Unit:1

**Introduction to artificial intelligence**

What is intelligence?

->an ability to

Deal with new situations

Solve problems

answer questions

Device plans,etc

What is artificial intelligence?

-->study of systems that act in a way that to any observer it would appear to be intelligent.

-->involves using methods based on intelligent behaviour of humans and other animals to solve complex problems

-->branch of CS that concerns with building intelligent machines that are capable of performing task that generally need intervention of human knowledge.

-->AI techniques are used to solve complex problems or simple problems that are internal to more complex systems .

Importance of AI

--> Al’s are being seen as tools and techniques that makes our life easier.

-->These technologies are a great asset to humans and are programmed to minimize human efforts as much as possible.

-->Can be easily in an automated fashion.

-->speed up our tasks and processes with guaranteed accuracy and precision

-->have played an important role in opening a new chapter in Medical Science,Air transport,banking and financial institutions,gaming and entertainment and many more.

Strong AI and Weak AI

What is Strong AI

-->Followers of strong AI believe that by giving computers sufficient processing power,and by providing it with enough intelligence,one can create a computer that can literally think and is conscious in same way that a human is conscious.

-->Many believe this view to be false and even ridiculous.

-->Creating a robot with emotions and real consciousness is rarely considered to be the goal of AI.

What is weak AI?

-->it doesn’t mimic human intelligence,It simulate human behaviour.

-->Followers of weak AI believes in the view that intelligent behaviour can be modeled and can be used by the computers to solve complex problems.

-->has potential to benefit the society by automating time consuming task and by analyzing data in ways that humans sometimes can’t.

-->may argue that just because a computer behaves intelligently does not prove that it is actually intelligent in the way that a human is.

Strong Methods and Weak Methods

What are weak methods?

-->They uses systems such as logic, automated reasoning and other general structures that can be applied to a wide range of problems.

-->they do not necessarily incorporate real knowledge about the world of problems that is being solved.

-->they have neither a precisely defined domain nor a precisely determined initial point.

-->They can certainly not be used to build system that could solve a wide range of general problems on their own because knowledge is the key ingredient.

What are strong methods?

-->Their problem solving depends on a system being given a great deal of knowledge about it’s world and the problems that it might encounter.

-->Strong methods problem solving depends on weak methods because a system with knowledge is useless without some methodology for handling .

-->These are designed to address a specific type of problem in contrast to weak methods that are general approaches that may be applied to a number of problems.

-->These are certainly essential if our aim is to build systems that are able to deal intelligently with new problems.

Turing Test(World war 2--Alan Turing--the 1950s)(TT)

-->TT was developed as a way to judge the success or otherwise of an attempt to produce a thinking computer.

-->It was based on the idea that if a person who interrogated the computer could not tell if it was a human or a computer ,turing said that the computer is intelligent.

-->The test is designed as follows

-->The interrogator is given access to two individuals,one of which is human and the other is computer.

-->The interrogator can ask questions to the two individuals,but cannot directly interact with them.

-->the questions are entered into a computer via a keyboard and the responses appear on the computer screen.

-->The human is intended to attempt to help the interrogator,but if the computer is really intelligent enough,it should be able to fool the interrogator into being uncertain about which is the computer and which is the human.

-->The real way in which the human proves his/her humanity is by giving complex answers that a computer could not be expected to comprehend.

-->But of course , the inventors of the truly intelligent computer program would have given their program the ability to anticipate all such complexities.

-->This in itself is not a particularly useful functions,but the attempt led to improvements in understanding of areas such as NLP.

-->To date, no program has passed the Turing test.

Chinese Room Experiment

-->An English-speaking human is placed inside a room. This human does not

speak any language other than English and in particular has no ability to

read, speak, or understand Chinese.

-->Inside the room with the human are a set of cards, upon which are printed

Chinese symbols, and a set of instructions that are written in English.

-->A story, in Chinese, is fed into the room through a slot, along with a set o

questions about the story. By following the instructions that he has, the

human is able to construct answers to the questions from the cards with

Chinese symbols and pass them back out through the slot to the questioner.

-->If the system were set up properly, the answers to the questions would be

sufficient that the questioner would believe that the room (or the person inside

the room) truly understood the story, the questions, and the answers it gave.

-->Searle’s argument is now a simple one. The man in the room does not

understand Chinese. The pieces of card do not understand Chinese. The

room itself does not understand Chinese, and yet the system as a whole is

able to exhibit properties that lead an observer to believe that the system

(or some part of it) does understand Chinese

-->Running a computer program that behaves in an intelligent

way does not necessarily produce understanding, consciousness, or real

intelligence.

-->This argument clearly contrasts with Turing’s view that a computer system

that could fool a human into thinking it was human too would actually be

intelligent.

-->the Systems Reply,

claims that although the human in the room does not understand Chinese,

the room itself does. In other words, the combination of the room, the

human, the cards with Chinese characters, and the instructions form a sys tem that in some sense is capable of understanding Chinese stories.

**Knowledge Representation**

-->in order for a computer to solve a problem that relates to the real

world, it first needs some way to represent the real world internally.

-->In dealing with that internal representation, the computer is then able to solve problems.

-->The representation should be such that the computer does not waste too much time on pointless computations, it should be such that the representation really does relate to the problem that is being solved, and it should provide a means by which the computer can actually solve the problem

Semantic Nets

-->A semantic net is a graph consisting of nodes that are connected by edges.

--> The nodes represent objects, and the links between nodes represent

relationships between those objects.

-->The links are usually labeled to indicate the nature of the relationship.

-->Semantic nets provide a very intuitive way to represent knowledge about objects and the relationships that exist between those objects.

-->The data in semantic nets can be reasoned about in order to produce systems that have knowledge about a particular domain.

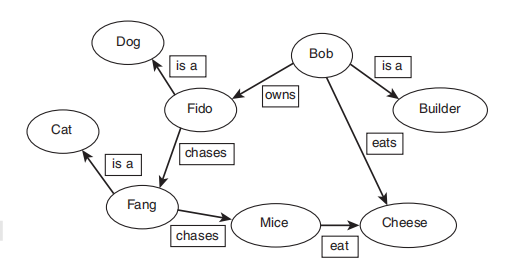
-->Semantic nets do have limitations, such as the inability to represent negations

-->This kind of fact can be expressed easily in first-order predicate

logic and can also be managed by rule-based systems.

-->Semantic nets convey meaning the relationship between nodes and edges in the net conveys information about some real-world situation.

Eg:



Frames

-->Frame-based representation is a development of semantic nets and allows

us to express the idea of inheritance

-->frame system consists of a set of frames (or nodes), which are connected together by relations.

-->Each frame describes either an instance (an instance frame) or a class (a class frame).

-->Each frame has one or more **slots**, which are assigned **slot values**.

--> Rather than simply having links between frames, each relationship is expressed by a value being placed in a slot.

