Contemporary Issues in Philosophy of Mind and Cognition
Prof. Ranjan K. Panda
Prof. Rajakishore Nath
Department of Humanities and Social Science

Indian Institute of Technology, Bombay

Lecture No. # 19
Artificial Intelligence – I

In this lectures, I am going to talk about artificial intelligence in contemporary philosophy of mind. Artificial intelligence plays a vital role in explaining mind in different ways and mind plays important aspects in artificial intelligence. Because in any definition on artificial intelligence, if you see on any book and you find that, artificial intelligence is you find that, the concept of mind is there and the concept of intelligence is there and all the mental concept is there. Ordinarily, we can say that, artificial intelligence is a machine making do things and it requires intelligence, if done by human beings.

The object of research in artificial intelligence is to discover not only how to program a computer to perform the remarkable function that make of human intelligence, but also it leads increasing the use of computers, also enhanced understanding of human cognitive processes which constitutes, what we mean by intelligence and the mechanism that have required to produce it. What is needed? Here is a one of the deeper understanding of human intelligence and the human mind. Here, we focus on the various definitions of artificial intelligence and organizes it into many categories. The basic it enhance of this thesis, especially artificial intelligence is that, the brain is just a digital computer and that the mind is a software program.

Especially in the mid of the 19th century, the hypothesis, a machine can think and becomes very popular after Alan Turings article on computing machinery and intelligence. This thesis claims that, a machine can think, a machine can act, machine can do rational activities and many other things, which we human beings are doing. Therefore, mind can be explainable in terms of machine or machine can be explainable in terms of mind and has no distinction between mind and machine. The same has no

distinction between mind and body; that is why, it is one of the main thesis and may one of important part of the contemporary issues in philosophy of mind.

For them, the brain is just a digital computer and that the mind is a software program. (( )) that mind is the software and the brain is the hardware in which, a mind functions. Now, let us see what is this artificial intelligence? It is very difficult to give any kind of precise definitions. Let us see, what is artificial intelligence? First, let us see these definitions on artificial intelligence, which is defined by John Hagueland. Let us see this PPT. The exciting new effort to make computers think and machines with minds, in the full and literal sense.

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Secondly, if you see according to the Bellman, it is the automation of activities that we associate with human thinking, activities such as decision making, problem solving, learning and etcetera and which is the Bellman's definitions. From this, we can conclude that, system that thinks like humans. How they are concluding is, from these two definitions, if you see differently special the definition of Hagueland and Bellman. Both of them are explaining that, artificial intelligence is concerned with a thought processes and reasoning. They have explained that, the mind has a machine that is completely associated with human thinking. Therefore, that is to say that, computers do things; therefore, system that thinks likes humans.
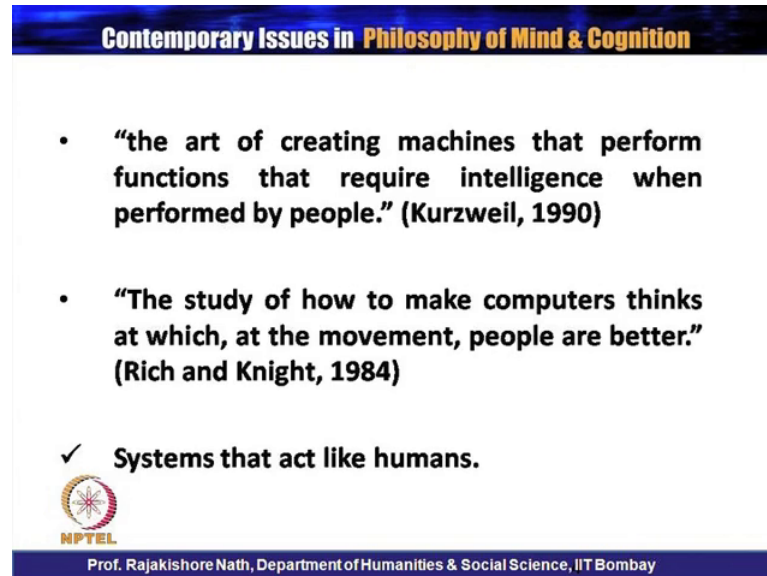
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Secondly, if we see some of the definitions given by some other scientists like Charniak and McDermett, for them artificial intelligence is the study of mental faculties through the use of computational model. According to Winston, the study of the computations that make it possible to perceive, reason and act. This is one of the important factors in the Winston's thesis on mind. If you go back to the Hagueland way of definition, because he has explained in the full and literal sense and the machine is full and literal sense like the mind.

Here, even in the full and literal sense, the way we believe it you understand the general thinking, the general story or general things about the world and intentional factors about the world. The same way, a computational system can understand in the same way; here McDermett, Charniak and Winston are concerned, but here McDermett and Winston has concerned with an ideal intelligence. That intelligence which equivalence with the human intelligence and therefore, there is no distinction between the human intelligence and the artificial intelligence and both are going to (( )).

They explain the mental faculties through the use of computational models and therefore, that is no distinction between a mind and machines. That is also rational capacity also is there in the case of Winston's and McDermett's thesis, because the mental faculties is there. It can perceive; it can have reasoning capacity; it can act. Therefore, it can do any

kind of rational activities and these rational activities are there. Let us see, some other explanations on artificial intelligence.
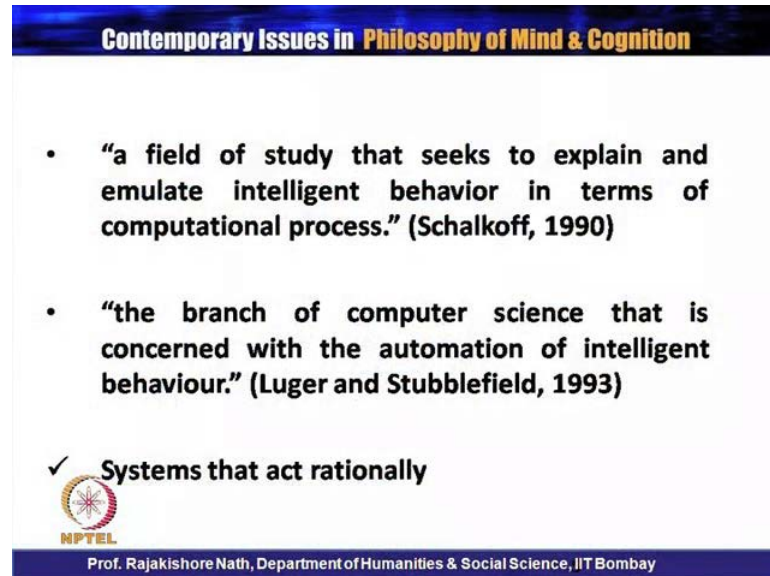
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According to Kurzweil, the art of creating machines that performs functions that require intelligence when performed by people. Here, Kurzweil is explained one of the each sense creating machines in that, array also intelligence and machines have also intelligence, whenever we human will perform and we require intelligence. Rich and Knight say that artificial Intelligence is the study of how to make computers thinks at which, at the movement, people are better. Both Kurzweil and Rich and Knight are explaining each sense of artificial intelligence, but even if this intelligence belongs to the human mind.

Although, this intelligence in human performance is there; human function is there, but at the same time, all these functions are basically belongs to the human mind and human things. Even if whatever the mechanical activities is there, those mechanical activities can be activated to many humans and humans are better than the machines. It is one kind of (( )) way of explaining the artificial intelligence. But in the case of, if you see in the Hagueland thesis, the reverse way which is one kind of a strong thesis. Hagueland, Winston's all of them have raised that, it is just a strong way of that mind is machines.

There is no distinction between mind and machine. Mind can be reduce able to the machines and this reductionist explanation is the right explanation on this; whatever way,

the artificial intelligence is explaining about mind and that is about the mind. Let us see, some of other definition on artificial intelligence.

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Here, according to Schalkoff that, a field of study that seeks to explain and emulate intelligent behavior in terms of computational process. Secondly, this Stubblefield and Luger say that, the branch of computer science that is concerned with the automation of intelligent behavior. Therefore, system that acts rationally. Therefore, intelligence we will be there for rational activities are there and here, both Luger and Stubblefield are concerned with the behavior aspects of systems. If you summarize all the definitions of artificial intelligence, it can be organized into four categories. They are follows.

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The system that think like humans; the system that act like humans; the systems that think rationally and the systems act rationally. These points can be elaborated in different ways. Now, you have to look at each aspects in differently and because which is very important to see, how these points are related to different philosophical as well as scientific aspects of mind?

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Let us see this, acting humanly, first we have to see turing machine approach and thinking humanly: the cognitive modeling approach and thinking rationally: the laws of

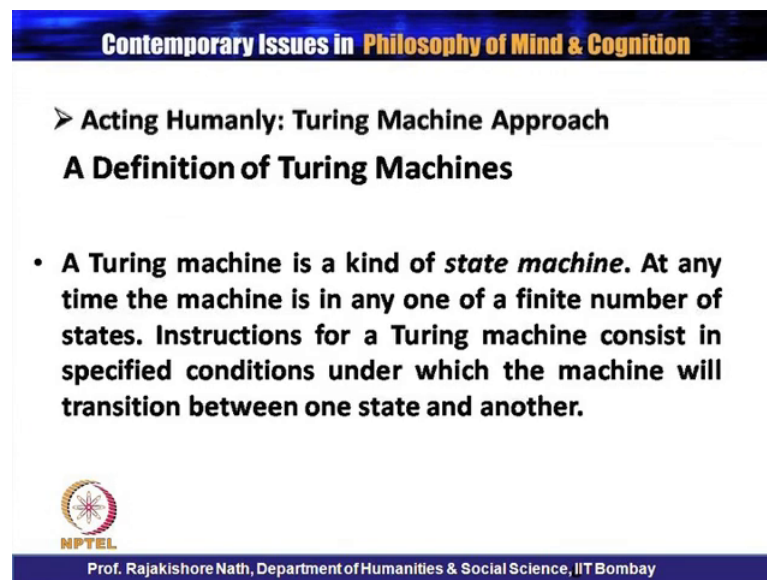thought approach and acting rationally: the rational agent approach. All these 4 approaches are explaining about the mind. They are giving that explanation which shows that, there is no distinction between mind and machines. Let us see, this turing machines approach on acting humanly.

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The turing thesis test, it is named after Alan Turing was a British philosopher as well as mathematician, logician (( )) designed to provide a satisfactory, operationally the finishing of intelligence. Turing defined that, intelligence behavior hide the ability to achieve human level performance in all cognitive tasks to full and interrogator. In his (( )) on computing machinery and intelligence, Turing says the new form of the problem can be described in terms of a game, which we called imitation game.

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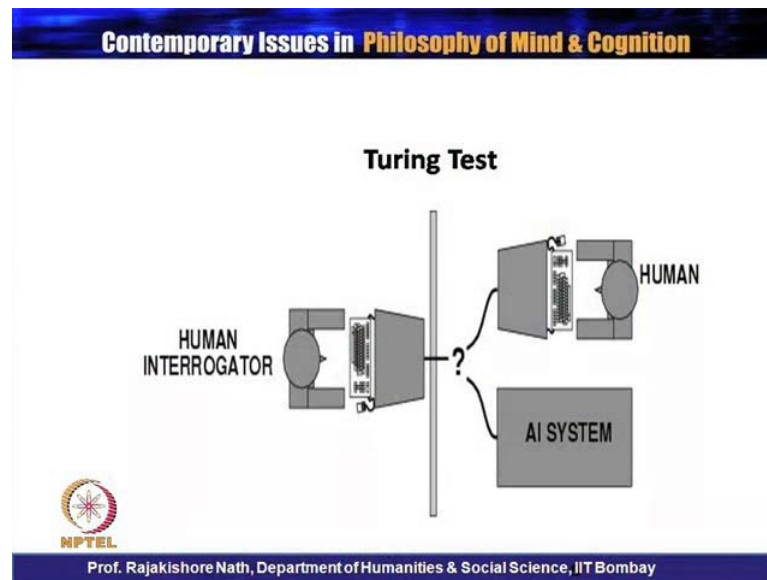
It is a game played by a man and a woman and interrogator who may be of either sex. The interrogator stays in a room apart from the other two rooms. The object of the game or the interrogator is to determine, which of the other two, which is the man and which is the woman. And here, she knows them by labels x and y. At the end of the game, here she says that, either x is a or y is b or x is b or y is a; the interrogator is allowed to put questions to a and b. Thus c will ask the questions. Will x please tell me the length of (( )) are here. Now, suppose x is actual a, then a must answer to the questions and the main aim of this game is to pull interrogator.

But if the communication is between the interrogator and the two other people, either men or women; those who are sitting separately and the best way communication is a teleprinter. That teleprinter is the perfect medium of communication to recognize the intelligence. alternate device and Intermediately can repeat the equations and answers. The object of a game for the second player that is, b into head the interrogator. The best status for us is, probably to give a truthful answer and she can add to her answers such thing as, I am the woman. Do not listen to him, but it is of no avail as the man can make similar (( )).

Now, you can ask questions; what will happen, when a machine takes the part of a in this game? Now the question is, will the interrogator decide wrongly as of and when the game is played like this? As it has when the game is played between the man and

women? Turing's answers to these questions are more or less showed up in this way that, even if he believes that, there is a possibility is there. We can program the computers which will storage capacity of about the way, even if human being is storing the memory or everything else. To make them play of a imitation game as well as an (( )) interrogator will not have more than any 70 percent of chance of making the right identification after (( )) of questions.

What Turing had predicted at that time now? In fact, is a fact that the machine or the computer can imitate human viewer. It should be pointed out that, the Turing's believes about the capabilities and capacities of machines are not limited to such activities, as playing the imitation game as successful as human beings. Roughly speaking, the test Turing property is that, the computer should be interrogated in the place of human beings. Turing test deliberately avoided a physical interaction between the interrogator and the computer, because physical limitation of a person is unnecessary for intelligence.

However, the so called Turing test includes a video signals. So that, the interrogator can tests these subjects personal perceptual attitudes. In order to pass through total Turing test, the computer will need a computer vision to perceive objects and robotics to move them. Again, the issue of acting like a human comes up primarily, when artificial intelligence programs have to interact with peoples as well experts system explained. (( )) it came to its diagnosis or a natural language processing system has a dialogue with the uses. These programs must have according to certain normal covertness of human interaction in order to make them understood.

The Turing test is the test shows that, the machine can interact with human beings; that the way human being interacts amongst themselves. That is to say that, machines can behave the way, the human beings do and here, I would like to give some more examples like that. Though, presently we are chatting, even if in the case of chatting; it is very difficult to say, suppose I am writing something online chatting somebody else; even in the opposite side that may not be a human, that may be a program. It is very difficult to recognize as to recognize either he or she is present in the opposite side and what way he or she is thinking; she is doing activities.

In the same way, the Turing the whatever Turing was purposing. Now, the chatting machine, the online chatting is the same way of doing one kind of activities. Therefore,
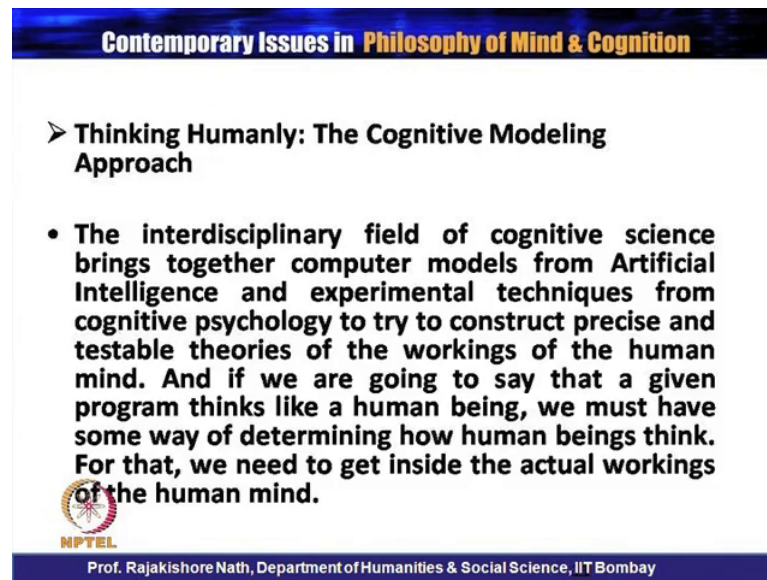
Turing thesis is not a false, but some says Turing thesis; it end to stimulate or duplicate to the human mind. But through the mechanical also in the explanation of the mind that and even if any kind of computer, we can say is a Turing machines. Even if a computer, we can say in a robotic machine and we can say also physical symbol system also; because there is a physical is there and all those things are there.

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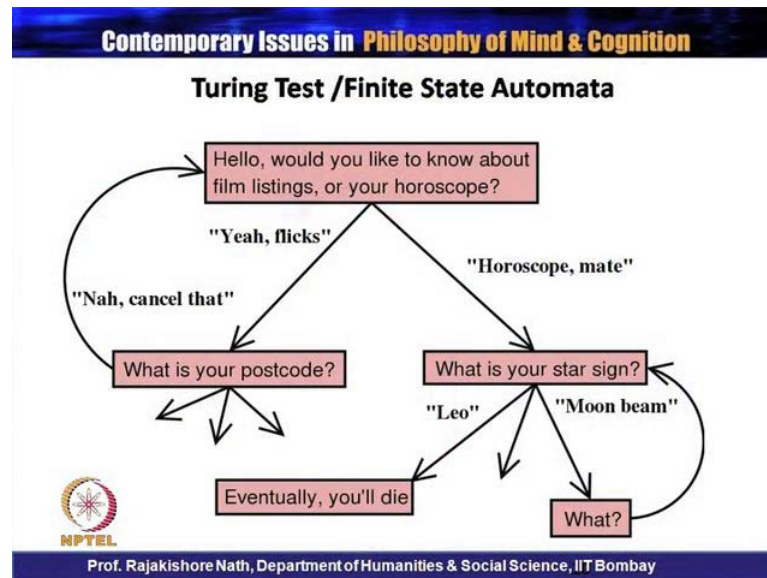
For example, even if Turing state it can be called a finite state automata. Many people have claimed that, many scientist can claim that finite state automata; it is function in a finite state automata; it is not an infinite state automata. All these things will be very clear, if we see from the points like thinking humanly, the cognitive modeling approach which is one of the important model in developing the cognitive science or cognitive psychology. They are explaining about the human mind or about the computational model of mind. Let us see thinking humanly, the human cognitive approach.

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As you know, the interdisciplinary field of cognitive science belongs together computer models from artificial intelligence and experimental techniques from cognitive psychology to try to construct precise and testable theory of the workings of human mind. And if we are going to say that a given program thinks like a human being, we must have some way of determining how human beings think. For that, 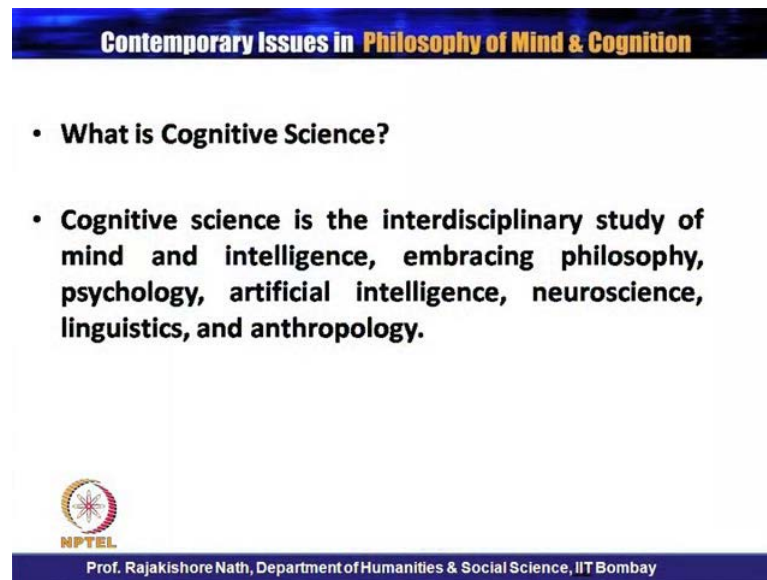we need to get inside the actual workings of the human mind. Stewart Russell and Peter Narwik say that, there are two ways to do this; through intersection trying to catch our own thoughts as they go by or through psychology experimental sense.

Once we have sufficiently précised theory of the mind, then it become possible to express the theory as a computer program. If the programs input, output and timing, they were matches human behavior; that is, to say that the evidence that some of the programs mechanism may also be operating in humans.

Now, it is almost taken for granted by many psychologists that, a cognitive theory should be like a computer program, but as we know that cognitive science is the science of mind the cognitive science is the science of the mind. Therefore, cognitive science is to understand pursuing, thinking, remembering, understanding, language learning and other mental phenomenon. The research is remarkable diverse ranging from observation children's mental operation through programming computers to do complex problem, solving to analyzing the nature of meaning.

In order to appreciate the work in artificial intelligence, this is necessary part of the cognitive science. It is necessary to have some familiar with theories of human intelligence. The cognitive scientists introduce the notion of machine intelligence and emphasis; the relationship between human and machine intelligence. The aim of artificial intelligence is to develop and to test computer program that a (( )) characteristic of human intelligence. The most fundamental contributions of symbolic computer science modeling have been the physical symbol systems.

According to Nuewale and Symons, a physical symbol system has the necessary and sufficient means for general intelligent actions. And here, what is physical symbol system? As I told you from the beginning, even if we can call a machine as a machine or a Turing machine or artificial intelligence or a finite state automata or a physical symbol system; according to Symons and Neuwale a physical symbol system has the necessary
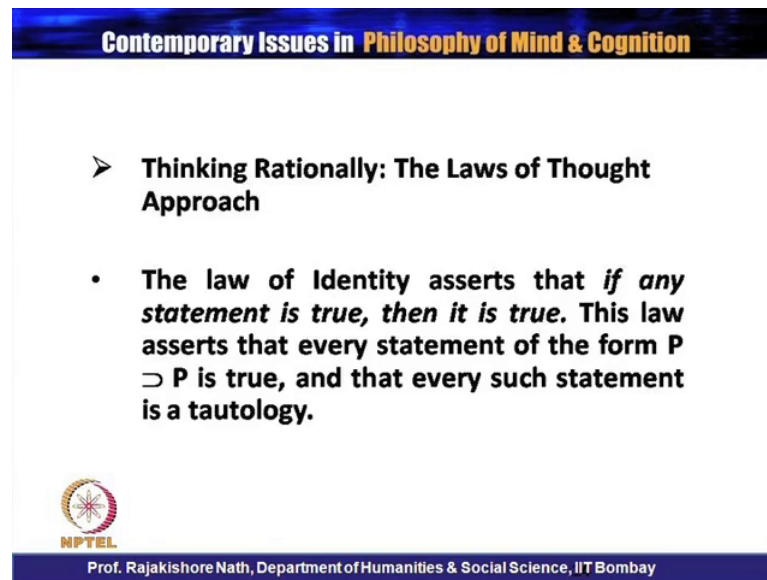
and sufficient means for general intelligent actions. By necessary here we mean that, any system that established general intelligence will proof of an analysis to be a physical symbol system.

Secondly, by sufficient we mean that, any physical symbol system of sufficient size can be organized to except general intelligent actions. And lastly by general intelligent action, we used to indicate the sense (( )) of a intelligence as we see in the human actions. That states that, any kind of actions I truly react to the appropriate demand of the environment that occur within some systems. This thesis claims that, according to Symons and neuwale that, there is no distinction between mind and machines; because it has sufficient size; it can produce, reproduce and establish, reinterpret.

This intelligence is necessary equivalence with a human intelligence. Therefore, there is no distinction between a human intelligence and physical symbol system. Again they claim that, the ability of computer simulations to module such process is interpreted as a proof of the border claims that, a symbol system is at the center of human intelligence. In this hypothesis it shows that, intelligence is an essential aspect of machines. If the machines have the capacity of intelligence, intelligence is the essence of human cognitions.

Therefore, machines have cognitive capacity like the human beings. In the cognitive modeling approach, thus human beings and machines show the property of being intelligent. Therefore, from this cognitive modeling approach we see that, machines are intelligence; there is no distinction between human being and machines.

And thirdly, we have to see now thinking rationally: the laws of thought approach. The laws of thought approach plays important role in even if in the case of Aristotle and philosophy; because rationality is the key concept in Aristotelian philosophy. If you see Aristotle has explained that, without rationalities is very difficult to do any kind of things. If it is the artificial intelligence scientist and cognitive scientist, they have tried to simulate and implicating the thing. Rational capacities in the machines and they have tried to implement these rational capacities in the machines. Right thinking is the inferential character of every reasoning process.

Aristotle in his famous syllogism provided the pattern of original structures that, always give a correct cognition from a given correct premises. In the Aristotle syllogism, the laws of thought play a vital role; because these give law of the right explanation of syllogistic inferences. There three laws of thought to recognize by the logicians.

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These have traditionally been called the laws of identity, the laws of contradictions and the laws of excluded-middle and these laws of thoughts are appropriate to different context and the formulations appropriate as follows. The laws of identity as said that if any statement is true, then it is true. This law as I said that, every statement of the form P and P is true, and that every such statement is a tautology, all the time. And it is true; it is one kind of universal truth and there is a no distinction between these kinds of things.

The laws of contradiction I said that, no statement can be both true and false. This law asserts that, every statement of the form P. P is false, that is, every such statement is self-contradictory and its negation is logically true. And thirdly, the law of excluded-middle asserts that any statement is either true or false. This law asserts that every statement of the form P and P is true, that is, every such statement is a tautology. In these laws of thought approach to artificial intelligence, the whole emphasis is on the correct syllogistic differences. For example, I can say the concredable Socrates is a man; all men are mortal; therefore, Socrates is a model.

In this inferences, the cognizes based on the premises, according to the rules of inferences. The above syllogistic inferences based on to formulate artificial intelligence for a while. All reasoning of this type, the emphasis is on the logical impress of a conclusion from differences. In the artificial intelligence program, this type of logical impresses is of much use. Since this program provides a variety of logical reasoning in

an inference, a set of variable, a set of constant terms and a set of function, the set of connectives. If and or not (( )) exist for all the important symbols to build and a program.

All these constant and variables are arbitrary representation of the world. With the help of all these, so called logistic tradition within the artificial intelligence hope to build and such a program to create intelligence systems. If this is possible, then the rational thought is possible; inner to be a rational all this logical capacity is necessary; without logical capacity is very difficult to have a rational capacity or rational thinking or rational activities.

And how artificial intelligence it defining mind, at the same time defining artificial intelligence. Whenever there a scientist defining artificial intelligence, they are using that are mind and then concluding that, there is no distinction between mind and machines. Machines are artificial intelligence can be defined in terms of mind with machines and therefore, there is no distinction between mind and machines. And as you know, the rationality is one of the important factors of human mind and this rationality we can find in the computational system, according to artificial intelligence scientist.

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If you see this PPT, it is rationally they have said that the rational agent approach, agent is equal to architecture plus program. And here, they have been and they are arguing that, this rational capacity or rationality you can find re-implement or simulate in machines. If stimulation is possible, then the same way as the human mind is working. Therefore, this

rationality not only existing in the human mind, but also existing in the machines acting rational. The rational agent approach actually it is, agent refers to a mechanical agent that; so a computer or what. Acting rational means acting. So as to achieve one's goal given one believes.

An agent or a mechanical agent is something that perceives and acts also and it can decide what to do what not to do; because the rational capacity is there; the correct. In any kind of rational activities, you will find that; being a rational agent, we have to derive from the correct inferences; because one way to act rationally is to ration logically to a conclusion given action that will achieve one's goals and then, to act on that conclusions. According to artificial intelligence scientist, that rational agent therefore has two advantages. Firstly, they say that it is more general than the laws of thought approach, because correct inference is only a useful mechanism for achieving rationality and not a necessary one.

Secondly, it is more amenable amenable to the scientific development than approaches based on human behavior or human thought, because the standard of personality is clearly defined and completely general. Therefore, it arises from the agent is something, that perceive and it also act according to the environment. But here, we have to point out that, the job of artificial intelligence is to design the agent program; that is a function that implements the agent mapping from percepts to actions. We can assume from this program and this program will run on some sort of computing device.

A human agent has eyes, ears and other organs for sensors; hands, legs, mouth and other body parts for effectors. Thereby, the relationship among agent and architectures and programs can be summed as (( )) like this. Active rationality, the rational agent approach; agent is equal to architecture plus program. Let us see this PPT, the agent is autonomous to the extent that; its behavior is derived by its own experience. A truly autonomous agent should be able to operate successfully in a wide variety of environments. I given sufficient time and scope; but before we design an agent, we must have a partly good idea of the possible percept and actions.

The agents goal is supposed to achieve and what sort of environment, it will be operate in it. Again as we have mentioned that, an agent is something to perceive and acts. In this approach, artificial intelligence is viewed as a study and construction of rational agent.

One of the important factors is that, correct inference is not the whole of rationality; there are also way of acting rationally and that cannot be reasonably, say to involve inferences. For example, pulling one's hand of a stone is a reflex action; that is more successful than slower actions taken after careful derivations. Therefore, this shows that computational systems act can rationally.

Therefore all these definitions on artificial intelligence, whatever we have defined is scientific definitions, but also a philosophical implication for explaining the concept of mind. Here, we have explained about the system that think like humans, the systems that act like humans, system that think rationally and system that act rationally. All these things we have explained in approach to the Turing approach then cognitive modeling approach and the laws of thought approach, the rational agent approach. Therefore, all these approaches are one of the artificial intelligence models of mind and they are explaining in the scientific way.

In the next lectures, we have to see field of artificial intelligence and whether artificial intelligence is art or science and what artificial intelligence or a computer can do. All these things plays vital role, because these are necessary to explain in the introductory classes of artificial intelligence. Although, I am not going deep into the scientific aspects of artificial intelligence and I will be dealing with the general introduction of artificial intelligence and then, some of the philosophical arguments or limitations to artificial intelligence. Thank you.