

Episode 36

WELCOME TOMORROW

(Radio Serial on Artificial Intelligence)

THE CHALLENGES FACING INDIA'S AI DEVELOPMENT

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Anchor: Good morning listeners. You all know that the field of Artificial Intelligence, dubbed as a tribute to human intellectual power, is moving fast. Many countries around the world have recognized the importance of AI for development in all fields and are investing huge amounts for AI research and innovations. Five years from now, the field of AI will look being different from what it looks like today. Methods that are considered cutting-edge may become outdated. So, our country can't remain unprepared. The Government of India too has recognized the potential of AI for the country's development and is going in a big way to become the AI hub of the world. However, the pace of innovation around establishing a comprehensive AI strategy is not comparable to America, China or South Korea. Especially when china is making rapid progress in AI-based research it is indispensable that our country view AI as a critical element of national security strategy. However, there are challenges facing AI development which need to be addressed. In this episode we will understand these challenges and the strategies for overcoming them through several initiatives by govt, and other non-government agencies.

Characters:

Naveen	(18) B.Tech student
Sundar	(52) Father (Lecturer in computer applications)
Jayanti	(48) Mother (High School teacher)
Jwala	(15) Daughter (10 th class student)
Ravi	(31) AI –ML researcher
Vasu	(39).....Ravi's car driver

SCENE-1

Ravi: Vasu, drive carefully. After unlock roads are again busy with traffic. Is Google voice assistant connected?

Vasu: Yes sir.

Ravi: Then ask about traffic ahead.

(There is a crowd 1 km ahead. Go slow or take diversion)

Ravi: Vasu let us go straight on the highway. No diversion.Stop..I see the crowd of people there. What is the reason?

Nagu: (Noise of people arguing ..) Sir there is a shopping mall and a petrol pump by its side .There people are jostling without maintaining queue and social distancing. Can't we manage such crowds with technology sir? You are doing research on such matters.

Ravi: Why not Vasu? Now-a- days police are using Artificial Intelligence for intelligent traffic management system and crowd management in our country also. Even large crowds at Kumbh Mela could be managed well.

Vasu: Sir, it's only available at a few cities in our country. My friend, Kiran is a truck driver in Singapore. He says Singapore started using robots to enforce social distancing norms in a bid to prevent spread of Coronavirus. They are using advanced smart traffic light system to regulate traffic and to alert vehicle drivers about possible hazards on the way ahead. He also told me that in china robots are being used as gas attendants at petrol stations. It seems these countries are all more advanced than India, sir.

Ravi: Of course India is a bit late in the development of AI. But there are some challenges for it. In the coming 4 or 5 years we will certainly outsmart other countries in AI technology. We will discuss these things later. Drive carefully. We should reach our Bangalore office at 11'O clock. We will have lunch at my sister's house near the office. We shall have a cup of tea on the way.

Vasu: OK sir.

SCENE-2

Naveen is busy with his cell phone searching for some information.

Naveen: Hi Siri! Good morning.

Siri: Good morning to you too Mr. Naveen...

(Sundar enters the hall and hears indistinct voices)

Sundar: Naveen with whom are you speaking? With your friend? Any thing important?

Naveen: Hmm...I just asked the voice assistant SIRI about global talent in the age of Artificial Intelligence.

Sundar: AI ! Why is this special interest in AI? Any online competition?

Naveen: Of course not a competition father, but it's a webinar on AI challenges for India .

Sundar: Oh! I see. Who is conducting?

Naveen: Our university is conducting on Tuesday. I have to participate as one of the speakers. That's why I have to prepare well. I need your help too.

Sundar: AI ! It's an excellent topic. We can have a discussion.

Jayanti: (Coming from the kitchen with breakfast and coffee cups on a tray). You have forgotten your breakfast and entered into discussion so seriously.

Sundar: Jaya, keep the plates and cups on this table. Why don't you join us for this discussion on AI? Today is Sunday and you are also free.

Jayanti: Artificial Intelligence! I am also interested. But I have work in the kitchen. The domestic help Vimala has also not turned up. I will join you after some time.

Sundar: It's alright Jaya. But where is Jwala?

Jayanti: Jwala has not yet woken up. I will wake her up and ask her to join you.....
Meanwhile finish your breakfast.

Naveen: OK Mom.

(Sounds of plates and cups)

Sundar: Naveen, tell me what information you have got from your search.

Naveen: The Global Talent Competitiveness Index (GTCI) Report 2020 gives 72 Rank to India among 132 countries. You know USA ranks 2 and China 42. So we are lagging behind.

Sundar: Listen Naveen, there is no reason for any disappointment. WE will discuss all factors The GTCI Report recognizes the growing importance of AI . It gives ranks to 132 countries across all groups of income and levels of development. It covers several variables, not exclusively AI.

Naveen: I found some improvement this year. Last year's India's Rank was 80.

Sundar: That's ok . You know, we are in the age of the Fourth Industrial Revolution and AI has been the centre of debate everywhere. In fact, it has become the game changer in industry and all other sectors.

Naveen: Why are nations in a race for AI supremacy ? I don't understand the new found interest in AI.

(Sounds of foot steps....)

Mother is coming dad..

Jayanti: I'm a bit late. I just finished the kitchen work. I think I have not missed any important thing.

Sundar: Jaya, We just started. But where is Jwala?

Jayanti: Jyala just had her breakfast and said she will resume watching a movie from where she had left it last night. She will join us in 15 minutes.

Sundar: It's ok. Naveen, today, all nations understand that AI is a foundational technology that can increase productivity, protect national security and help solve societal problems. That's why many nations are racing to achieve a global innovation advantage in AI.

Naveen: Is AI such a great technology?

Sundar: Yes, **Naveen**. It is making enormous advances. You know, it is the key technology behind self-driving cars, automatic translation systems, image processing and all kinds of diagnosis and recognition systems. It appears that there are no areas that are beyond improvement by AI.

Naveen: I now understand why there is a race for AI supremacy.

Jayanti: If so, where does India stand ? Are we losing in the race?

Sundar: No. No. Jaya. It is a misconception. India has developed into one of the most AI forward countries in the world. Surveys have indicated that India ranks 13 in AI tech and stands 17 in AI readiness ranking in 2019.

Jayanti: Then which countries are at the top of the list?

Naveen: I found in my search that America, Singapore, Britain, South Korea and China are ahead of our country.

Jayanti: What makes these countries so advanced? Can't India become a leader in AI ?

Sundar: First let's look the advancements in the most forward countries. India ought to study what steps these countries are taking for progress in AI. Then we need to work out our own strategies.

Naveen: OK. I learnt that China is trying to become AI superpower and is vying with the United States of America.

Sundar: It's true. China and the America are competing extending over a wide range of technologies and AI has taken the centre stage. They are targeting AI for technological supremacy. These two countries have roughly equal-sized economies.

Jayanti: But there are some differences too!

Sundar: Yes. In the US the AI efforts are led by companies while in china such innovation is driven by government policies.

Naveen: Yes dad. In America there are major companies like Apple, Amazon, Microsoft, Intel, Google and Facebook that maintain their competitive edge!

Jayanti: In China too there are tech giants like Alibaba and Huawei and they lead much of the AI development in the country.

Sundar: It's true. However, the US leads in AI for several reasons.

Naveen: What are the reasons, father? Please tell. I will note down.

Sundar: OK. First, America has the most AI start-up ecosystem. It has received the most private equity and venture capital funding. Second, it leads in the development and of both traditional semiconductors and the computer chips that power AI systems.

Naveen: I think AI start-up ecosystem includes concepts of machine learning, deep learning and artificial narrow intelligence.

Sundar: Yes. You are right.

Jwala: Mom, Your mobile is ringing. You don't listen. I answered the call.

Jayanti: Ok. Tell me who made the call?

Jwala: It's Ravi uncle mom. He is coming from Tirupati by car for a visit to his company head office in our city.

Jayanti: Very good. He is a researcher in Artificial intelligence and Machine Learning.

Naveen: He is coming to Bengaluru, the Silicon Valley of India! He will tell us how India is preparing to become a technology hub with focus on AI.

Jwala: He is coming for lunch. Do you stop your discussion on AI?

Sundar: No . That's not right.

Naveen: PAPA please tell me the AI successes in some countries.

Sunder: Wait for some time.....Your uncle will tell us several things including India's strategies to meet the challenges.

Jwala: OK. I too will follow your discussion because AI is very interesting. I just watched a movie . There a robot takes care of an old man and looks after all his daily needs like a domestic help. It shows how our life would be in the company of a robot.

Jayanti: We too may have one such robot. I can get relief from kitchen work, etc.

Sundar: (Laughs loudly).There is a AI-Powered robot revolution everywhere. You want it here too!

Jayanti: Just for fun. Leave it. You were telling about AI successes in the US and other countries.

Sundar: Yes. America has a well established tech culture. It is benefitted with \$ 10 billion venture capital channeling in the direction of AI. The country has more elite talent. Though it produces fewer AI scholarly papers than the European Union or China, it produces the highest quality papers on average.

Jayanti: I think the US has a national strategy for AI.

Sundar: Yes. In 2016, the US released National Artificial Intelligence Research and Development Strategic Plan with 7 strategies and updated the Plan in 2019 with the 8th strategy. The US prioritize long-term investments in AI develop a broad spectrum of evaluative techniques for AI. They do everything to enable the country to remain a world leader in AI.

Naveen: I think the plan is working well.

Sundar: Yes. There is increasing importance of partnership between federal government and academia, industry, other non-federal entities and international allies to achieve technological breakthroughs in AI and transform these breakthroughs into capabilities.

Naveen: Switzerland is also well ahead of several other countries in AI technology.

Sundar: Yes Naveen. Switzerland has become a hub for AI. It is home to world-renowned universities and research institutes in the area of AI. Tech giants such as Google, IBM or Microsoft run their AI research from here. Switzerland also drives AI developments in health care. It boasts of the highest number of AI patents worldwide which showcases its greatest potential for innovation.

Jwala: We have our neighbor China which is competing with the US.

Jayanti: Yes Jwala. I learnt that China is already a global leader in AI research and has committed to build a domestic AI industry with \$150 billion to become the leading AI power by 2030.

Sundar: Yes both of you are right. The Chinese government is trying hard to build up a dynamic AI wave to even take it ahead of US. There are two dominant technologies namely facial recognition and AI chips that are taking China's growth in AI to the next level.

Naveen: What is the use of facial recognition?

Sundar: It is a video mass surveillance programme aimed at controlling crime and corruption. It is also used to track the movement of people across shopping malls, roads, buildings and other institutions in a bid to regulate social behavior.

Naveen: So it is collecting lot of data. Are we not using facial recognition technology in our country?

Sundar: Yes. But it is somewhat limited. Recently police in Delhi and Uttar Pradesh used facial recognition tech for catching rioters during protests and to screen the crowds at rallies.

Jayanti: OK. South Korea is also heavily investing in AI. The government of S Korea has released an AI strategy and wants to become a top 4 contender in AI by 2022.

Sundar: South Korea has AI capabilities and ambitions and is looking to strategically position itself as a global contender. It is using industrial robotics technology. Large well established tech companies such as Samsung, LG and Hyundai are in the country and all are showing readiness to invest in AI.

Naveen: So, the government and Korean companies alike think that AI is an important technology for the country.

Sundar: Yes. However, just as India South Korea also faces some formidable challenges to long term growth of local AI ecosystem.

Jayanti: OK. France, Japan, Canada, Singapore, Britain and Russia are also in the forefront of AI-ML technology.

Sundar: It's true. France published the AI strategy in January 2017 followed by a detailed policy document in March 2018. Japan released a document in March 2017. Britain (U.K) released its industrial strategy in November 2017. All these countries are significantly increasing the allocation of resources for Science, Technology, Engineering and Mathematics (STEM) talent development for building the future work force for AI, Britain has planned to build over 1000 government supported Ph.D researchers by 2025.

Naveen: Canada and Russia are also investing largely in AI.

Jayanti: I know that Canadian government committed to invest \$ 125 million for AI research. Russia has an annual investment of \$12.5 million on AI. A number of AI demonstrations of the country are military in nature such as AI-empowered fighter jets and automated artillery. Russian president Vladimir Putin said the country that leads in AI would rule the world.

(Door bell rings.)

Jayanti: Jwala , you go and open the door . It may be your Ravi uncle.

Jwala: Coming.. (*creaking Sound of the door.*)

OH! Ravi uncle, come in. we are all waiting for you.

Jayanti: Welcome Ravi.

Ravi: Good afternoon Sundar Bava garu. This is Mr. Vasu my car driver and my good friend. He is from a agricultural family.

Sundar: Welcome both of you. You have come after a long time.

Ravi: Yes Bava. Due to COVID lockdown our company asked us to work from home and only recently after unlock we are given some assignments outside. That's why I have come here to meet our scientists and some research scholars.

Jayanti: OK Ravi. It's lunch time. Let us first move to the dining hall.

Sundar: I'm also hungry. But today lunch won't be free.....you need to share your experience about AI in India.

Ravi: AI ! Oh. Wonderful. (I shall wash my hands and come for lunch)

(Sounds of dishes and water bottles etc on dining tabbe)

(Scene Ends...Music)

SCENE-3

Ravi: Thank you sister. My stomach is heavy. All items are good. Brinjal curry, sambar, coconut chutney !All our typical konaseema dishes!

Jwala: Mom is an expert. She never forgets her native place.

Naveen: Dad, you told many things about AI successes in America, China, South Korea and some other countries. But what about India's strategies for AI development?

Sundar: OK.With China making rapid progress in AI-based research India should necessarily view AI as a critical element of national security strategy. Your Ravi uncle will tell us many things.

Jayanti: AI-based innovation and AI-ready infrastructure are necessary to prepare India's jobs and skills markets for an AI-based future and to secure its strategic interests.

Naveen: Now we have to discuss the challenges facing India's AI development. Uncle, I think you have some information.

Ravi: Oh yes. I will share some information with you. Vasu, you also follow the discussion.

Naveen: Uncle, in comparison to other countries, India is a bit late to the AI technology run up. Experts say that we are not doing enough justice to our potential. Why it is so.....I mean what are the problems and challenges before us?

Ravi: It may be true to some extent. In 2017, the Commerce & Industry department of the Govt. of India (GOI), launched a task force on AI for India's Economic transformation. In February, the GoI mandated NITI Aayog to establish a National Programme on AI to guide research and development in new and emerging technologies.

Vasu: What is NITI Aayog, sir?

Jwala: I know NITI means morality.

Sundar: In the present context it means policy Commission. NITI stands for National Institution for Transforming India. It replaced the Planning Commission.

Naveen: Did NITI Aayog take any follow up action?

Ravi: Yes. Since the start of this year, NITI Aayog has partnered with a number of leading AI technology players to implement AI projects in critical areas such as agriculture and health.

Vasu: How do they help agriculture, sir?

Ravi: It's a good question Ravi. That shows your interest in agriculture. Precision agriculture has been initiated in some districts.

Vasu: I don't understand what is meant by precision agriculture.

Ravi: I will tell you, Vasu. Precision agriculture is also called satellite farming. Its goal is optimizing inputs while preserving resources. Real-time advisory based on satellite imagery, weather data etc. is used to increase farm yields. All these innovations are based on artificial intelligence. With precision agriculture farmers can increase their revenue by 35 to 60% per acre.

Vasu: It's welcome sir. I will tell my father about it.

Sundar: It's alright. NITI Aayog is also working on health care applications of AI. Robotics startups are deploying robots in hospitals thereby minimizing human intervention. The robots are used to carry out tasks such as sanitation and to deliver food and medicines to infected patients. They are also carrying out temperature checks and arranging video calls with doctors in case of emergency.

Ravi: Image recognition AI is used to augmenting the productivity of pathologists and radiologists. AI models are used for early diagnosis and detection of diabetic retinopathy and cardiac risk.

Sundar: Indian language project is also initiated to build a natural language processing platform.

Vasu: How is it useful to us, sir?

Sundar: It is useful for conversational general and career counseling through chatbots and assistants conversing in 22 Indian languages.

Ravi: Yes. India is pushing forward to come up the AI curve and be on par with global peers. Because AI has seen decades of slow progress, most departments had very few AI faculties. However, things really changed in the last six years. Now there are several professors working in AI field in every IIT and many companies.

Sundar: Industry experts say that open data warehouses and a strong ecosystem of government and private bodies can be a game changer needed for AI in India. We need 2 or 3 large Flipkart-like organizations in AI.

- Ravi:** Government of India is pushing for digitization and enacting more AI initiatives. There is financial support for AI programmes . Government allocated \$480 Million to the development of 5th Generation(5G) technologies like AI-ML, Internet of Things, 3D printing and block chain. Guidelines and policies are being developed for the AI utilization in industries.
- Sundar:** The recent union budget for 2020-21 has recognized the importance of Machine Learning and Artificial Intelligence besides other technologies. Fibre to home will link over 1,00,000 gram panchayats through BharatNet.
- Ravi:** You are right Bava garu. Data centre parks will be set up throughout the country. The budget has also allocated Rs 6000 crore to set up National Mission on Quantum Computing and Technology
- Naveen:** Yes. We have Aadhar Project. I believe that it the largest unique identification project in the world.
- Vasu:** We are using Aadhar cards for ration and for all other purposes.
- Ravi:** Yes. Now, more and more Indian startups and established tech firms are beginning to implement AI in their products.
- Naveen:** Every year our universities are producing many engineers, mathematicians and software developers.
- Ravi:** Yes. That's true but we need to upgrade the IT education to be on par with USA and China to expose our youth to modern AI approach. Our Prime Minister says that the evolution of technology has to be rooted in the ethic of Sabka Saath, Sabka Vikas.
- Naveen:** That's great. But India faces some challenges for AI incorporation.
- Ravi:** Yes. There are grand challenges such as improving manufacturing especially in the small & medium sized enterprises, improving health care quality, improving agricultural yields and improving delivery of public services.
- Sundar:** That's right. But data is the raw material for AI. Is it not a challenge in India?
- Ravi:** Yes Bava garu. The most important challenge is to collect, validate, standardize and correlate and distribute the AI-relevant data to organizations, people and systems without compromising privacy and ethics. Lack of competency and need for re-skilling and up-skilling workers. Lack of trust and resistance to change and job losses are some other challenges
- Sundar:** Ravi, in order to ride the AI innovation wave, a robust intellectual property framework is required.

Ravi: That's true. The government is taking a number of initiatives in strengthening the IP regime. However, challenges remain especially in applying stringent and narrowly focused patent laws to AI applications.

Vasu: These are important issues. But how can we tackle them?

Ravi: To tackle these issues, establishment of IP facilitation centres to help bridge the gap between practitioners and AI developers, and adequate training of IP granting authorities, judiciary and tribunals is suggested.

Jayanti: The CEO of NITI Aayog remarked at the RAISE -2020 Global Virtual Summit on AI that India is uniquely positioned to become the AI laboratory of the world and contribute to inclusive development and growth through empowerment.

Naveen: What is the potential of AI to India's growth?

Ravi: It is estimated that AI has the potential to add \$957 billion to India's GDP by 2035 and boost India's growth by 1.3% by 2035.

Naveen: It's really very promising!

Ravi: That's true. Our Prime Minister stressed that the govt. wants India to become global hub for AI. Many Indians are working in this area and hope many more will do so in the times to come. He also stated that the govt. decides rightful use of AI for solving societal problems.

Naveen: Oh, it's great! Now that the Prime Minister has recognized the potential of AI, India will soon surmount all challenges and emerge as AI superpower.

Sundar: Experts are confident that India is ready to implement an agenda that will promote AI for a strong, sustainable and equitable New India.

Jayanti: Let us all hope that India will be a country that leads 'AI for all'.

Vasu: Thank you all. I have some idea about our country's efforts to become world leader in AI. Let us hope India will use this emerging technology for the wellbeing of its citizens and to ensure the economic development

Jwala: We all hope so. We had a good discussion on Artificial Intelligence and India's readiness to face the challenges.

Sundar: Yes Jwala. Let us thank your Ravi uncle. He has given us lot of information on India's challenges for AI development.

Naveen: Now I can make a good presentation at the webinar.

Sunder: By the way, Jwala what is that movie you talked about in the morning? We will watch the movie with your uncle.

Jwala: It is Android Kattappa, a Malayalam dubbed movie.

Vasu: I have already seen the movie. It is very interesting.

Jayanti: I will bring snacks and tea for you all now. Take it and then watch the movie.

Naveen: Mon, you chaat with uncle.....I will make teas and serve snacks to all.

Ravi: I brought laddus from Tirumala.

Jayanti: Thank you Ravi. I will distribute laddus to all.

Scene Ends