

Science Serial, “Welcome to Tomorrow” (Aane Wala Kal)

Episodes: 11

Expert Systems & Artificial Intelligence

Research & Script—Dr.R.S.Yadav

Concept and Co-ordination —Dr.B.K.Tyagi

Participants & Artists

- 1. Ritik (21 yrs.) Graduate Student of Engineering**
- 2. Satish (20 yrs.) ... Final year student of Engineering**
- 3. Aarushi (20 yrs.) ... Student**
- 4. Mrs. Shyamal (Social Scientist & Ritik Mother--- 45 years)**
- 5. Dr. Ritesh: Professor of Engineering and Expert - Artificial Intelligence.**

(Opening part of the Title Song)

Narrator-I :- Hello listeners! Welcome. We are here with the eleventh episode of the Science Serial “Welcome to Tomorrow” popularly known as ‘Aane Wala Kal’ in Hindi.

Opening part of title song/music

Narrator-II :- In our last episode you listened about the various aspects of NPL, I mean Natural Language Processing technology. Let me refresh your memories.

Music part of title song continue under Narration

Narrator-I :- Natural Language Processing a technology used to aid computers to understand the human’s natural language. Through the use of Artificial Intelligence, such machines have been designed to understand the process of human communication.

Narrator – II :- Some of you might have virtual assistants in the form of Amazon Echo or Google Home. On the other hands many of you have enjoyed a computer based conversational interface and in search engine predictive text behave similarly.

Musical part in the background

Narrator -I :- Wow! Do you know, this technology also drives e-commerce through search engine. There are many interesting tools like SignAll which enabled us to converts language into text. It has been predicted that very soon most of the interactions will be managed without involvement of men. But machine learning has an innate failure, to decide when and where to stop?

Narrator – II :- Friends the journey does not stop here. Please be with us to know more about this fantastic science of Artificial Intelligence.

Change over Music

Scene I: Morning time, Indian family’s home, Radio/TV sound in the background etc.

Shyamal:- Ritik.... O.....Ritik! My son, it is almost midnight, go for your sleep....Look at the clock.

Ritik:- Mummy, I am preparing for my Tech. Festival. I forgot my script somewhere and preparing a fresh one.

Shyamal:- My son! You are living in the Digital Age. Be smart.....

Ritik:- Mummy, you were saying something about Digital Age.

Shyamal:- Listen, we are part of the Digital Age and Social Media. Your team mates and colleagues too have a copy of the script. Why not you ask them to send you on your Watsup Group or mail it on your Email Id.

Ritik:- Oh Mamma! Why not you tell me earlier. My tension is over. Now I am a free bird to enjoy my sleep(Laughing).

Shyamal:- Good boy. Have a nice sleep and sweet dream!

Ritik:- Oh my sweet quilt be with me. Bye.... Bye.... Cold!

Effects of switching light

Change over Music & Sound Effect of Morning Alarm

Shyamal:- Ritik O....Ritik... Are you listening me. Your alarm is wringing. Get up, it is morning time. You have to be ready by nine O'clock.

Ritik:- Mammy, pleaselet me sleep..... Only half an hour.

Shyamal:- You have your Tech. Fest in the college. Stand up to call your friend for the script.

Ritik:- Oh!.....(Hurriedly)..... I remember.....please have a cup of coffee.

Shyamal:- Ok .

Sound Effects of coffee machine/kitchen utensils

Shyamal:- O.....Ritik.....Come soon. Your coffee is ready.

Ritik :- (Shivering effect of cold). Mummy, it is cold or I am feeling it more ?

Shyamal:- Why not you ask the Alexa about today temperature.

Ritik:- For me my mom is my God and everything (Laughing).

Shyamal:- OK....OK... No need for buttering. Have your coffee.

Ritik:- Hello Alexa! Are you getting me?

Alexa:- Yes, I am getting. Any help that I can do?

Ritik:- Alexa! What is outside temperature?

Alexa:- The outside temperature is almost touching freezing point and is 2.5 degree Celsius. The day temperature can touch 18 degree Celsius, sky will be clear and morning and evening will be partially foggy.

Ritik:- OMG! Touching zero. Our body is best indicator of the climatic condition.

Shyamal:- Ritik, what is about your script? you got it or not?

Ritik:- Yes mummy, I am going to call Satish.

(Ritik murmuring some rhyme in poetic tune and searching his mobile phone)

(Effect of footsteps/ door /de-plugging Mobile Phone Ringing etc.)

Ritik: - Hello Satish! Bolo... What is matter? As per yesterday planning, I am reaching by 8.00 O'clock. Better we can meet at the college gate.

Satish: - (From other side on phone call) that is fine. I shall be ready within half an hour.Ritik...Your voice is not clear.....

Ritik:- Are you getting me now Satish?

Satish:- Yesyes.....Now it is fine. Dost (Friend), this is a call for reminder (laughing)! and one more thing, I mean again reminder(Laughing). Dear buddy, where is your script?

Ritik:- Satish, I was just going to call you. In the meantime, I got your call. We have excellent matching frequencies(laughing).

Satish:- What is about your rehearsal?

Ritik:- No Yaar! My script is not traceable. I left it somewhere? Can you help me?

Satish:- My dear! Have a look in the window of your brain(laughing)? Yesterday you left it in the college and I forgot to tell you.

Ritik:- Oh My God!

Satish:- You need not worry. I am posting a copy of the same on Watsup Group.

Ritik:- Please do fast. Before breakfast I want to go through it.

Satish: - Ritik I can also mail soft copy Email ID.Do some reading,.....

Ritik:- Thank Satish. I am waiting for your post. **(Effect of Watsup Notice)**

Satish:- Hello Ritik. I just posted it on the Watsup Group. Have a look and check it?

Ritik:- (In mesmerising voice and tune)Wow! I got it. Thank you very much.

Satish:- OK! Let's have a master stroke in the final. We have to win the show.

Ritik:- Yes dear! We will do that? Bye.

Satish:- OK.... Bye.....Ritik.

(Ritik put his mobile and run towards kitchen, with excitement and smile, where his mother is busy)

Shyamal:- Ritik.... O....Ritik..... Have you got your script?

Ritik:- Vow..... Yes mummy. Your suggestion worked.... see Here is a copy of the script.

Shyamal:- A perfect use of digital technology.

Ritik:- Yes mummy. We have explored a fraction of Digital Technology. In future it is going to govern our lives and it will be impossible to imagine life without it.

Shyamal:- That is why some Sociologists call it the 'Age of Digital Technology'.

Ritik:- Mummy do you teach all these in your Sociology classes.

Shyamal:- We have basic chapter based on it. Not so much but it put light on all basic concepts of this technology.

Ritik:- You are right mom. One of our Professor is working on it. His research works are cited throughout the world. He is genius?

Shyamal:- Ritik Beta! You are doing so much home work on your presentation and drama skit but never told me about the theme. You were talking about Artificial Intelligence.

Ritik:- My Mom is super. She catch everything from the straws(Laughing). Mummy ! What are you talking , our skit is based on that.

Shyamal:- Being a Social Scientist, I can draw conclusion but sorry to say that I am duffer in your Artificial Intelligence(Laughing).

Ritik:- Mom our theme goes beyond that I means it is part of Artificial Intelligence. But mom you are Expert of Expert (laughing).

Shyamal:- Don't bluff and be serious. I can read from your face.

Ritik:- I am serious. Your intelligence goes beyond my Artificial Intelligence(Laughing).

Shyamal:- OK...OK.... No more bluffing. Tomorrow in the open assembly, I am going to tell my students about this very subject.

Ritik:- Mummy it is all about Artificial Intelligence. There are many applications of it. Expert System integrate machines, various software and many more.

Shyamal:- But expert means something beyond that. It may involves integration of so many things. Am I right?

Ritik:- My mom is always right. She has integrated her family so beautifully.

Shyamal:- Don't joke, here you have to integrate your time, rehearsal and communication.

Ritik:- I am not joking. Like an expert guide it involves gathering of special information to impart reasoning and advising. If one goes beyond that, this system provides explanation and advise to the users.

Shyamal:- Ya....Yaa... Now it is clear. Ritik....can you cite some examples to clear it.

Ritik:- Yes mummy, that is why I say my Mom is genius and even supersede my own Expert System (Laughing).

Shyamal:- Ritik, come to the point. Time is precious and I have to prepared breakfast too.

Ritik:- Vow! What an integration of time. Mummy is like an Expert System and software that uses knowledge, stored in a System to solve problems.

Shyamal:- This means replacement of a Social Scientist like me by the data, stored in a system and analysed by the software.

Ritik:- Yes mummy. The Expert System can provides explanation and even can advise them how to proceed to solve problem.

Shyamal:- But who put all these data, human or machines.

Ritik:- Mummy the person who put data in the system is an expert of the technology. Ordinary human can't do it. Yes, after feeding all these, the software can be used by ordinary man.

Shyamal:- Any specific examples of this Expert System that you have cited in your script.

Ritik:- A Social Scientist know how to extract fact (Laughing)? The most common is MYCIN, used in treatment of blood infections. Here the system diagnose the patients based on reported systems and medical tests.

Shyamal:- That is interesting. The software perform the roles of an expert.

Ritik:- Mummy you will be surprised to know that the system, after analysis and diagnosis, can recommend a course of treatment.

Shyamal:- OMG! Science and technology have excellent integration.

Ritik:- DENDRAL is another example used for chemical analysis. Here the Expert System used spectrographic data for predicting the molecular structure.

Shyamal:- Very interesting my son. My students will be happy to know all these.

Ritik:- You know mummy, very soon cancer will be in the list of curable diseases. PXDES is a system that can easily determine the type and the degree of cancer in a patient, based on the available data.

Shyamal:- Yes Ritik. Cancer is curable if detected at an early stage.

Ritik:- I can cite so many examples mummy. This field is very interesting and I wished to continue my higher study in AI to serve humanity.

Shyamal:- My good wishes.

Ritik:- Mummy, I wish that you should also attend our college Fest. You will find new things to tell your students.

Shyamal:- OK, My son. But one secret is there! One meeting has been schedule with your Principal in the morning. I shall also try to spare time to meet your Professor Ritesh.

Ritik:- Vow! That is great. Professor Ritesh is an authority on Artificial Intelligence. He is also a member of the committee constituted by Ministry of Human Resources and Department of Science & Technology on Artificial Intelligence.

Shyamal:- How can we use this technology for the benefit of our society is very important.

Ritik:- Mummy, Professor Ritesh has also given time to our team, so that we can keep the flag of our college high.

Shyamal:- Smart team.

Ritik:- Mummy my friend Satish is expected shortly. He is accompanying me. His bike is giving some trouble.

Mrs. Shyamal:- That is good. Car-pooling or similar travel is good for our environment.

Call bell at the door and door knocking

Ritik:- I think Satish has arrived. Let me see.

Satish:- Hello Ritik, good morning. How are you? Your smile is mirror of your confidence.

Ritik:- Well friend. This smile is all due to you. My tension has been wiped, when you mailed the script.

Shyamal:- (From inside) Oh my son! Ask your friend to be inside.

Satish:- Namaskaar Aunt.

Shyamal:- Good morning Satish. How are you and your parents?

Satish:- Aunty...both mummy and papa are fine. Occasionally, they enquired me about your well-being. The lecture that you delivered on "Human Behaviour and New Trend" impressed them very much.

Shyamal:- They still remembered.... My god

Effects of utensils/cups and plate etc.

Ritik:- Mummy, we are ready. Can you serve breakfast for us?

Shyamal:- It is already on the dining table.

Satish:- Aunty, please don't take pain. I have already some light refreshment.

Shyamal:- Don't be too much formal. I have prepared brunch for all of us.

Ritik:- Mummy, in the college Satish snatched my lunch and enjoyed lots.

Satish:- Vow! The lunch prepared by aunty, is too delicious. I can't miss that(Laughing).

Ritik:- Come on, today you will not have that party.

Effects of cups/plates/ biting food etc.

Satish :- Vow! What a delicious meal. Aunty is Super cook..... Far better than our Expert System (Laughing).

Ritik:- Satish, take one more piece of the snack. Today it will be difficult to spare time for launch and let's have our Brunch.

Satish:- I have my breakfast cum lunch and what I had with you was add on to that (laugh)

Effects of sliding chairs/ table/ cups and plates

Shyamal:- O.K. children are you ready? I am going to your college for a meeting. Before meeting, I have a some discussion with Professor Ritesh.

Satish:- Good. We can have enough time to discuss our script.

Ritik:- That means to kill two birds with one stone..... Aam Ke Aam aur Guthali Ke Dhaam'.

Shyamal:- That is good to utilise time, like an Expert System (Laughing).

Effects of car windows/ car starting/ car sound/ Traffic on the road etc.

Ritik:- Our knowledge on AI and Expert System is very little but it sound like a cascading effect.

Shyamal:- This is all due to your keen interest, which act like catalyst to synergise the results.

Satish & Ritik:- We are also of the same view.

Satish:- My question is, how all these happened? Through Data Mining or beyond that.

Ritik:- It helped automatically, to augment difficult levels.

Satish:- Here Augmented Reality is also equally important.

Ritik:- Moreover human Experts are perishable but an Expert System is permanent.

Satish:- Vow! I too wish to have blessing of the Almighty to live for ever.

Ritik:- Dear, there is no place for emotional feelings in technology.

Satish:- But there is harm to desire to live a long life (Laughing).

Ritik:- Not only long life but healthy and prosperous life is equally important.

Satish:- Again one more complex question for my Expert System(Laughing).

Ritik:- Yes, then ask your Expert System, I mean your brain to solve complex problems by deducing new facts through the existing information (Laughing).

Satish:- Buddy be serious. Don't take it lightly, we are going for the final battle.

Car stop/ windows open/ college ambience/students noise etc.

Shyamal:- Boys, you can have discussion with your Professor. In the meantime, I can inform the Principal.

Ritik:- Ok . All right mom.

Satish:- Look..... look.... there. Aarushi is waiting for us.

Aarushi:- Hello fiends! Good morning. Where have you been lost? I am waiting you since last one hour.

Satish & Ritik:- Good morning Aarushi. But why wait?

Aarushi:- Hello gentlemen! No more time pass. I am asking you. Look there, Professor Ritesh is waiting for someone. We can have his views on our script.

Satish:- Good suggestion. Aarushi always think one step ahead (Laughing).

Ritik:- His guidance and last minute suggestion will be of great help to win the trophy.

Aarushi:- Oyai..... smart boys.... to be optimistic is good but don't be over smart.

Satish:- Aarushi he is joking. Don't be too much serious

Ritik:- Ssssatish..... I am serious. Don't take it lightly.

Aarushi:- Seesee... Professor Ritesh has turned and going inside his lab. He always says, Lab is meant to work and not for gossip.

Satish:- That quality makes him different from others. But he is very supporting.

Effects of footsteps

In one voice:- Very good morning, sir!

Prof. Ritesh:- Hello students! How are you? Be relaxed and enjoy your Tech.Fest.

Aarushi:- Yes Sir. But we need your help.

Professor Ritesh:- I am here to help you.

Satish & Ritik:- Sir, Can you spare some time. We need your last minute guidance.

Prof. Ritesh:- Yes....yes....why not?

Aarushi :- Thank you sir.

Prof. Ritsh:- O.K....Let me know your problem? What can I do ? Take your chairs and be seated.

Aarushi (Vow):- What a beautiful lab?

Prof. Ritesh:- You like it but here you will be under observation of an Expert System(Laughing).

Satish:- Invisible eyes.... Sir! We don't understand.

Aarushi:- Sir! We would like to know about it.

Professor Ritesh:- Your curiosity say something else.

(In one voice):- Thank you sir!

Prof. Ritesh:- O.K, Now come to the point. What is your problem?

Aarushi:- Sir, we are representing our college in the National Tech Fest. The theme of our presentation is ...Expert System and Artificial Intelligence.

Prof. Ritesh:- Understand. Rumba can be in your team (Laughing). He is very smart.

Satish:- Sir...sir.....Once you delivered a National Lecture on this very subject.

Aarushi:- We were highly impressed by your presentation.

Prof. Ritesh:- That is good. What about your preparation? I can guess, you will do excellent. O.K.....Let me know..... how can I help you?

Aarushi:- Sir.....This is our script. We tried our best to put it in a presentable format.

Satish: - Sir, please have a look on it and would like your comments.

Prof. Ritesh:- O.K. Very smart.

Satish:- Here it is ,sir.

(Sound effects of papers/murmuring etc.)

Prof. Ritesh:- Oh....! Interesting story. Well written and well informed.

Aarushi:- Sir, we tried to incorporate all those elements that you had explained in your National Lecture. It is a team effort.

Prof. Ritesh:- Content wise, your script is very strong. It is always better to communicate science in simple and layman language.

(In one voice):- O.K. Sir, that we shall do.

Prof. Ritesh:- Good luck and all the best.

Aarushi & others:- Thank you sir for your encouragement.

Knocking at the door

Mrs. Shyamal:- Excuse me. Good morning Prof. Ritesh! You asked me to be here by 11.00 AM

Prof. Ritesh:- It is exactly 11 AM. What a socialisation of time by a Sociologist? Welcome Mrs. Shyamal.

Mrs. Shyamal:- Thank you Professor.

Prof. Ritesh:- You might have knowledge of the Tech. Fest. A National level event that is going to be happened in this institution.

Mrs. Shyamal:- Professor Ritesh, I am highly fascinated about the Artificial Intelligence and the Expert System. To have more information, I have few questions in my mind.

Prof. Ritesh:- Mrs. Shyamal, this team of young students are presenting their skit on the very same subject. They have designed all facts through their dramatized story. If you get time, try to attend that too.

Mrs. Shyamal:- I shall try Professor. But some questions in my mind.

Prof. Ritesh:- That is my pleasure to answer.

Mrs. Shyamal:- I am of the view that Artificial Intelligence is itself an expert system, then what need is felt to have Expert System within the system?

Professor Ritesh:- Interesting question. Only a Social Scientist can have such quarries.

Mrs. Shyamal:- Thanks Professor for your supporting words.

Prof. Ritesh:- Expert systems are one of the prominent research domains of Artificial Intelligence. It was first introduced by the researchers at Stanford University, USA. The expert systems are the computer applications developed to solve complex problems in a particular domain, at the level of extra-ordinary human intelligence and expertise.

Mrs. Shyamal:- It is some software or else.

Prof. Ritesh:- In an Expert System there is a software that uses knowledge, stored in a knowledge base.

Mrs. Shyamal:- That is role of an Human Expert.

Prof. Ritesh:- The success of any ES depends upon the collection of highly accurate and precise knowledge.

Mrs. Shyamal:- Knowledge ?

Prof. Ritesh:- Yes, data is collection of facts. The information is organized as data and facts about the task domain. Data, information and past experience combined together are termed as knowledge.

Ritik:- Sorry sir to disturb you ? I have a question in my mind.

Prof. Ritesh:- Genius, come on! This platform is equally open for all of you.

Ritik:- What are components of Knowledge Base in the Expert system?

Prof. Ritesh:- Gentleman! It stores both, factual and heuristic knowledge. A Factual Knowledge is an information widely accepted by the Knowledge Engineers and scholars. Whereas a Heuristic Knowledge is all about practice, accurate judgement, one's ability of evaluation and guessing.

Mrs. Shyamal:- That mean encroachment on our social aspects by the technology.

Professor Ritesh:- Yes to solve problems, human experts are required but here the system preserves human knowledge in its data base. It is in the form of a rule known as 'IF-THEN-ELSE - Rule'.

Aarushi:- Sir, Ritik always have if and but..... **(All are laughing)**

Mrs. Shyamal:- Can such system is helpful to provides explanations to difficult problems.

Prof. Ritesh:- Yes, here the scientists have designed intelligent machines to advise users as well as provides explanation.

Mrs. Shyamal:- Technology is moving fast and we Social Scientists are unaware about it.

Aarushi:- Aunty, this is all due to digital gape. **(All are laughing)**

Prof. Ritesh:- You may be right Aarushi. Here we find a gape of knowledge dispersal. In India we have not merge science and technology with social science.

Ritik:- But sir, we have good co-ordination in our play to tell the story to the scientists, technocrats as well as to the Social Scientists.

Mrs. Shyamal:- The Expert System is becoming more popular in the field of medical science.

Prof. Ritesh:- Up to certain extent it is true. But in my view it is becoming popular day by day in every field. Pathfinder in medical field is an important tool. It deals with more than 60 diseases and it can recognises over 100 symptoms.

Mrs. Shyamal:- Vow...Great.

Satish:- Sir, This Expert System can't give solution to COVID-19. **(All are laughing)**

Prof. Ritesh:- Intelligent question. Scientists are using expert systems to find solution and designed vaccines for this novel virus.

Mrs. Shyamal:- This will be a gift to humanity.

Prof. Ritesh:- As technology continues to advance and this industry will also continue to evolve.

Ritik:- Sir, we are still at the infant stage.

Mrs. Shyamal:- Yes Prof. Satish. Even Mr. Ritik is very much keen to peruse his higher study in AI and related fields of Expert System.

Prof. Ritesh:- Mrs. Shyamal you are right. Keeping students interest, institutions are coming forward to start specialised courses in various fields of Artificial Intelligence.

Aarushi:- Vow ! Very interesting and rising field. I shall go for my research in AI and Expert System.

Professor Ritesh:- Mrs. Shyamal, your lectures and classes will open this fields to our young generation. I can guess the impact of your lectures.

Aarushi: - Sir....sir, What role the Engineers play in expert System?

Mrs. Shyamal:- Vow! Question by young engineer for her career (Laughing).

Prof. Ritesh:- A knowledge engineer is a person with the qualities of empathy, quick learning and case analysing skills. The System Engineer acquires information from subject expert by recording, interviewing and observing him at work. He then categorizes and organizes the information in a meaningful way by following rules of IF-THEN-ELSE to be used by interference machine.

Mrs. Shyamal:- This means it is more than the ES. Have a smile dear my future Engineers. You will be architecture of the Systems.

Aarushi:- Sir! Can I take liberty. How have you designed the interesting Humanoid Rumba. A great charm for all students of our college.

Prof. Ritesh:- The process of Systems development is integrative. First you have to identify the problem, which is suitable for an Expert System. It is designed in a way so that the concept can represent the domain knowledge in best way. Go for Prototype development. Next one has to acquire domain knowledge to represent it in the form of If-THEN-ELSE rules. After that go for test and refine the Prototype and finally develop the complete ES.

Mrs. Shyamal:- Professor Ritesh, what are the various fields, where it can be put for use?

Prof. Ritesh:- The applications are very wide. Design domain includes camera lens design and automobile design. In medical domain to deduce cause of disease as well as conduction of operations on humans. Monitoring Systems are used for leakage monitoring in long petroleum pipeline. Detection of possible fraud, suspicious transactions, stock market trading, Airline and cargo scheduling, a long list you can draw.

Mrs. Shyamal: - OMG! Our Engineers and Scientists, who are designing all these are genius. They deserve all applauses (clapping).

Satish: - All these applauses are for our future genius, I mean for Aarushi & Ritik (All are laughing).

Prof. Ritesh:- Their benefits are beyond imagination and production cost is reasonable. Very low Error rate as compared to human errors. They work steadily without getting emotional, tensed or fatigued.

Mrs. Shyamal:- Professor I am going emotional for the genius engineers(Laughing).

Aarushi/Ritik/Satish:- Sir, you are genius and we salute you.

Prof. Ritesh:- My good wishes to your whole team. I am waiting for the days, when you will be here to take this field to new heights.

Mrs. Shyamal:- Your blessings will work like catalysts to boost their moral. Now I we would like to take your permission. Bye Professor.

(In one voice):- Thank you sir. Thank you madam.

(All leave the Lab. While they leaving Humanoid Rumba wished them good bye and good luck in typical voice, effects of doors & footsteps).

Thank you dear Rumba. We are your great fans (Laughing).

Closing part of the title song/Music