

Name: M.N. KHAN

ID: 2216080041

Course: CSI-341

Dept: CSE (EN)

Sub: Artificial Intelligence

Ans. to the Q. No: 01

(a) Artificial Intelligence (AI): -

Artificial Intelligence is the simulation of human intelligence processes by machines, especially computer system. Specific application of AI include expert system, 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.

It is Science and engineering of making intelligent machines, especially intelligent computer programmes.

## 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 health care, 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 Health Care.
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.

## (b) 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 translation of natural language data.

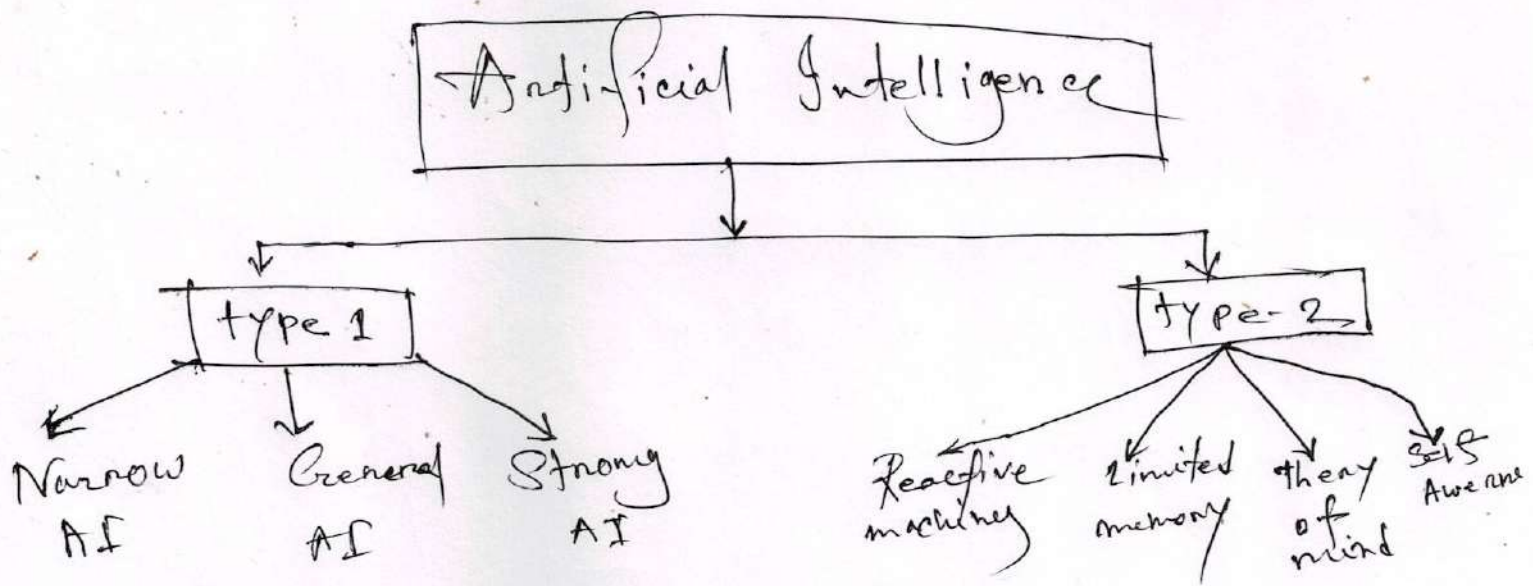
### Necessity of NLP in expert system: -

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 functionality of AI. Following is Flow diagram which explains the types of AI.



b) Foundation of AI: The disciplines that contributed ideas, view points, 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.

It explains 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 pay off?

\* How should we do this when others may not go along?

Utility, Decision theory, Game theory, Operations research.

#### 4. Neuroscience :

→ How do brains 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 related to thought?  
→ Computational linguistics or natural language processing and knowledge representation.

#### 8. Control theory and cybernetics :

→ How can artificial systems operate under their own control.

→ Control theory, homeostatic and objective function.

(c) Agents:

An agents Can be anything that perceives 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 .

(a) Algorithm of a rice-cook agent:-

A classic method

1. Rinse the rice.
2. Use the right ration of water, Add 2 part water and 1 part rice for 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.



\* Inferred 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:

- How the world evolves.
- How the agent's actions affect the world.

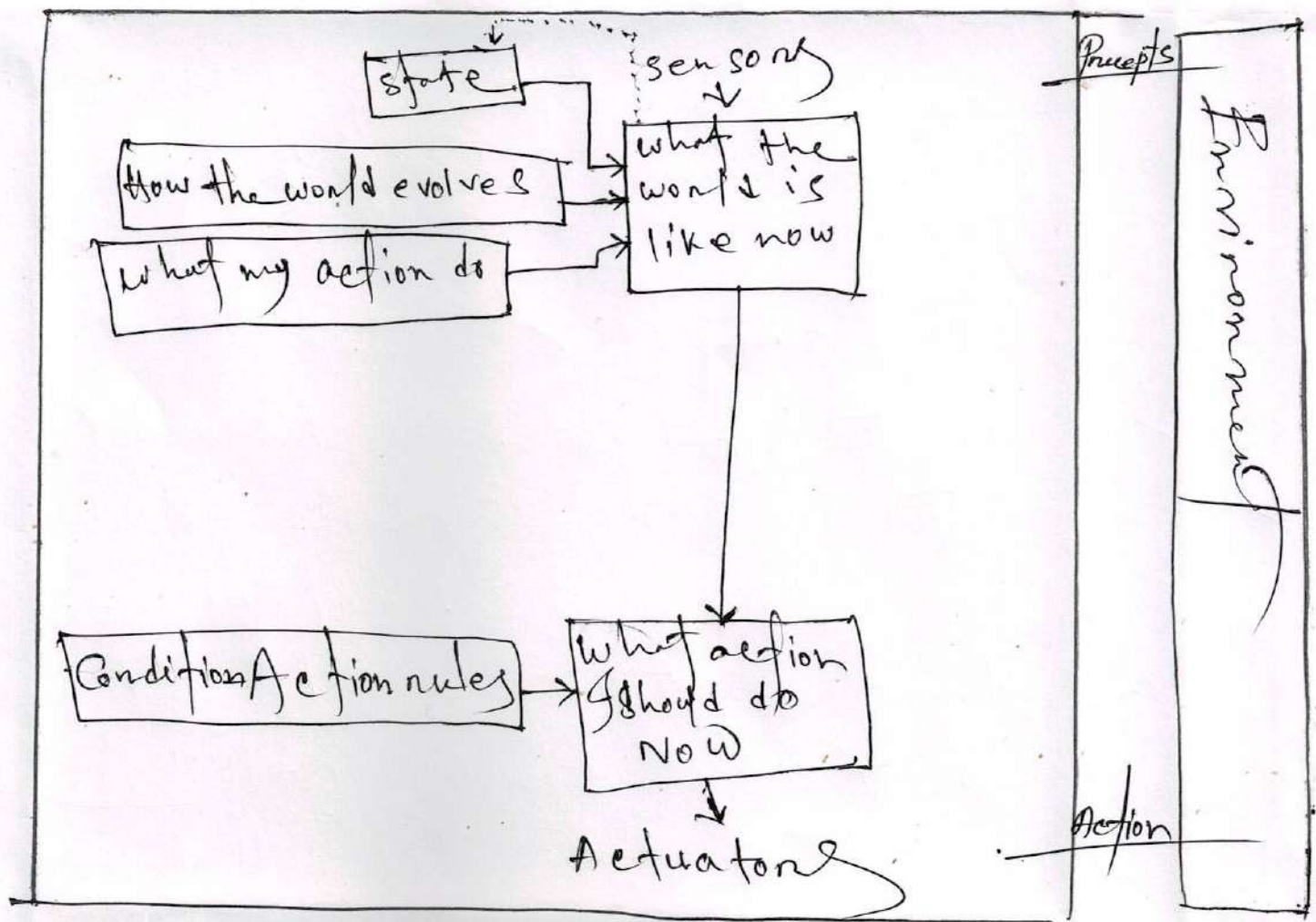


Fig: Block Diagram of Model-based Reflex agent.