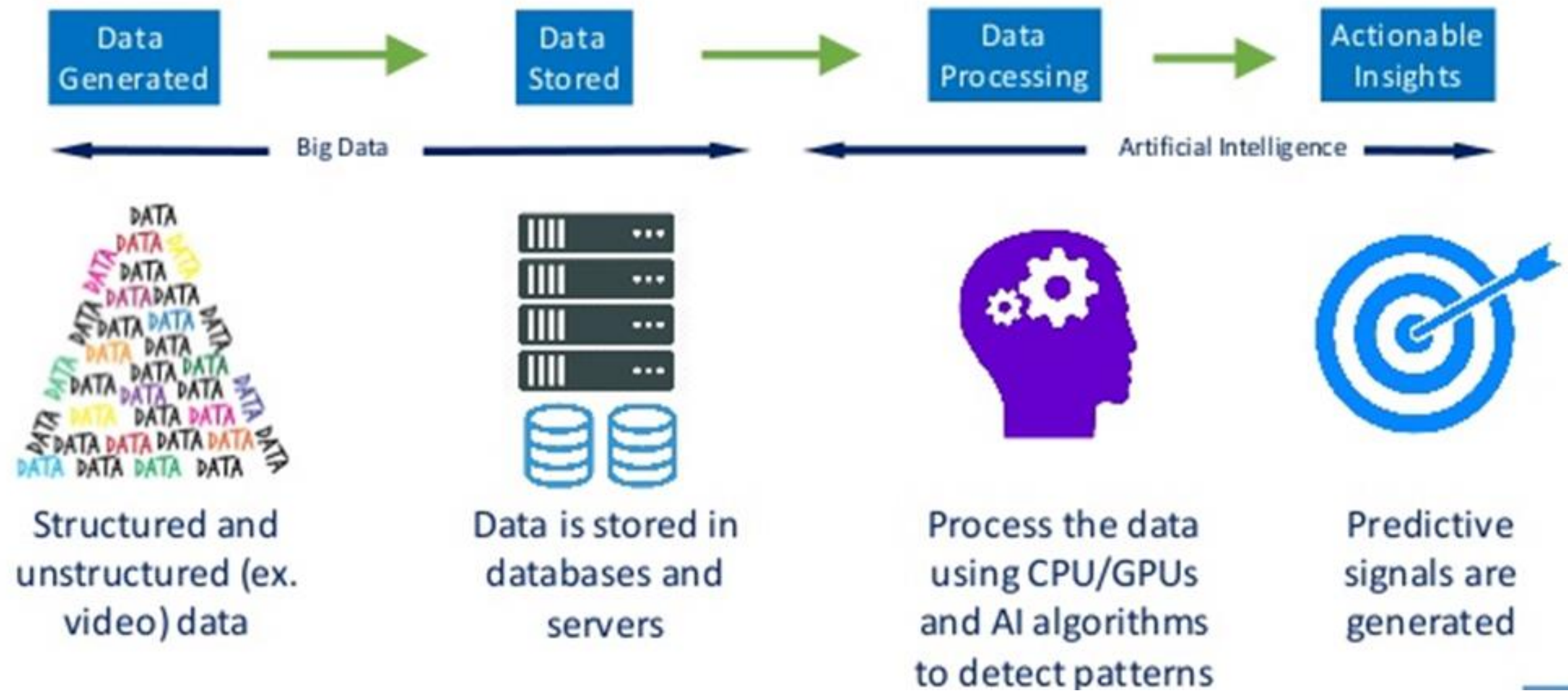


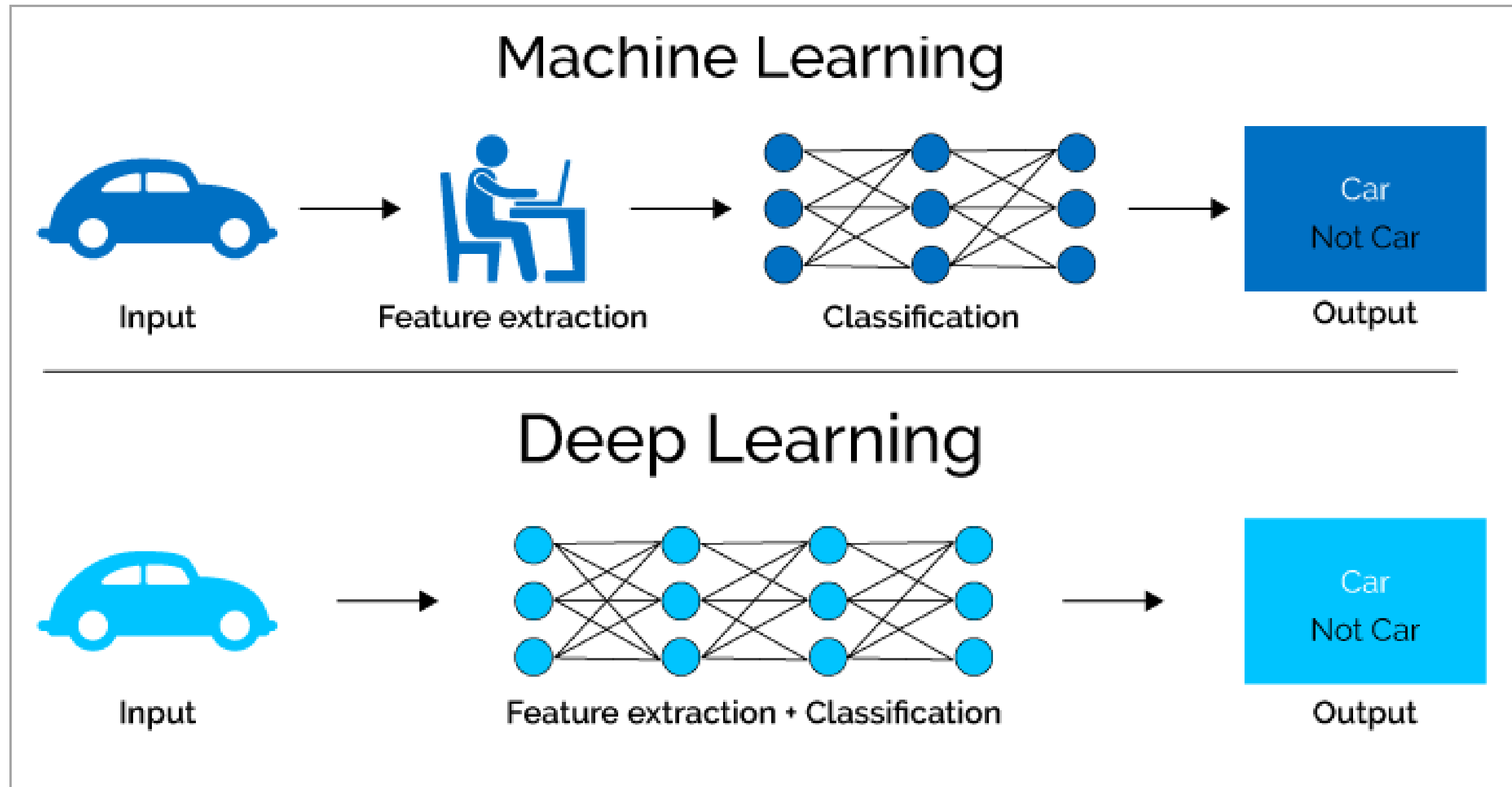
# Artificial Intelligence (AI) vs Machine Learning vs Deep Learning vs Data Science



- Artificial Intelligence (AI):
  - Broad concept of machines being able to carry out “smart” tasks
- Machine Learning (ML):
  - The use of statistical tools that help computers “learn” from data
  - Relies heavily on hand-crafted features
- Deep Learning (DL):
  - Subset of Machine Learning (ML)
  - Driven primarily by Neural Networks

# The Process





# Components of AI



## Applications

- Image recognition
- Speech recognition
- Chatbots
- Natural language generation
- Sentiment analysis

## Types of models

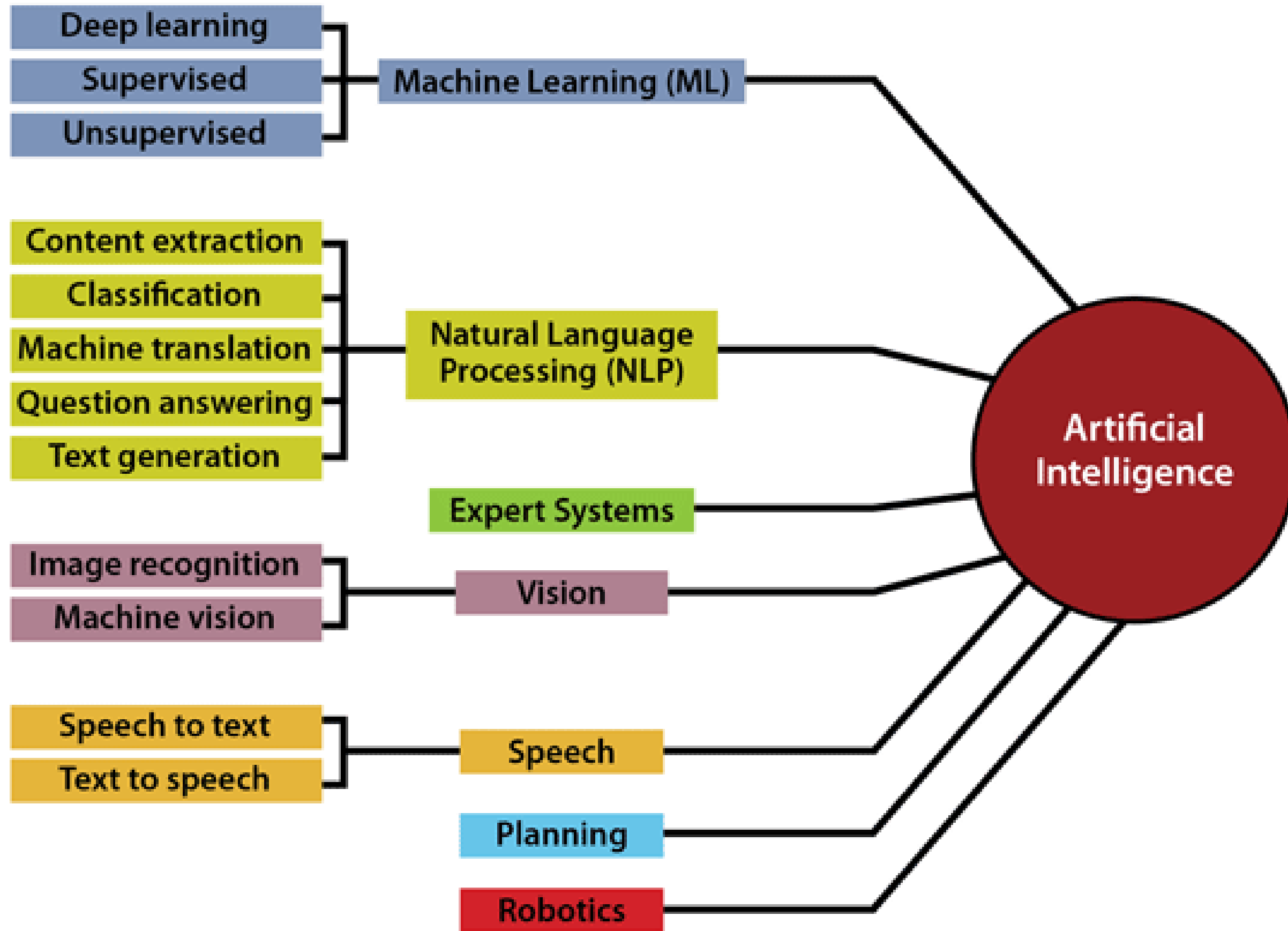
- Deep learning
- Machine learning
- Neural networks

## Software/hardware for training and running models

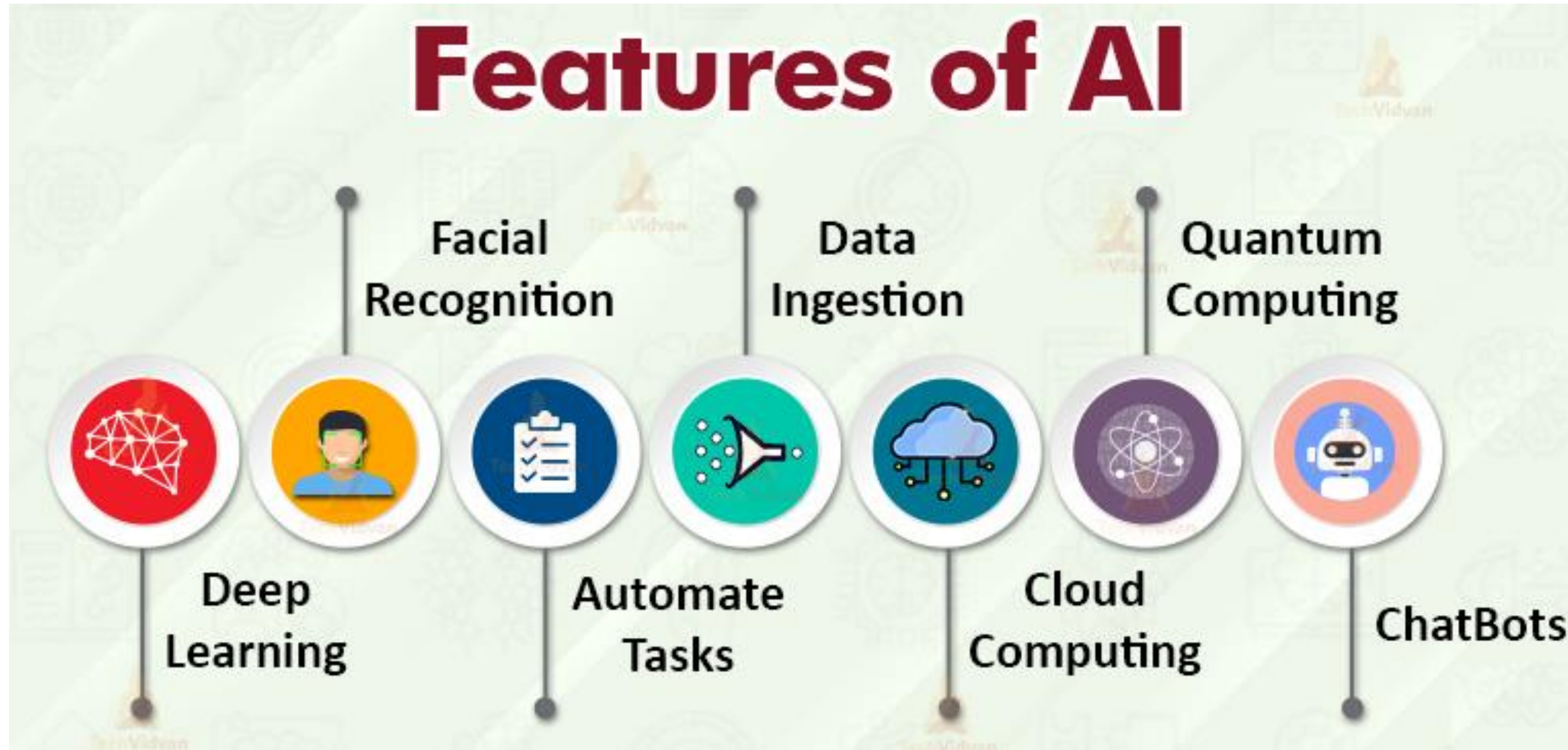
- GPUs
- Parallel processing tools (like Spark)
- Cloud data storage and compute platforms

## Programming languages for building models

- Python
- TensorFlow
- Java
- C



# Features of AI





# How AI is impacting our lives?

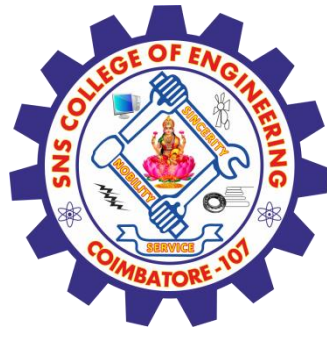




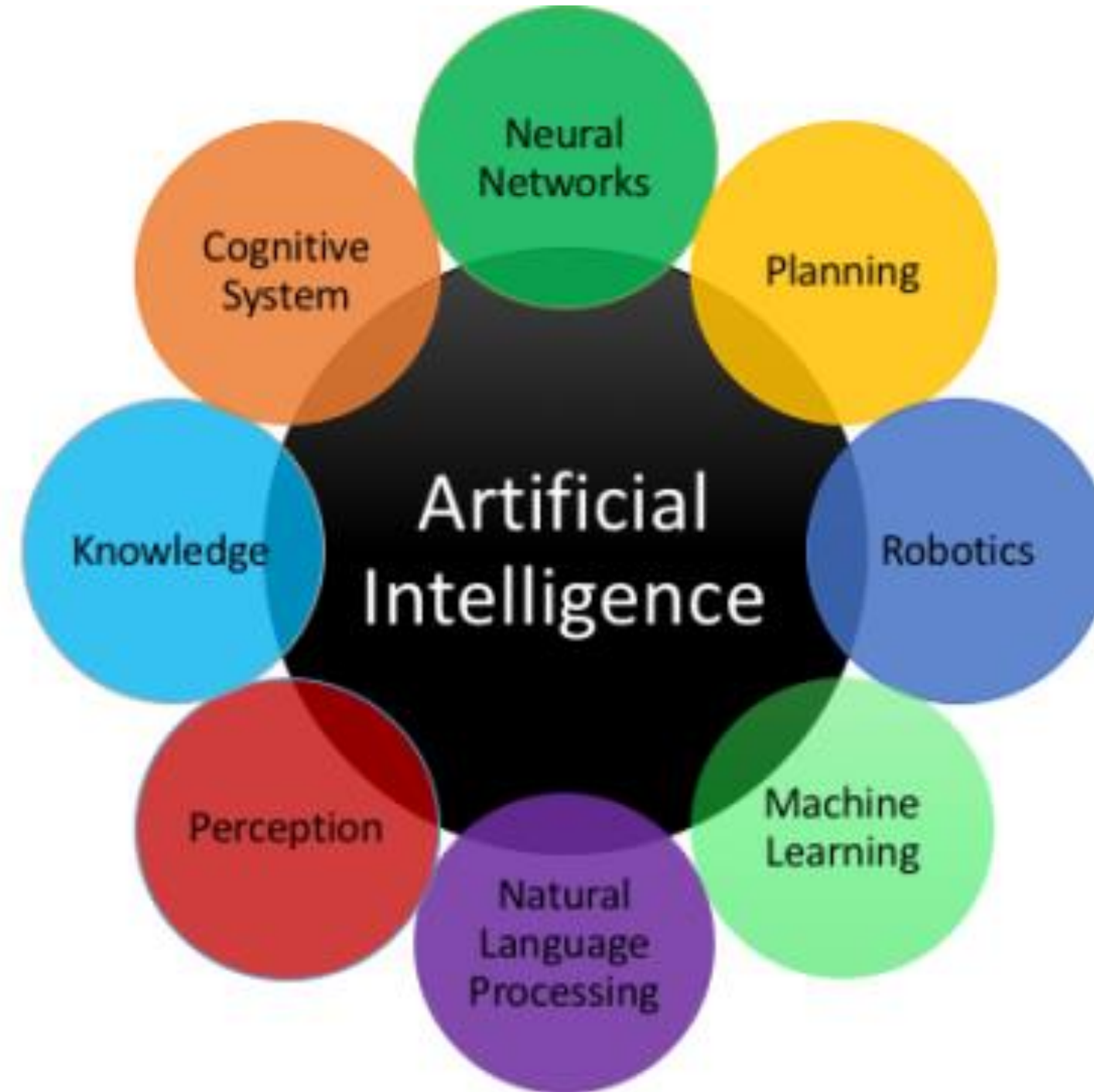
# ARTIFICIAL INTELLIGENCE

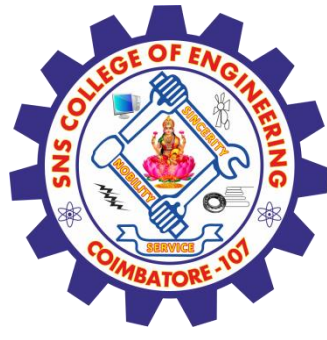


- Artificial
  - Produced by human art or effort, rather than originating naturally.
- Intelligence
- is the ability to acquire knowledge and use it" [Pigford and Baur]
- **So AI was defined as:**
  - AI is simulation by human intelligence processes by computer



# Goals of AI





# The Foundation of Artificial Intelligence

## Academic Disciplines of AI

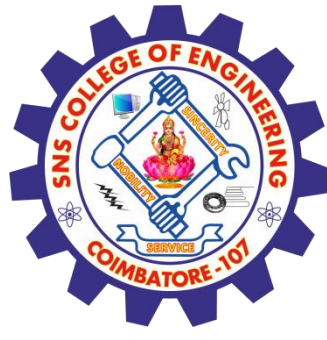
- **Philosophy** Logic, methods of reasoning, mind as physical system, foundations of learning, language, rationality.
- **Mathematics** Formal representation and proof, algorithms, computation, (un)decidability, (in)tractability
- **Probability/Statistics** modeling uncertainty, learning from data
- **Economics** utility, decision theory, rational economic agents
- **Neuroscience** neurons as information processing units.
- **Psychology/** how do people behave, perceive, process cognitive
- **Cognitive Science** information, represent knowledge.
- **Computer engineering** building fast computers
- **Control theory** design systems that maximize an objective function over time
- **Linguistics** knowledge representation, grammars



# Some Advantages of Artificial Intelligence

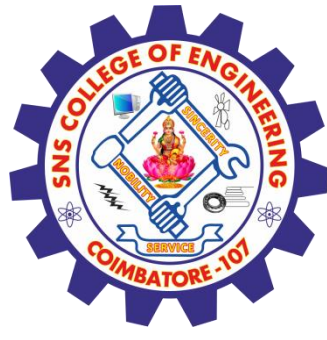


- more powerful and more useful computers
- new and improved interfaces
- solving new problems
- better handling of information
- relieves information overload
- conversion of information into knowledge



# The Disadvantages

- increased costs
- difficulty with software development - slow and expensive
- few experienced programmers
- few practical products have reached the market as yet.



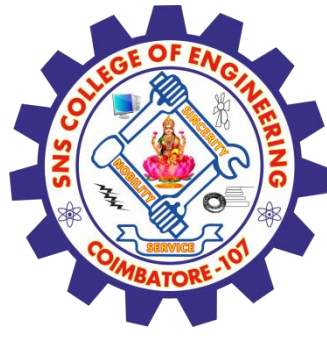


# Topics in AI

Artificial intelligence can be considered under a number of headings:

- Search (includes Game Playing).
- Representing Knowledge and Reasoning with it.
- Planning.
- Learning.
- Natural language processing.
- Expert Systems.
- Interacting with the Environment  
(e.g. Vision, Speech recognition, Robotics)





# Search

- *Search* is the fundamental technique of AI.
  - Possible answers, decisions or courses of action are structured into an abstract space, which we then search.
- Search is either "blind" or "uninformed":
  - blind
    - we move through the space without worrying about what is coming next, but recognising the answer if we see it
  - informed
    - we guess what is ahead, and use that information to decide where to look next.
- We may want to search for the first answer that satisfies our goal, or we may want to keep searching until we find the best answer.



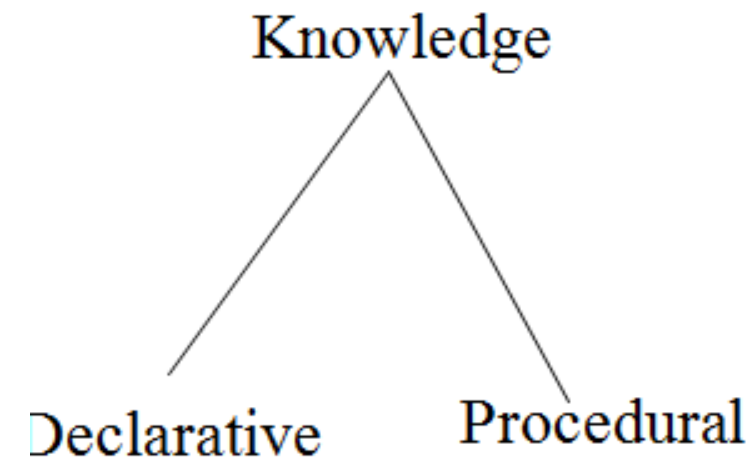
# Knowledge Representation & Reasoning



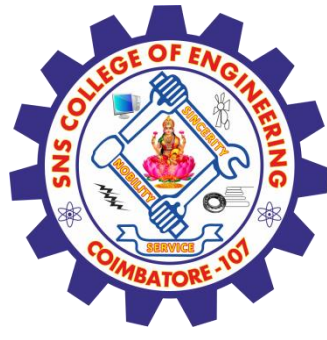
- The second most important concept in AI
- If we are going to act rationally in our environment, then we must have some way of describing that environment and drawing inferences from that representation.
  - how do we describe what we know about the world ?
  - how do we describe it *concisely* ?
  - how do we describe it so that we can get hold of the right piece of knowledge when we need it ?
  - how do we generate new pieces of knowledge ?
  - how do we deal with *uncertain* knowledge ?



# Knowledge Representation & Reasoning



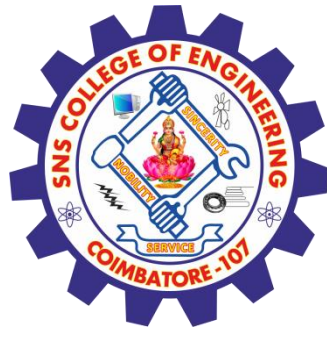
- Declarative knowledge deals with factoid questions (what is the capital of India? Etc.)
- Procedural knowledge deals with “How”
- Procedural knowledge can be embedded in declarative knowledge



# Planning

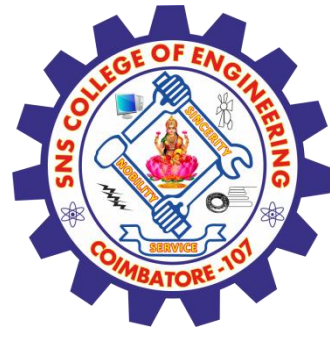
Given a set of goals, construct a sequence of actions that achieves those goals:

- often very large search space
- but most parts of the world are independent of most other parts
- often start with goals and connect them to actions
- no necessary connection between order of planning and order of execution
- what happens if the world changes as we execute the plan and/or our actions don't produce the expected results?



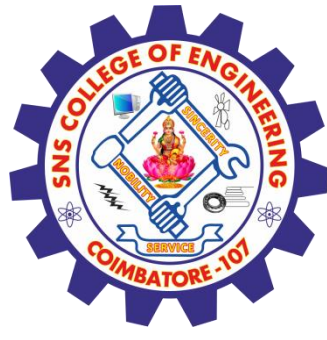
# Learning

- If a system is going to act truly appropriately, then it must be able to change its actions in the light of experience:
  - how do we generate new facts from old ?
  - how do we generate new concepts ?
  - how do we learn to distinguish different situations in new environments ?



# Expert system

- Computer program designed to act as an expert in particular domain
- Medical diagnosis
- Chemical analysis
- Geographical exploration



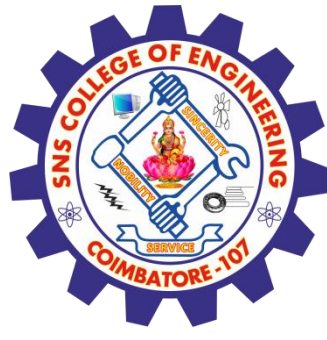
# NLP



- Natural Language Processing
- People and computer to communicate in a natural language (English) rather than computer language
- 2 category

NL understanding

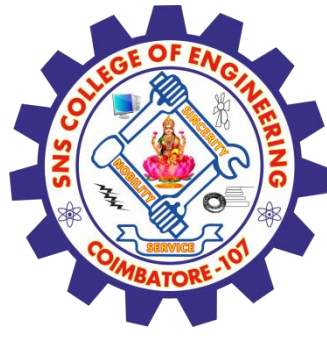
NL generations



# Interacting with the Environment

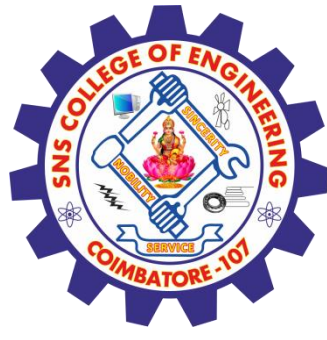
- In order to enable intelligent behaviour, we will have to interact with our environment.
- Properly intelligent systems may be expected to:
  - accept sensory input
    - vision, sound, ...
  - interact with humans
    - understand language, recognise speech, generate text, speech and graphics, ...
  - modify the environment
    - robotics





# Speech Recognition

- Hear our voice & recognize the words
- **Computer vision:**  
Image processing
- **Robotics:**  
Chat bot



# AI

- Program to think
- Social interaction

# ROBOT

- Program to do
- Low level interaction

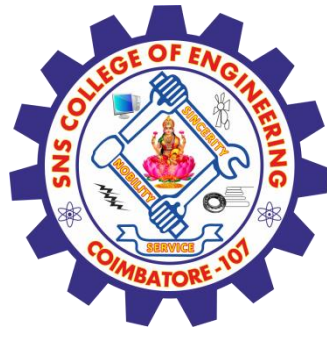
## AI TEST-ALAN TURING

### Turing Test

Computer result will not compare with human

### Limitation Game

Computer result will compare with human

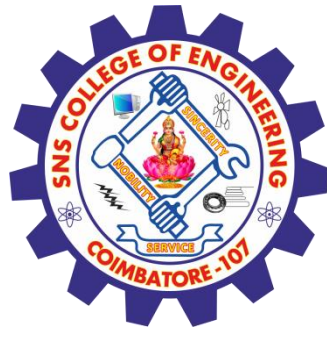




# EVALUATION



- List the component of AI
- What are the features of AI?



# REFERENCES



1. S. Russell and P. Norvig, "Artificial Intelligence: A Modern Approach", Prentice Hall, Third Edition, 2009.

## THANK YOU