

The Shadowy Depths of Mind

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[This episode is a fiction that details the process of machine learning and deep learning in artificial intelligence. It also elaborates on Artificial Neural Network that forms the basis of today's machine intelligence. It has an intelligent robot called Anirban that is injured along with a human being in an accident. Both of them are kept in a hospital but on the following morning both of them disappear. The engineer responsible for manufacturing the robot claims that a 'eureka' moment has occurred in the learning process of the machine. It has been able to activate a hibernating potential to be able to operate on the injured human being. The story has to be followed to understand the underlying mystery.]

Characters:-

Abhik (Medical professional, Age 35)
Meher: (Engineer, Age 30)
Anirban (Robo)
Dr Nair and Dr Srilata. (A team of Dr.)
Lilly, Nidhi and Raghu (Engineering Students)
Dr. Nair (Age 50)

[In an interior room of a big hospital two bodies are laid side-by-side on two beds. One is that of a human being and the other, that of a robot. The two look the same from outside. However, the persons attending the two bodies are different by training. While one is a medical professional called Abhik, another is an engineer called Meher.]

Abhik: Sorry Meher, I had to call you at this hour of the night.

Meher: No issue doc, duty is duty.

Abhik: Yes of course, duty is above everything but I thought that your nature of duty doesn't include on-call duties at such small hours of the night.

Meher: The world has changed doc ...

Abhik: You can call me Abhik.

Meher: Thank you. So Abhik, as you can understand ... the world is less human these days. And so, we engineers are required to bring machines back to life at odd hours.

Abhik: (Lets out a subdued laughter) Well said ... the world is less human these days ... but I have had very little exposure to sub-human lives ...

Meher: Sorry for interrupting but you can also say super-human lives ...

Abhik: Super-human! Do you really mean that?

Meher: Of course! The lifeless body to your right deceived you because it looks like a normal, young man on the street. Right?

Abhik: Err...yes...

Meher: You would have been misled similarly if you had seen it in action.

Abhik: So where is the super-human part? It's all like other human beings!

Meher: You will be able to notice it only when it accepts an assignment that will be thought impossible-to-complete by a normal human!

Abhik: Did this man...err..I mean machine do anything like that?

Meher: Exactly so. It would have successfully completed the same had it's decision forest not failed it.

Abhik: They were in a forest you mean?

Meher: (Suddenly checks his words.) Well, by forest I am referring to the labyrinths of his logic system that even we are unable to track these days.

Abhik: Well...I myself feel like left in a jungle...I can guess that you are referring to some level of artificial intelligence that drives this robot but...

Meher: Let us not fret over the terms Abhik. Tell me please, does the human being have any chance of surviving?

Abhik: You know this fellow by any chance?

Meher: Not at all. Just curious.

Abhik: From the first glance it doesn't look hopeful. The head has been very badly damaged. In fact I am worried about a possible brain-dead situation.

Meher: Really sorry to hear that.

Abhik: But the essential supports will have to be provided in any case. I had issued my instructions before you arrived. The arrangement will be hear soon.

Meher: But why put him here, in this isolated room? You could have arranged everything in your usual trauma care ... I mean something of that sort must be there in your hospital!

Abhik: Hmm...you are right. But let me share something that is secret. Beyond our routine diagnosis and treatment exercises we also look forward to something that offers the chance to do research.

Meher: You want to do research with this human body? But the relatives...

Abhik: See, I shared our intention with you hoping that you will not be leaking it out.

Meher: That is assured. But tell me, how would you explain the case to the relatives of this patient?

Abhik: Research does not necessarily mean doing something completely unusual to the patient. We would follow the standard norms but expand our range of treatment. Try a few things that we generally don't attempt. There is some advantage as far as relatives are concerned.

Meher: What advantage?

Abhik: We found no identity proof on the body of this patient. Not even a word written anywhere. It was easier with the robot of course. The number on the neck revealed everything. It was easy to know who the manufacturer was. Thus I could contact you. But there was no help with the body. The face has also been distorted and hence we could not search the Net with facial image. So you can see, there are no relatives till now ...

Meher: I assume that your research has already started.

Abhik: The observation is in progress. The fellow with the computer in the corner is preparing a document with these observations. There are two other physicians in my team. Dr Nair and Dr Srilata.

Meher: I see.

Abhik: But what about your robot? Would you like to take it to your workshop?

Meher: See Abhik, I cannot do anything at this hour of the night. Further, our workshop is undergoing some facelift. So there is not much room. Can I ask for a favour?

Abhik: Go ahead my friend.

Meher: Could you allow the robot to be kept here for another two days? No-no, I won't extend that period. You can trust me. Just two more days ...

Abhik: It's a bit unusual but still I can manage. We are not allowing any more bed in this room and so, it can remain there. I shall instruct the staff. No problem.

Meher: Thanks Abhik for all that. I shall take your leave now. I have a hectic day tomorrow. Training session for the fresh batch of engineers going on right now and I am in charge. So ...

Abhik: Right. I can understand. Get going. You need some rest. See you after a couple of days.

Meher: Bye. I shall remain in touch. Take care.

[Meher departs. Change of scene. It is a classroom. Freshly graduated engineers are undergoing a training session and Meher is speaking.]

Lily: Sir, Arun will be late today.

Meher: Why? What great responsibility has fallen on his shoulders?

Nidhi: Actually Sir, his father is suffering from some nerve related disease. It's a chronic one. Arun has to take him to the clinic every fifteen days for check-up and advice.

Meher: I see. Nerves ... a very important part of our intelligence. Without nerves functioning properly you neither see nor hear nor can feel with your skin. The nervous system in a human being is so complex that it continues to elude the best scientists of the world.

Raghu: Sir can't we make a simpler version of this system and plant it in a robot?

Meher: Easier said than done Raghu. You will be put to a serious test when you will be asked to decide which part to include in the simpler system and which to discard. The whole thing is so neatly tied and the parts are so interdependent that you will be left completely confused.

Nidhi: Sir, Lily was telling me that a great deal of progress has been made in making artificial neuron making and connecting them

Lily: I just happened to read an article in an online journal. The author of course says that the possibilities that appeared very bright in the last century has not materialised yet.

Raghu: Sir, do we put all the instructions in the intelligence system of the robot or should we let it learn by itself?

Meher: Such a beautiful bouquet of questions. I really appreciate your focus on the subject and your queries. What Lily is referring to is called the Artificial Neural Network or ANN in short. This is being put to use in every aspect of sensory perception and intelligence building.

Lily: That means the breaking point is near enough? I mean there will soon be a machine that will surpass its builder in intelligence!

Raghu: I do not think that the situation offers so much hope. True that we are building a good number of intelligent robots every year but I am still suspicious. It is not so easy to equal or surpass human intelligence.

Meher: You all are both right and wrong. See, intelligent software can simply crush the best competitors in games like chess or Go but when it comes to language, reasoning or what you call common sense, they are not even equal to four or five year old human babies.

Raghu: But sir, machines are learning on their own.

Nidhi: Yes, machine learning. Plus this learning is being carried on at a deeper level.

Lily: That is why the term 'Deep Learning' is being used.

Meher: You have to understand that we humans are trying to achieve too much in too little a time. That is itself mind boggling. Think of our evolution. Modern humans appeared on this planet a few hundred thousand years ago. Agreed

that we had some innate abilities but it still took a lot of time to master faculties that can keep us alive on earth.

Lily: Sir, does that mean we will require a similar stretch of time to bring up machines to the level of intelligent humans.

Meher: I did not mean that. As computers are becoming more powerful the ANNs are benefitting from the increased computing power. Along with that we are able to collect huge amount of data. Something like Google was not there three decades ago. But now, with such fantastic search engine we can not only collect simple bits of information but have beautiful images that can help in training robots.

Nidhi: That means the machines are learning in a better way!

Meher: It is a different approach altogether. Think of the days when Artificial Intelligence was just making its appearance on the scene. Those were the days of symbolic AI. Pioneers like Marvin Minsky said that it is the responsibility of the programmer to explicitly program the algorithm by which the system operates. ANN has changed the approach. Here, the system “learns” from data. Since the end of the 1980s ANNs are being inspired by advances in neurosciences. Deep networks in modern ANNs require very little human intervention. They learn from bits of data.

Lily: Has this company made anything in this regard? I mean something that can be called ‘groundbreaking’?

Nidhi: Yes sir, I am also eager to know that. You enjoy so much reputation in the market...what is the secret?

Meher: Don’t say ‘you’, say ‘we enjoy’, you all are part of this company now. Yes of course, there are some secrets that every company guards zealously. We are no exception. However, I do not have the right to divulge it in this class. As you get integrated with our system you will also get to know those secrets.

Raghu: At least tell us sir whether our company is in a position to produce highly intelligent cyborgs that we see in the films.

Meher: Raghu, you are an engineer, not an ordinary movie-goer. So if you want to be hopeful then you must build your hopes on solid foundation. The progress in general in the field of AI has been amazing in recent years. Our company, however, has taken a different approach to make machine learning faster. Not only that we are almost on the verge of overcoming some hurdles that none of our competitors are even close to doing.

(Phone rings. Meher takes out his phone.)

Meher: Excuse me trainees, I have to take this call, this is a very important one. (Accepts the call.) Yes, Meher speaking...who is this? Dr Nair...where? From the hospital? Right Dr Nair. Tell me please, anything happened...what? You must be joking! ...er no, how could this happen? I mean ...ok ok, I am coming. Give me half an hour. I shall be there soon. (Concludes the call.)

Raghu: What happened sir? Anything wrong? You are looking very nervous.

Meher: (Speaking to himself) How could this happen? Not so early...

Nidhi: Sir, are you ok? Shall I fetch you some water?

Meher: (Regains his composure) Umm ... no, I am alright. I am sorry, I shall have to go to the hospital.

Lily: Any relative of yours admitted there sir? Shall we accompany you?

Meher: Thank you. That won't be required. (Again speaks to himself) But how can this happen so early!

Nidhi: Sir, I think that one of us at least should accompany you.

Lily: I can go. Nidhi can give me the notes from the other classes later on. Please don't say no sir. We are quite worried from the way you look!

Meher: You want to go with me? Ok then, come. We shall have to be fast.

Chorus: Bye sir! Take care.

[Change of scene. Meher is driving the car. Traffic noise heard.]

Lily: I can understand that you are very stressed but I thought you could lessen the pressure on your mind by sharing your worries.

Meher: Lily, it is not about a human being that I am worried. Dr Nair called me to say that one of our intelligent robot is missing from the hospital.

Lily: Robot? Was it put on some special duty sir?

Meher: No, it was travelling in a vehicle on some special assignment with a human being. They suffered a heavy accident on the way. A truck driver passing by noticed them and brought the two bodies to the hospital believing that both are humans.

Lily: That is unusual sir. You mean to say that all the expression of the machine resembles that of a human?

Meher: Both had lost their senses. So, no question of expression. But yes, the face and the structure of the robot is a perfect copy of a young man of say thirty years. The doctor in charge was also misled in believing that it is a human.

Lily: So they tried to treat it as they do with humans?

Meher: No, doctor Abhik could understand pretty soon that it's a machine. He called me and I had requested to keep it for a couple of days. He had agreed. But ...

Lily: Then what sir?

Meher: That is the hospital. You will know everything once we meet Dr Nair.

Lily: Ok sir.

[They park the car in the designated area and move to Dr Nair's room.]

Nair: Ah, you have come! Who is this lady accompanying you?

Meher: She is Lily, a new recruit of our company.

Nair: This matter has taken a serious turn Mr Meher. Can I discuss it in her presence?

Meher: Yes Dr Nair, please go ahead. She is a part of our company now. And please call me Meher.

Nair: I cannot understand what is happening! Both the human body and your machine has disappeared.

Meher: When did you notice that Dr Nair?

Nair: In the morning. Abhik and Barun are on leave today. As I entered the hospital the sister rushed towards me. She was weeping. She could not tell anyone about it since we had cautioned them about leaking out any news regarding this. Even the superintendent is not informed yet.

Meher: No clue whatever regarding what had taken place?

Nair: No clue Meher, nothing! Wait a minute, I have to give some advice to the family of a patient. You wait, I shall return in a couple of minutes.

Meher: Right Dr Nair. Take your time. We shall wait.

[Dr Nair departs.]

Lily: Sir I am dying of suspense. Please tell me what happened.

Meher: You heard what Nair said. The two have disappeared.

Lily: Sir, tell me something. Are you totally ignorant about the human body. I have a hunch that you ...

Meher: I...I mean (gasping)...

Lily: Calm down sir! You are a leader in your professional field. There is nothing that can unnerve you. Please share what you know. I am a fresher I know but still sometimes any odd individual can suggest something.

Meher: Yes, I know the man. He is called Lokesh. He works as a scientific assistant in a big laboratory and he is ambitious.

Lily: What is the problem with that sir? Everyone is ambitious in today's world.

Meher: You might know that around two hundred kilometre from here there is a hill with a flat top.

Lily: Of course I know. It's surrounded by a thick forest. I have also heard that very few people enter the zone because of poisonous reptiles and ... and some species of...

Meher: Right, some type of plants that is also very poisonous. The leaves itself can deliver a lethal blow if those come in contact with some open wound on the

body. But Anirban, I mean the robot, and Lokesh had tried to go deep into the jungle and climb the hill.

Lily: Why?

Meher: It is believed that there is a crater on the top of the hill and that is created by an impact with an asteroid. One geologist had surveyed the area from helicopter around five years ago and he confirmed the fact. He had also said something that interested Lokesh.

Lily: Told what?

Meher: Told that the crater might contain some exclusive element...some metal that is not found on earth. In an interview to a local newspaper he also said that such metals could become a wonder drug if properly used in solutions.

Lily: This sounds rubbish to me sir! How can a geologist come to a conclusion like this?

Meher: You might well be correct. But Lokesh remembered the words of the geologist. It created a tension in his head for a gold rush.

Lily: Gold sir? You just said that it could be some exotic material.

Meher: I am talking of human's eternal thrust for money and riches Lily. He wanted to find the metal, use it to prepare some wonder-drug and hoped to open a company to trade with that.

Lily: It looks that things are being put in place. You mean to say sir that Lokesh influenced the intelligent robot and made the machine greedy as well and...oh I can't believe this...both were on gold rush!

Meher: Exactly. It is on their way that they suffered that unfortunate, fatal accident.

[Nair enters his room and takes his seat.]

Nair: What do you make out of all this Meher? We are in deep trouble now.

Meher: I can understand sir. Just tell me, did Abhik work overnight in the room? I mean did he enter a lot of information in the computer about that injured man?

Nair: Yes he did. He is used to doing so. That old fashioned desktop computer is still his favourite. He won't touch our modern computers. But why do you ask about that?

Lily: Sir, are you feeling uncomfortable?

Nair: Meher, are you feeling unwell?

Meher: No Dr Nair, it's alright. Our machine has done something revolutionary. It has treated and brought a human being back to life all on its own.

Nair: What nonsense are you talking Meher? Have you gone mad?

Meher: No Dr Nair, I am perfectly in my senses. You will be glad to know that we had built Anirban, our robot, with a potential to be of medical help in space adventures. Somehow our contract was cancelled and the training was not given to the machine. But I did not destroy that potential. I kept it in a hibernated state. It was requisitioned by a well-known scientific laboratory later on and we had rented it out for a period of ten years.

Nair: You mean to say that the period of hibernation is over now?

Meher: I am a bit puzzled myself Dr Nair. But I can guess something.

Lily: Guess what sir?

Meher: Anirban has no problem in reading information from a computer. All the information that Dr Abhik must have entered was read and assimilated in a fraction of a second. I am clueless about how it's own fault was repaired but I am sure about the operation done on the human body.

Nair: This is plain rubbish Meher. A neurosurgery like the one needed by the man is not kid's play!

Meher: I fully agree with you sir! But I also know that the impossible has happened overnight. It's called deep learning by a machine and the eureka moment, we knew, would take place beyond our notice.

Lily: Where do you think they are now?

Meher: Towards the west, about two hundred kilometres from here ...

Nair: What are you speaking Meher? Have you seen them? Tell me in details ... we might have to inform the police. Meher!

Meher: (Talking to himself) The eureka moment has arrived a lot early than we expected! I knew it would come ...

Lily: Sir, please tell Dr Nair about how to find them ...

Nair: Meher, we could be in trouble. Please tell me everything ...

[A music rises and their words are drowned in that music. The episode concludes.]