

AI and Smart Cities (Transportation) In India

Go India... Go!

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Smart mobility and Transportation system are the vital features of a smart city. Smarter and safer modes of transportation; and minimizing traffic congestion problems are the needs of the time. Today's society demands a high degree of mobility of various kinds, so as to enable efficient and safe transportation of both people and goods. As a major contributor to overall emissions, this sector must also be sensitive to ideas of environmental sustainability.

This episode describes the need of smart transportation system and how artificial intelligence helps to achieve it.

List of Characters :

Laxmiratan Shukla : A traffic police (age about 55 years)

Ranjan : Son of Laxmiratan (age about 18 - 20 years)

Nandini : Wife of Laxmiratan (age about 50 years)

Mr. Suraj Kumar : A businessman (age about 40 years)

Mrs. Kiran : Wife of Mr. Dhaval (age about 38 years)

Mr. Prasad : Friend of Suraj Kumar who is mathematician (age about 40 years)

Street Commutators which include middle aged men and women, college going boy

(Note : Some artists can play multiple characters)

(A scene of the main road with heavy traffic. It's a prime time and everybody is in a hurry, rushing towards their workplace. Sounds of various vehicles, their horns, and whistle of traffic police are heard. Then all of a sudden a sound of a car hitting the bike is heard followed by sounds of many commuters. They all gather at the spot where the accident has taken place. Laxmiratan Shukla, a traffic policeman comes at the spot.)

Laxmiratan : **(Blows whistle)** What has happened? Come on... all of you... move away! *Chalo baju hato, sab log...*

Biker : (To the car driver) Are you blind?

Car Driver : How can I control my car, if you suddenly stopped your bike?

Biker : Jada awaj mat kar.... Dikhta nahi kya?

Car Driver : Hey, mind your language....

Biker : Have you not seen the indicator lamp?

(The sound of debate goes on increasing and then Laxmiratan interferences)

Laxmiratan : **(Blows whistle)** Come on both of you.... Give me your licenses... fast...

Biker : Police Sab, why are you asking for a license? We will settle it down....

Car Driver : Yes, yes.... We are already getting late and there is not much damage also.... We will settle it.

Laxmiratan : Okay then. Move your vehicles aside.... Let others go... they are also getting late.

(Sounds of different horns are heard and vehicles start moving again. The scene ends.)

(Change over music)

(The scene of Laxmiratan's house. He is returning home from his duty. Today he is returning home late from the duty)

Nandini : Why are you so late today?

Laxmiratan : Nandini, don't ask questions.... I am very much tired.

Nandini : Ya... I can see it. Become fresh; the dinner is ready.

Laxmiratan : Okay!

Nandini : **(calling her son Ranjan)** Ranjan.... Come for the dinner! Your Pappa has come.

(A sound of taking plates and utensils is heard)

Ranjan : Yes, Mamma.... Coming!

(Laxmiratan comes for the dinner. He is sneezing and coughing)

Nandini : It seems you are not keeping well.... I will give you hot milk with turmeric. That will give relief to you.

Laxmiratan : Nandini, it's of no use....

Nandini : Why?

Laxmiratan : Day by day, the situation is becoming worst....pollution, sound.... It is becoming unbearable.... I am just waiting for my retirement.... The last 4-5 years are left!

Nandini : Don't get frustrated!

(Nandini is serving the food. Sounds of utensils are heard)

Laxmiratan : You know Nandini, today was the worst ever day I have witnessed in my service!

Ranjan : What happened Pappa? Anything serious!

Laxmiratan : Yes!

Nandini : What happened?

Laxmiratan : I don't understand why everybody is in hurry.... Where do all the people rush and for what?

Ranjan : But, exactly what has happened Pappa? I am sure this is not the correct reason...

Laxmiratan : **(Coughing)** Today... there were three accidents... in one single day!

Nandini : Ohh my god!

Laxmiratan : Two were minor... but in one accident the biker was killed... and it happened in front of my eyes....

Ranjan : Horrible!

Laxmiratan : The biker was overtaking unnecessarily to a truck... the truck driver got confused... lost the control and the mishap took place.

Nandini : Have you arrested the truck driver?

Laxmiratan : All legal procedures and formalities were carried out... but those won't bring the life of that biker back... **(Coughing and sneezing)**

Nandini : You should take care of your health first! Things move with their own course. This is city life... what can you do?

Laxmiratan : Yes... Nandini... I think, you are right! What can I do? I can just blow whistles and at the most threatening those who breaks the rules... I just don't understand what is the future of the city and what is the future of our next generation!

Ranjan : The future is bright Pappa!

Nandini : **(Scolding to Ranjan)** This is not the time to make fun, Ranjan! Be serious!

Ranjan : I am not making fun, Mamma... I am serious!

Nandini : Serious?

Ranjan : Yes! I will explain you, but before that, give me one roti!

Nandini : Hmmm... Take this!

Ranjan : Now listen... The things are changing fast... In fact, these changes are such that, they will also make us to change!

Laxmiratan : I did not understand. What does this mean?

Ranjan : Pappa, the meaning is simple... in future, there won't be any traffic police!

Laxmiratan : What?

Rangan : Neither traffic police nor road accidents!

Laxmiratan : How is it possible, Ranjan? The people are so undisciplined...

Ranjan : That's what I said. In future, the things will occur in such a way that, people will change their behavior.

Laxmiratan : But how it will be possible!

Ranjan : It's possible by using technology... through Artificial Intelligence!

Laxmiratan : What do you mean by intelligence? Here I don't find any connection between intelligence and community by large. People do not have common sense.... forget about intelligence!

Ranjan : (Laughs) Pappa, let me tell you a story.

Laxmiratan : Story?

Ranjan : Yes, this story will tell you how the future will be!

Laxmiratan : Don't tell me a fairy tale. You... next generation people are always dreaming...
(Coughing and sneezing)

Ranjan : No...not at all Pappa! This is not a fairy tale. It's a story of a businessman. You told us how you have spent your day; now listen to how this businessman is spending his day in this story.

Laxmiratan : Okay...

Ranjan : This is the story of Suraj Kumar, a businessman and how he spends his day!

(Change over music. A scene of Suraj Kumar's home. The cell phone rings. Suraj Kumar takes the phone)

Suraj : Hello Sir, Suraj Kumar here! Actually, I was about to leave from my home Okay Sir. Then what should I do?..... Okay. Definitely... I will make it! Don't worry.... Okay, thanks. I will update you..... **(Calling his wife)** Kiran... Ki..ran!

Kiran : What happened Suraj? Why are you shouting?

Suraj : Kiran, I have to go to Delhi.

Kiran : When?

Suraj : Right now!

Kiran : Now?

Suraj : Yes... right now. Tomorrow morning one delegation is coming from Singapore and therefore, I have to reach Delhi by tonight.

Kiran : But how can you reach?

Suraj : Everything is done including my air tickets... only thing is I have to go. That's all.

Kiran : Have you booked the cab for airport?

Suraj : Yes, I am booking it now! Just help me in packing up.

Kiran : Yes, surely!

(Change over music. The sound of doorbell is heard. Kiran opens the door)

Kiran : **(Sees Prasad waiting outside)** Hi, Prasad... Come in.

Prasad : Hello, Kiran... How are you?

Kiran : I am fine! But Suraj has to go to Delhi now!

Prasad : Now? Anything serious?

Suraj : Hi, mathematician! Nothing serious.... Just for urgent business meeting! Will be back tomorrow.

Prasad : Okay... So I have come at wrong time, it seems! **(Laughs)**

Suraj : Any particular reason?

Prasad : No... nothing particular! I have come just to meet both of you! By the way, when are you leaving for the airport?

Suraj : Now! See everything is packed... I have called the cab also. It is coming within two minutes....

Prasad : That's great! At least I can get free ride now!

Suraj : Means?

Prasad : I have to go to Ramanujan Institute... so you can drop me there. It's on your way to airport!

Suraj : Yes, sure!

Kiran : You then have a company, Suraj!

Suraj : Yes... Let's leave now, Prasad!

Prasad : Yes....

Suraj : Bye Kiran... I will be back tomorrow, but I will be late!

Kiran : Okay...Take care... Bye!

(Change over music.)

(The car has arrived. It's self driving car. Beep sound of door opening and then closing is heard. Suraj and Prasad got into the car)

Prasad : You are lucky, Suraj!

Suraj : Why?

Prasad : You get such a brand new self driving car.... When I call a cab, I don't get such a car!

Suraj : *(Laughs)* You need to pay more for that! *(both laughs)* Any ways... the travel has become comfortable and fast since when these self-driving cars have arrived.

Prasad : It's the magic of technology and of course, of mathematics!

Suraj : Yes.... Agreed my dear mathematician! *(Laughs)*

Prasad : *(Becomes nostalgic. A music piece at the background)* Just remember those days when we used to get stuck up at traffic lights that never seem to change to green....sitting in queues of cars that stretch on for miles or delayed by a glut of slow traffic... Traffic jams were a blight on our modern, fast moving lives. And we had been dealing with them in a very unmodern way.

Suraj : Yes... In 2015 there were an estimated 1.3 billion motor vehicles on the world's roads and with growing affluence in developing economies now number is soared to about 2 billion! Even with new roads and bypasses, this ever increasing level of traffic could quickly outstrip the ability of our road networks to cope in many busy areas, such as cities.

Prasad : But when you are in crisis, there is mathematics! *(laughs)*

Suraj : Means?

Prasad : It means mathematics plays important role in solving your problems!

Suraj : How? As a businessman, I know the numbers, but the application of mathematics and technology.... It's not my cup of tea!

Prasad : I will explain it to you.

Suraj : Okay! Go ahead...

Prasad : Now we are travelling through self-driving car...meaning there is no driver, but the still the car is moving safely with a speed of about 70 to 80 kilometers per hour and it will take us to the correct destination!

Suraj : Yes, absolutely!

Prasad : This is possible due to artificial intelligence!

Suraj : Hmmm...

Prasad : As far as using Artificial Intelligence in open space, such as roads, is concerned, it is necessary to install smart traffic management system governed by the artificial intelligence as a part of the infrastructure before launching such self-driving vehicles.

Suraj : How does this smart traffic management system work?

Prasad : Good question! A smart traffic management system basically provides greater leeway to the self-driving vehicles as they can then be directed and controlled more by the external environment.

Suraj : And therefore this has become possible in few cities and not in all!

Prasad : Correct! These self-driving robotic vehicles can be taught to drive less erratically and react faster than human motorists. But for that an architecture of an intelligent traffic control system is required. Moreover, this intelligent traffic control system must be outlined with regards to the different levels of data collection, data analysis and interpretation, decision, and control.

Suraj : Wait...wait! Control yourself. I am a poor businessman... I can't understand the language of mathematician!

Prasad : *(laughs)* Okay...let me simplify it. To control and monitor the traffic, technology uses artificial intelligence through traffic cameras.

Suraj : How?

Prasad : The system uses video feeds to automatically detect the number of road users, including pedestrians, and types of vehicles that are at an intersection. The AI software then processes this information second by second to come up with the best way to move traffic through the intersection, changing traffic lights depending on the most optimal way of keeping traffic moving. Decisions can be made autonomously, and shared with neighbouring intersections to help them understand what is coming their way.

Suraj : Okay....that's why there is no traffic jams on the road!

Prasad : To respond in this way, however, requires data.... A lot of data..... Fortunately, this is not something in short supply. There's lots of information from traffic monitoring systems, road infrastructure, self-driving cars.... and in case of drivers it is via their mobile phones. Literally millions of cameras and sensors line our roads while the passing vehicles induces tiny electrical currents in loops of metal hidden beneath the tarmac, providing further information about the traffic conditions. Some of this monitoring technology – like the induction loops – have been around since the 1960s while others like cameras capable of tracking traffic and reading number plates are more recent. The challenge is doing something useful with all this information.

Suraj : So people are trying it since last century....

Prasad : Even before that. Suraj, I can say, since Isaac Newton we are trying to influence the world by building mathematical models! If we have data we can figure things out. It is as simple as that and the same applies to traffic! More data means more dynamic model.... That means more efficient system! Now because of such systems the travel time has reduced by almost 30 per cent helping significant reduction in fuel, that is energy consumption.

Suraj : Yes, I remember the days when we used to stuck in frustrating queues on busy roads.

Prasad : We were in schools during those days! *(laughs)*

Suraj : Yes.... Now I can not just imagine such situation as it literally kills very productive man hours!

Prasad : Smart cameras at junctions can automatically identify different road users, allowing the traffic management system to adapt according to their needs. Another major advantage is traffic is moving smoothly without any accident. So the possibility of accidents is almost zero.

Suraj : Yes, absolutely! So with the intervention of artificial intelligence, the travelling has become fast and at the same time safe!

Prasad : One more important aspect you are missing, Suraj!

Suraj : Which one?

Prasad : Parking of the vehicles!

Suraj : Yes, you are right! I remember those days when finding a parking spot in major cities had become a tiring and frustrating activity due to the increasing number of vehicles and the rising rate of urban migration. While traditional parking lots were continued to dominate a large part of our geography, cars almost always used to fail to get a parking spot when in need. That was ironical!

Prasad : This was simply because parking spaces were mismanaged and maintaining them with parking personnel was an expensive undertaking.

Suraj : Hmmm.....

Prasad : In smart cities, artificial intelligence can take already available real-time traffic information and use it to see not just whether cars are moving, but how they are moving. With this information, it can determine whether cars are circling in search of parking and take measures to guide them to the best available space.

Suraj : This is the strength of big data, mathematician! *(Laughs)* Correct?

Prasad : Yes. Artificial intelligence-based smart parking systems can easily navigate vehicles to vacant parking spots based on the information collected and data stored on its system. This helps in better management of the parking system, resulting in increased revenues as well as time-saving.

Suraj : Absolutely!

Prasad : The smart parking systems can also analyze data such as vehicular traffic, vehicle type, peak hour timings, and frequency to predict future trends and provide a seamless parking experience over time. Using automatized digital payment methods can also assist in saving time for the visitor and help the parking operator run the parking lots more efficiently.

Suraj : By the way Prasad, we have to feed instruction where to drop you....otherwise the car will get parked at the airport directly because of its intelligence! **(Both laughs)**

(Change over music)

(Scene of Laxmiratan's house. Ranjan, Laxmiratan and Nandini are discussing)

Ranjan : So, Pappa... how was the story?

Laxmiratan : Beta Ranjan, the story was good, but.....**(Coughing)**

Ranjan : But what?

Laxmiratan : But, will it be possible in our city.... In our country?

Ranjan : **(Laughing)** Don't underestimate our country Pappa! We are certainly heading towards it, Pappa.

Laxmiratan : But, I don't see it all around!

Ranjan : There are now attempts to harness ability of artificial intelligence to make sense of large amounts of information and change the way that we move around our cities. For example in Maharashtra, Pune, has launched 'The Pune Street Light Project' to setup energy efficient street lights that can be remote controlled through a 'Supervisory Control and Data Acquisition' (SCADA) systems. Surat has built a network of more than 600 surveillance cameras which will be expanded to all major locations in the city, and also trying to develop solutions for water management and urban planning using artificial intelligence. And do you know Pappa?

Laxmiratan : What?

Ranjan : The Delhi Traffic Police is trying to set up an intelligence traffic management system, that is ITMS, which will work on a radar-based monitoring with the help of Artificial Intelligence. One of the key tools in the system will be automated traffic signals. It will help to analyse the traffic pattern, volume, number of vehicles and collect them on a cloud which will be further used to manage the traffic. And there is one more advantage of using this smart technology.....

Laxmiratan : Which one?

Ranjan : The smart system will also contain features like high-resolution CCTV cameras to capture commuters and motorists breaking the laws. The automated number plate recognition cameras, that is ANPR will directly send the challan to the homes of law breakers.

Laxmiratan : So, it will ease our job!

Ranjan : Yes, Pappa, certainly! It will also help reducing the health issues of traffic policemen. A survey conducted in 2018 showed that about 31 percent traffic policemen are suffering from one or more respiratory problems.

Nandini : Ohh my god! You are also supposed to take care of your health.

Ranjan : Don't worry Mamma... Soon there will be a change. In several other countries people are practising it... and our government is also heading towards it.

Laxmiratan : So, you mean to say I must go to sleep peacefully.... Without any tension!

Ranjan : Yes, absolutely Pappa... Don't worry about the future.... We will have smart cities with smart infrastructure... and that too before your retirement! **(all laugh)**

Nandini : Come on now.... Go to sleep! Tomorrow you have to go to your duty!

Laxmiratan : Yes, duty first! But tonight I can dream sweet!

(All laugh)

(Music piece. Episode ends)

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