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Course: CSI-341. (Artificial Intelligence).

Dapt: CSE (Ev.)

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Ans. to the Q. No - 01

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(a) Artificial Intelligence (AI) :-

Artificial Intelligence is the simulation of human intelligence processes by machines, especially computer system. Specific applications of AI include expert systems, natural language processing, speech recognition and machine vision.

While a number of definition of a artificial intelligence have surfaced over the last few decades, John McCarthy offers the following definition. in th  
It is science and engineering of making intelligent machines, especially intelligent computer programs.

## Application of AI :-

Artificial Intelligence has various applications in today's society. It is becoming essential for today's time, because it can solve complex problems with an efficient way in multiple industries, such as Healthcare, entertainment, finance, education, etc. AI is making our daily life more comfortable and fast.

Following are some sectors which have the application of Artificial Intelligence :

1. AI in Astronomy
2. AI in Healthcare
3. AI in Gaming
4. AI in Finance
5. AI in Data Security
6. AI in Social Media
7. AI in Travel and Transport
8. AI in Automotive Industry
9. AI in Robotics
10. AI in Entertainment
11. AI in Agriculture
12. AI in E-commerce
13. AI in Education

Natural Language Processing (NLP):-

Natural Language Processing is an interdisciplinary subfield of linguistics, computer science and artificial intelligence concerned with the interactions between computers and human language, in particular how to program computers to process and analyze large amounts of natural language data.

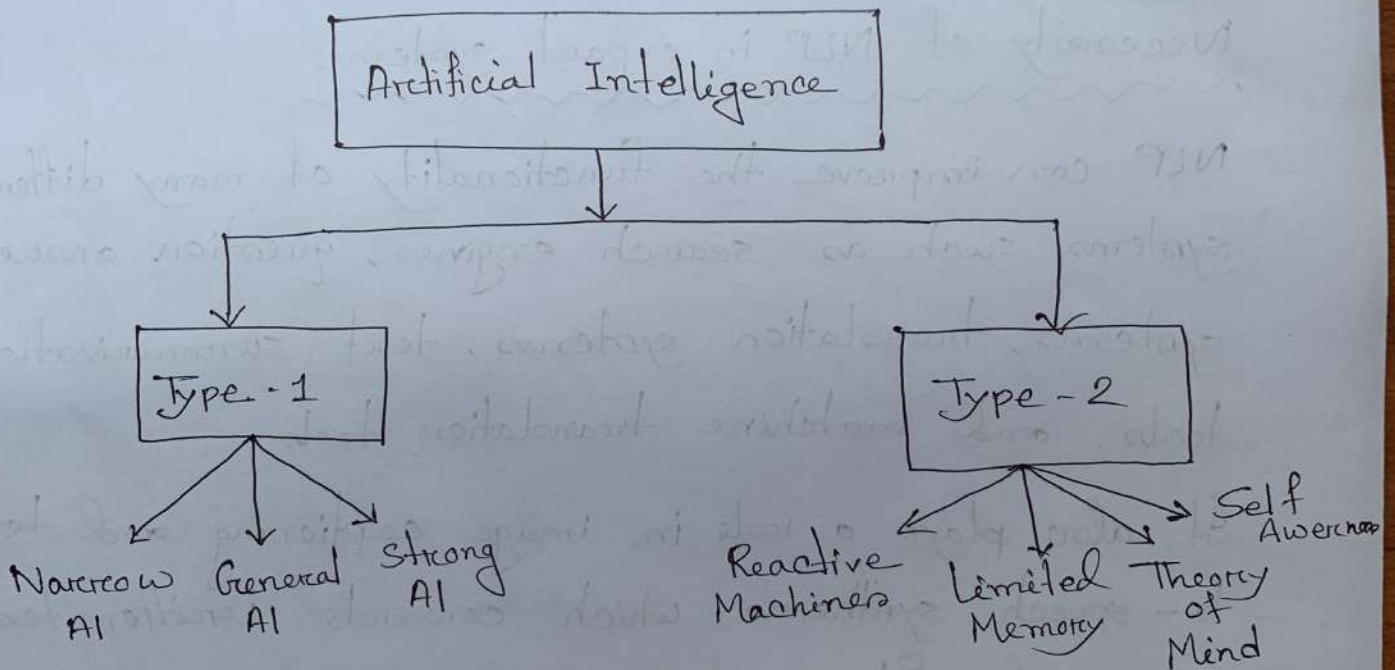
Necessity of NLP in expert system:-

NLP can improve the functionality of many different systems such as search engines, question answering systems, translation systems, text summarization tools, and machine translation tools.

It also plays a role in image captioning and text-to-speech synthesis, which converts written text into audio files.

(a) Difference type of AI :-

Artificial Intelligence can be divided in various types. There are mainly two types of main categorization which are based on capabilities and based on functionally of AI. Following is flow diagram which explain the types of AI.



(b) Foundation of AI :-

The disciplines that contributed ideas, viewpoints, and techniques to AI. It is forced to concentrate on a small number of people, events, and ideas and to ignore others that also were important.

(5)

I'll explain and represent it through a series of questions.

### 1. Philosophy :-

Rationalism, Dualism, Materialism, Empiricism, Induction, Logical Positivism, Confirmation Theory.

→ AI takes the following ideas from philosophy.

- \* Where does knowledge from?
- \* How does knowledge lead to action?
- \* Can formal rules be used to draw valid conclusions?

### 2. Mathematics :-

- \* What are the formal rules to draw valid conclusions?
- \* What can be computed?
- \* How do we reason with uncertain information?

The main three fundamental areas are logic, computation and probability.

### 3. Economics :-

- \* How should we make decisions so as to maximize payoff?
- \* How should we do this when others may not go along?

Utility, Decision Theory, Game Theory, Operations Research.

1. Neuroscience :-

\* How do brain process information?  
Neuroscience is the study of the nervous system, especially the brain. We are still a long way from understanding how cognitive processes actually work.

5. Psychology :-

\* How do humans and animals think and act?  
→ Behaviourism, Cognitive psychology

6. Computer Engineering :-

\* How can we build an efficient computer?  
→ Operational Computer, and operational programmable computer.

7. Linguistics :-

\* How does language relate to thought?  
→ Computational linguistics or natural language processing and knowledge representation.

8. Control Theory and Cybernetics :-

\* How can artificats operate under their own control?  
→ Control Theory, Homeostatic and objective function.

(c) Agents :-

An agent can be anything that perceives its environment through sensors and acts upon that environment through actuators. An agent runs in the cycle of perceiving, thinking and acting.

An agent can be :

- Human - Agent
- Robotic Agent
- Software Agent



The model-based reflex agent can work in a partially observable environment and track the situation.

It will have a data structure to store the information about the situation. It is called a model-based reflex agent.

Ans. to the Q. No-04

(a) Algorithm of "A Rice-cook agent" :-

The classic Method

1. Rinse the rice.
2. Use the right ration of water, Add 2 parts water and 1 part rice to a large pot.
3. Bring the water to a boil. Once it boiling, add a big pinch of salt.
4. Maintain a simmer.
5. Cook without peeking or stirring.
6. Let the rice rest covered.
7. fluff the rice with a fork.

(b) Model-based reflex agent :-

→ The model-based reflex agent can work in a partially observable environment, and track the situation.

→ A model based agent has two important factors:

\* Model: It is knowledge about "how things happen in the world," so it is called a Model-based agent.



\* Internal State:-

It is a representation of the current state based on percept history.

- These agents have the model, "which is knowledge of the world" and based on the model they perform actions.
- Updating the agent state requires information about:
  - a. How the world evolves
  - b. How the agents action affects the world.

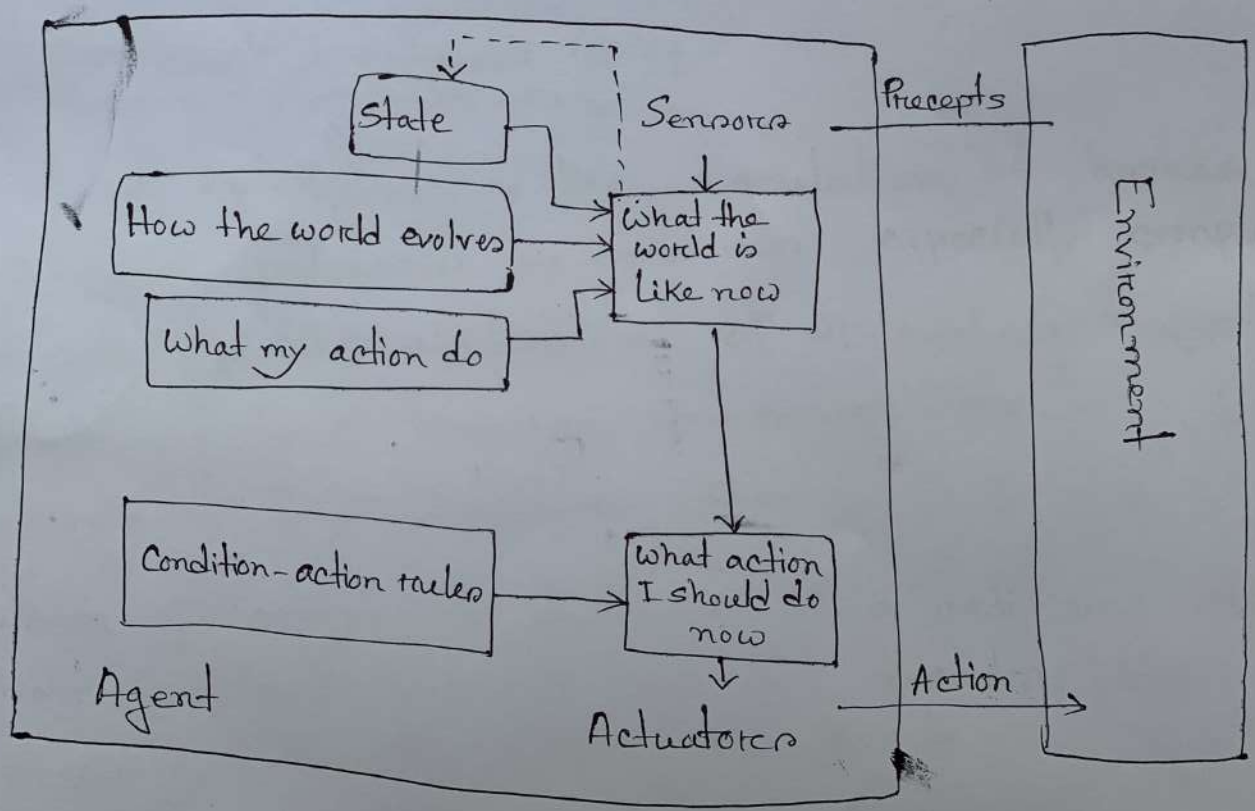


Fig: Block Diagram of Model-based reflex agent.