Artificial Intelligence: Search Methods for Problem Solving
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Lecture – 09
Introduction (2013)
The Notion of Mind in Philosophy

So, we are back. Having looked at the mechanical side of this history of AI. We want to now look at the philosophical side as to you know this notion of the mind. What is the notion of the mind? How did this notion of the mind never come out, and how can we get it across to the machines essentially?

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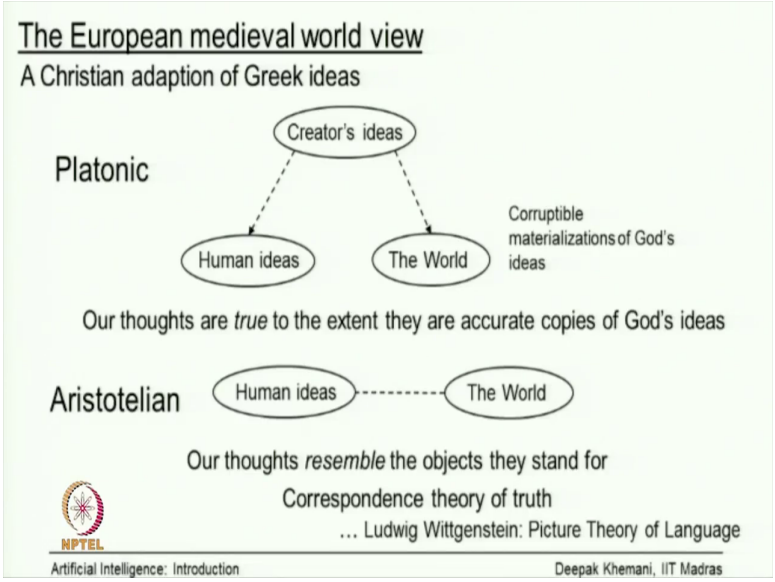

So, the medieval view world view in Europe was basically a Christian adaptation of Greek ideas essentially. There was a big gap between the Greeks and medieval Europe, but these

ideas that we Greeks started off with eventually ended up in medieval Europe. And the view of the world was of course, that it was a very anthropocentric view of the world, humans were at the centre of the universe and the everything revolved around the earth essentially.

So, we look at some of those ideas and so, what we are trying to see is how did human beings as sentient beings come up with the notion of the mind? How would you even imagine that there is something called a mind? I mean you of course, you are there in the world you are immersed in the world and you are interacting with the world. But, how do you come to this conclusion that you have thoughts and ideas which are in some sense existing independently?

So, we start with the Platonic view of the world, the idea of which came from Plato. He said that in the perfect world there are this creators ideas the Gods ideas. And our ideas are human ideas are derived from gods ideas and the world itself is derived from god ideas.

So, its a very platonic view of this whole world and the world was corruptable materialization of gods ideas, that you know that is why things were not perfect in the world. Even though Gods ideas are perfect the world is not perfect and likewise our thoughts are true to the extent that they are accurate copies of Gods ideas essentially.

That was the first starting point Plato, then we move on to Aristotle. Aristotle derive with the idea of a god and he said that the world is out there and human ideas are human ideas, and they in some way correspond to the world essentially. So, our thoughts resemble the objects that they stand for.

So, if I am thinking of an apple, then my thought of an apple resembles the apple in some sense essentially this is known as the correspondence theory of truth essentially. And one branch of philosophy which was it was taken up was by Ludwig Wittgenstein, who in his early works postulated something called the picture theory of language essentially. That behind every word there is a picture an image which is sitting out there essentially ok.

So, this is how the world as we saw it the earth was flat at the centre of the universe with the Gods heavens rotating around it essentially.

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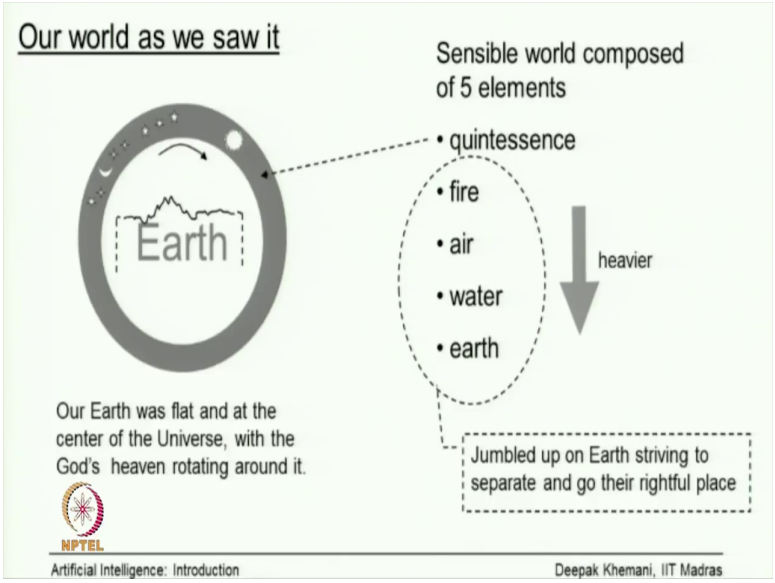

The sensible world the world that we could sense was composed of 5 elements quintessence, which was constant in the heavens did not change constant in that sense. And 4 other elements which was fire, earth, water; fire, air, water and earth listed in decreasing order of weight essentially.

So, you can find similar ideas all over the world about you know what is the basic elements of the world essentially. So, if you ignore quintessence which is there in the heavens you have fire earth water and earth air and they are all jumbled up on earth. Trying to find or striving to find their right rightful place.

Rightful place meaning by order of weight essentially earth should be the lowest and then there should be water and then air. And then fire and different materials had different amounts of these 4 elements in them and that is why they behave differently.

So, for example, wood had more water and therefore, and some air and therefore, it floated on water essentially. Whereas, iron had more earth and therefore, it sank in water essentially. So, they could explain why wood floated various iron sank and soon and if wood were to catch fire, then it know it would try to escape into air. So, they are this kind of explanations about the world essentially.

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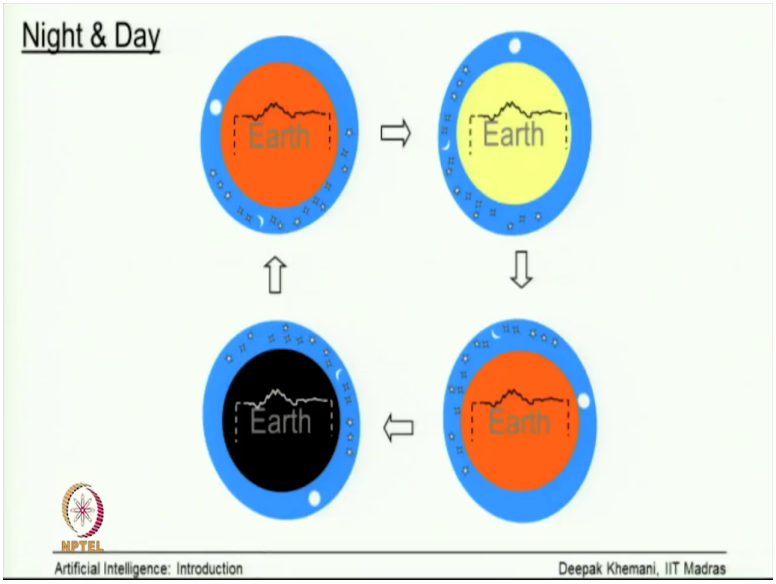

And this is how the colour inside, this circles is supposed to represent the colour of the sky. So, you know we have morning daytime evening and night. And as the sun, it depends upon the position of the sun as the sun rotates our day changes essentially.

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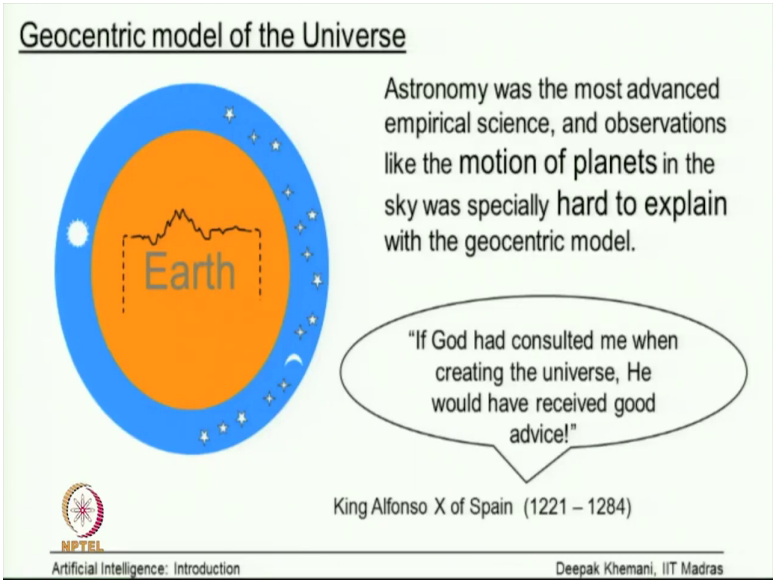

So, this is a small animation I created of what we thought about the world to be like, this is how the world was, you know all the heavens were rotating around and around the earth and the earth, was there centre of the universe essentially.

Now, in those days astronomy was for many reasons a very important science and it was a very empirical science, but it was difficult to explain the motions of the planets. For those of you who are interested in astronomy, you would know that the stars are always in the same position the constellations that we see Leo or Virgo or.

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Any of these constellations, they always appear in the same fixed pattern throughout the year. Its only the planets which you know move from one constellation to another and it was very difficult to explain, how they were operating essentially.

So, king Alfonso Spain in thirteenth century got so upset that he said that if god had consulted me when creating the universe, he would have receive good advice you know why I have this planets move around in this erratic fashion essentially is a quotation. I have got from McDucks book I should have mentioned it there.

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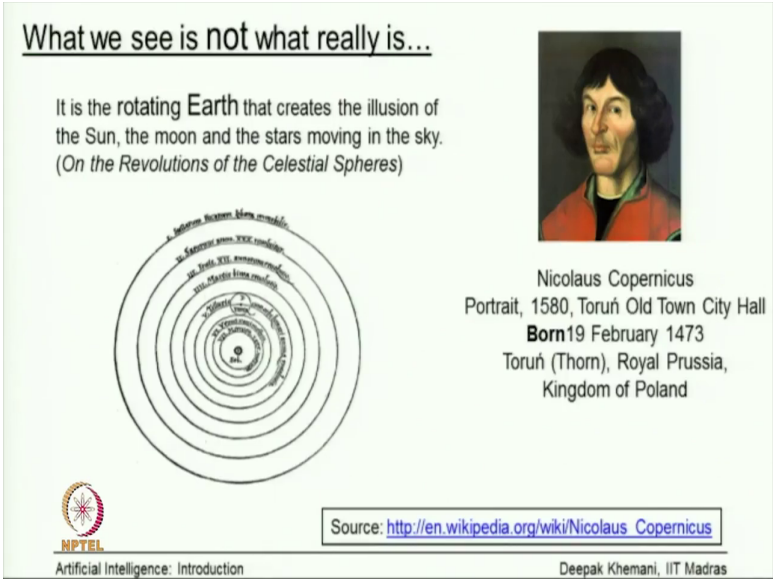

Then along came Copernicus essentially ok. So, this is a first and this what Haugeland says, the wegde between thought and reality the first wedge between thought and reality was

inserted by Copernicus, who says that what we see is not what really is. So, up till now you know remember this picture theory the notion of correspondence that our thoughts are in the image of what we see around us in that kind of a thing.

That the our thoughts reflect the world, as it is Copernicus for the first person who came and he must be familiar with his book on revolutions of the celestial spheres. He said that its that the earth is not at the centre of the universe. In fact, the earth revolves around the sun and earth rotates and creates the illusions of day and night and that kind of a stuff essentially. The important thing from our point of view is that what we see. Is not what really is out there essentially. So, the wedge has Haugeland says between thought and reality.

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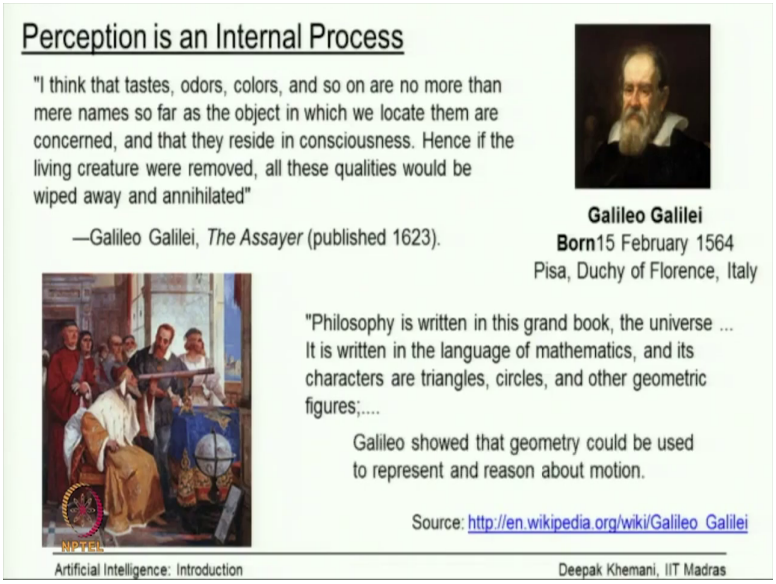

So, all these famous characters you have encountered them in one way or the other. So, we know Galileo Galilei because of the equations of motion for example, we always attribute them to Galileo v is equal to u plus at and you know that kind of stuff.

But, Galileo made his very important observation, he said that perception is an internal process, he says and this is quoted to him I think that tastes, odors, colors and so on and are no more than mere names as so, far as the object in which we locate them are concerned.

So, if you are smelling a rose and you feel that the rose smells nice it is nothing to do, this the notion of this smell of the rose is not located in the rose, but its located in our minds. So, he says taste odors, colors and so, on are no more than mere names so, far as object in which we locate them are concerned.

And that they reside in consciousness in our minds, in other words. And he says it hence if the living creature were removed that, we as the perceivers of this taste and smell and odor were removed. All these qualities would be wipe wiped away essentially, that this notion of taste and smell and colour is something that we have in our heads, its not a property of the object essentially.

So, he goes on to explain for example, he imagines that you know the notion of smell actually happens because, they are these particles which are impinging upon the inside of our noses which results in certain sensations, which we called as smell essentially which is very accurate as you can see.

But, Galileo said this in the 17th century essentially that perception is an internal process essentially. So, the we are exploring this notion of thinking how the notion of the mind evolves you know in the. So, all this is European history because, AI as we know it came out of European thought essentially.

So, even though for example, other civilizations like Indian philosophy has a lot to say about such some of these concepts like knowledge and so on. But, we are not I mean a I did not

come out of that essentially. Then Galileo says that philosophy is written in this grand book the universe, it is written in the language of mathematics.

And its characters are triangles circles and other geometric figures. So, when Galileo was doing all this reasoning algebra had not yet been invented essentially. In fact, his proofs of the equations that we attribute to him like v is equal to u plus at are essentially geometric in nature.

So, if you look at Haugelands book you will see some idea of how he draws triangles and says that this side represents this, this side represents that and the area represents this and you know that kind of thing. All is reasoning was done for him mathematics was geometry. And he says that the whole world can be described in mathematics. The language of mathematics and its characters are triangles circles and other geometric figures essentially.

So, you can see this another step away from the fact that our ideas are reflections of the real world out there. He is saying that you can think of motion, the laws of motion are about moving bodies, using the language of mathematics. So, the very already the representation has moved to something which is different from the real world out there essentially.

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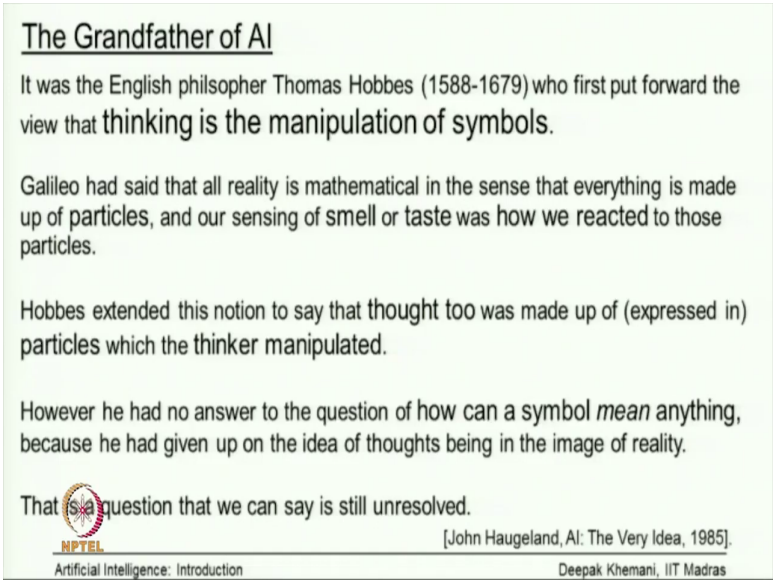

Next we look at ok. So, Galileo show the geometry could be used to represent and reason about motion, this is what we just said, then we come to the person who Haugeland calls as the grandfather of AI. It was the English philosopher Thomas Hobbes 1588 1679. Hooper first put forward the view that thinking is a manipulation of symbols, this fundamental to AI essentially. Because, after all we are talking about representing symbols and manipulating them and creating intelligence out of them essentially.

So, Galileo had said that reality is mathematical in the sense that everything is made up of particles. And our sense of smell or taste as how we reacted to those particles, Hobbes extended this notion to say that thought too was made up of or expressed in particles, which the thinker manipulated ok.

So, Galileo is talking about external reality and how we can represent think about that or talk about that. Hobbes is talking about the internal process of thinking and saying that even thinking is basically the manipulation of something, which you called as particles which we now call symbols essentially. However, he had no answer to the question of how can a symbol mean anything ok.

Because, we will see that for us intelligence is manipulating of symbols in a meaningful fashion. And Hobbes could never say how can a symbol mean anything. In fact, as Haugeland says he could not distinguish, he could not tell us how minds are different from books. In a sense that books are also collections of symbols and minds are also you know collections of symbols which we are manipulating, how can the two to be different. Because the idea of meaning is very elusive. So, if I were to ask you how do you know the meaning of a word? How would you what would your answer be?

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You just think any word let us say.

Student: In term word in term (Refer Time: 14:31).

So, you could use examples essentially like that ok, talking about our standard source of meaning which is a dictionary. So, if you want to look up a meaning of a word you go and look up a dictionary. How does the dictionary give us meaning essentially? Because, dictionary is only describing words in terms of other words essentially, when you give examples also you are giving examples in terms of other words.

Where does the meaning originate from, I mean is there a fundamental source of meaning essentially. This is a kind of difficulty which Hobbes faces. Where does meaning come from essentially, we also not able to say where is meaning comes from see for the people before him that the notion of an apple is because, you see an apple and that is what it means actually ok.

But when you talk about language and thought and symbols, we have this difficulty of saying, where does the meaning come from essentially.

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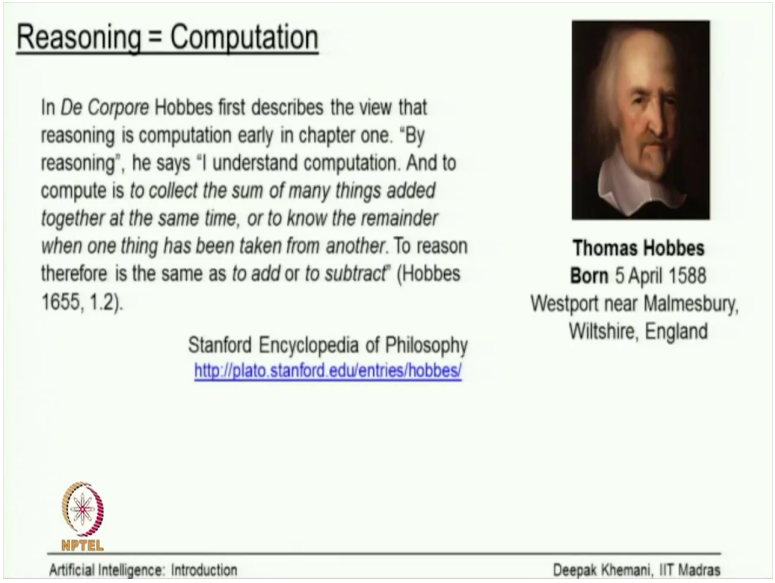

As a question that we do not, we have not yet answered today essentially this is the picture of Thomas Hobbes

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Reasoning = Computation