

**Indian Institute of Technology Madras
Presents**

**NPTEL
NATIONAL PROGRAMME ON TECHNOLOGY ENHANCED LEARNING**

**Introduction to Modern Linguistics
Lecture-8
Organs of Articulation**

**Prof. Shreesh Chaudhary
Dept.of Humanities and Social Sciences
IIT Madras**

Good morning make it warmer please good morning did you watch that film we are a very popular film where the actor says good morning Bombay did you that is actually a very good copy of another English film which says good morning in Vietnam you know you must watch that movie it is a wonderful movie good morning Vietnam okay right let us talk about today beginning today we are going to talk about production of speech sounds.

I told you yesterday that human-beings produce through their body all kinds of sounds but not all of them maybe sometimes they maybe but not all of them may be speech sounds here on this course we are directly concerned with speech sounds human beings have a unique capacity to talk they can talk in dark they can talk while running they can talk even while sleeping do you know anyone who talks in sleep lots of people talk wirelessly people talk even, when eating no other animal can do that I told you yesterday dog cannot bark.

While there is a bone in its mouth but human beings can you know the best of their quarrels take place at the dining table right human beings have the unique they can talk underwater they can talk even when you gag their mouth gag your mouth yourself and do try and say good morning okay that is a very versatile capacity you know they can talk through their nose they can say sit straight you know I remember .I had a grand aunt who would not speak while on prayer and at children.

When they disturbed her she would you know scold us through her nose okay you understand human beings have a very powerful brain and not an equally but almost equally powerful please right vocal apparatus a very powerful vocal apparatus.

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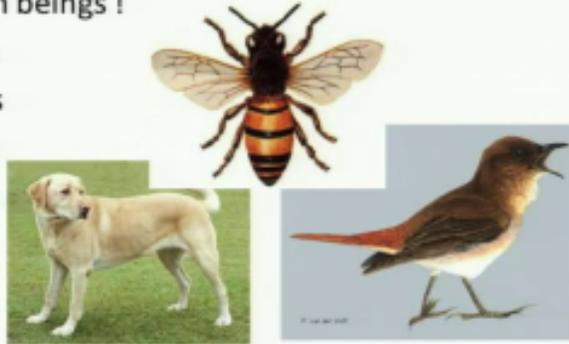


This enables them this vocal apparatus enables them to produce a variety of sounds under a variety of circumstances under a variety of conditions whether you are emotionally disturbed or otherwise it may be a lecture or a conversation it may be soft voice sweet like honey or it may be bitter voice like chilly you know no matter what human beings have a wide range they can whisper such that a fly is not disturbed they can shout such that a lion can be frightened human beings have enormous capacity with language and part of that reason is because they have a very versatile vocal apparatus actually some people say that human beings can speak like any other creature.

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Articulatory Phonetics

- A large variety of speech sounds are made by human beings !
- Hisses
- Buzzes
- Bangs
- Glides



In the world if you look at them look at these creatures from the point of view of language they can you can classify you can have four kinds unfortunately. I did not put the Fourth Kind here you know human beings can talk like reptiles are not here can you name any reptile please snake , crocodile, lizard anything else they speak in one way they produce hissing sound like produce that sound everybody please do it.

They produce hissing sound okay and they converse those who have a studied communication among reptiles and I mentioned will have a mention this book to you animal world by somebody called Gerald Durrell please write I am not too sure about the title okay but I am very sure about the author Google Darnell Google animal world and you will find perhaps the best book you may have read on communication among animals actually The Times Literary Supplement said while reviewing this book that if animals had a Nobel prize.

This book would get a Nobel Prize it is extremely well-written you know it is almost like a fiction particularly , I recommend this book particularly to those whose English is not good quote unquote good ok you will not only learn English you will also learn something about the annual world so through his singsong as well snakes and crocodiles and lizards and other kinds of reptiles have a lot of conversation have a lot of quarrel have a lot of plans have a lot of you know time happy or bad time together but they produce only one kind of sound what is that what is that yeah if any evilly very angry Cobra can only produce a hissing sound have you seen a Cobra.

I am sure those from the village may have seen it then otherwise you can walk to the lake park here you know your neighbor okay and look them then there are bees and flies they produce buzzing sound they do not speak but they are you know wings flapping produce buzzing sound something like do it keep doing it please do it everybody please so human beings can speak like flies but a flood and the human beings have enormous capacity we can produce buzzing sound in many of our languages we have a sound like disease do not we in English.

When you say is that is a buzzing sound okay or we can talk like birds not only Twitter you know the birds has they talk to one another they have very lovely sweet many of them maybe not all but many of them have such lovely you know communication systems they sing they cool they produce a sweet sound something like do it whistling sound how many people can whistle do it free please I want to work.

I want the world to see that IIT you know students at this institute are proper human beings they know yeah please produce this sound those who do not know please take tuition from those who know easy you know very simple just round your lips and produce some let air stream go out by sunset you will be producing you know whistling sound there can be a variety of whistling sounds not just one there can be frightening there can you know those you know look at the talk to the actors talk to the magicians talk.

To the street vendors they produce a variety of sounds in villages etc in agricultural areas where distances used to be long now of course everybody has a mobile phone but earlier you know when I was your age or even younger you know there was not any mobile phone and people who shout or people who Quizzed because whistle travels longer distance it is fundamental frequency may be low.

But his formant frequency terminal frequency is very high that is why birds can listen to one another from long distances there is a lot we can learn from birds as engineers as in engineering sciences read this book I am terribly serious when I recommend these things to you know birds have the radio frequency birds fly in a formation and those who have a studied say that when the fly information they fly at least 40% faster than.

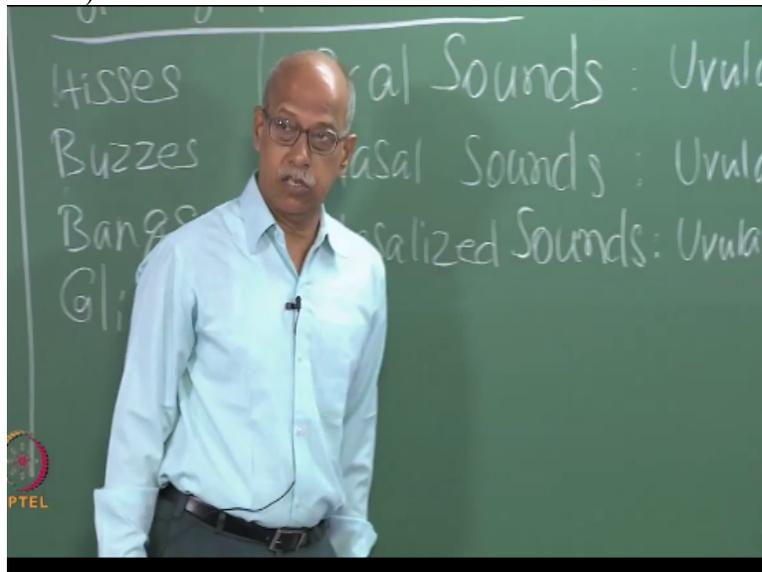
They do when the fly individually you know nature has given us all a variety of abilities so whistling can also be of a different of various kinds you know so you know human beings can

talk like birds they can talk like flies they can talk like snakes they can also talk like dogs or lions barking sound can anybody produce barking sound wow , wow produce eat corn now come on you see we are learning inhibition is alright when you do if it good things for that purpose there is nothing like good or bad in the world our philosophy is you tell.

You it is intention if you are giving somebody sweet but with a bad you know intention then sweet is bad okay come on do it Wow, Wow please looks like it was a class of ghosts come on produce some noise one two three do you see some people can do it I you know some people can do it really well congratulations to you but how can you do it well the question please come back okay you see Nature has been very kind to us the Bible says I do not know I am not a scientist Bible says God created man by man he meant both man and woman in his own image give human-beings a variety of abilities.

This is the only creature which can survive under the earth above the earth under the water perpetually snow snow-capped places like Alaska or the Himalayas or Ladakh okay, similarly with voices human beings can produce please right.

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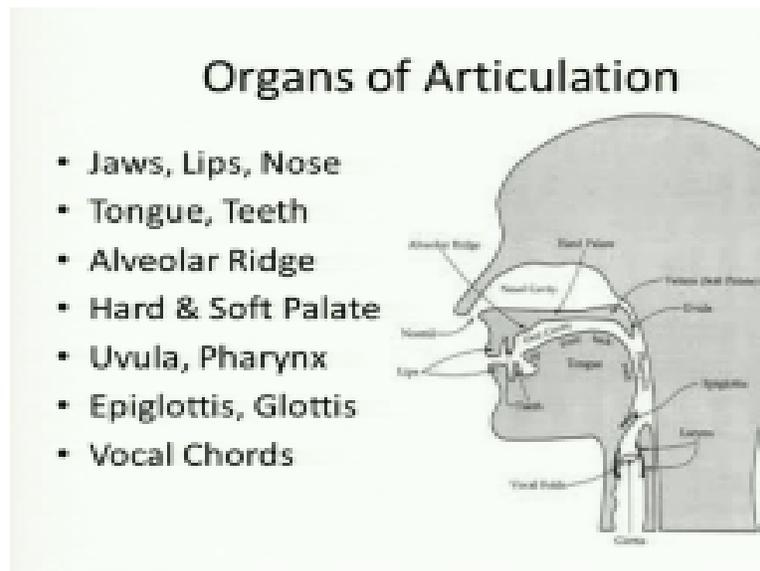
Various types of speech sounds they can produce hisses okay they can produce buzzes what is it buzzes they can produce banks chatter Wow ,Wow okay bangs they can produce glides bedrail like bird leg Queen sound gliding sound shouting roaring or whispering our singing or quarreling you know the range of human faculty in voice is extremely large when

you read more about phonetics I have given you references to books you can also Google many books are available.

I am also going to give you link two lectures on phonetics look at some of them if you find time and there is a lot to be learned how nature has done engineering with us human beings can produce please repeat after me husses buzzes banks and glides close your eyes human beings can produce hisses buzzes banks and glides now I will ask you questions and you will complete human beings can produce once again please human beings can produce right variety of sound how is that possible.

What did nature give us that it did not give to snakes or lions that it did not give us to flies or birds of course it gave us a very powerful brain the best that nature has okay it also gave us some matching apparatus the vocal apparatus look at the diagram of this vocal apparatus can you draw it.

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I will give you three minutes I guess you guys have done courses in engineering drawing am I right okay ,I will give you three minutes draw the outline and make it look like human beings you do not make it look like crocodile or frog okay and also label the parts you can ignore me for the few minutes camera please and just look at the notebooks. I do not need to be there in the camera okay make a relative position correct it doesn't matter really large or small but let

the relative positions be okay ,okay and do some practice back in your room you can look at any of the notebooks.

If you can if it is easily possible you did not pass your course in engineering not bad wow that is great man did you get a distinction in engineering joy lovely are you are you drawing your tank or head Joe of the humanity this student has a good drawing so you can later you know any finishes you can capture it do not worry let the relative position be okay oh this is nano vocal cord so small good enough do it back in your room as with the good pencil HP towards with such thing okay.

Are you talking the Kaku or human being not bad level it level it are you able to see okay these are the parts so find where they are sorry I took a bad I will change it okay I did not take a good coffee I am so sorry so you will know where jaws are where lips are where teeth are okay that is why I named it outside the diagram tongue and teeth can you please capture okay so you know you your I think you have no difficulty recognizing jaws lips nose tongue teeth alveolar Ridge this is alveolar Ridge you know behind your upper teeth behind your upper teeth ear.

This is alveolar Ridge then a hard and soft palate this is hard palate this is soft palate in some books you find it mentioned as vellum ,vellum okay this is uvula what in our common language we call little tongue or a small tongue okay this is uvula this entire thing is pharynx you see this entire thing is pharynx when you laugh your pharynx well when you shout your pharynx swells okay then this box it is sometime in some you know you will find it mentioned as larynx okay in some books.

You will find it mention that glottis there is minor difference between the meaning of two true meanings of two terms but call it what you like we in general language call it Adam's apple inside the Adam's apple there is a very highly sensitive diaphragm which vibrates at the pressure of air and that is called please write in some books you will find it mentioned as vocal folds excuse me in some books you will find it mentioned as vocal folds in many other books you will find it mentioned as please write vocal cords.

So basically this is the vocal apparatus or organs of articulation okay , some people of course you will also use their hands while is speaking they cannot speak unless they move their hands you know they you know they are in their case movement of hand is almost inevitable it is like

you know theater on this side. I have love on that side I have my parents my parents are saying do not marry this boy or girl my love says marry this boy or girl oh god what should I do okay some people would always speak like they were in a theatre.

But you can also speak without moving your hand can you say yes or no please you can speak without moving your hand but you cannot speak without moving your lips can you speak without moving your lips can you speak without moving your tongue can you speak without the help of the jaws can you speak without the help of your uvula or vocal cords so there are some organs which are you know which have a direct role in articulation please write those organs are called organs of articulation which have a direct role in articulation.

If you do not use them you cannot speak so hands and feet and eyes in this subject and this course are not organs of articulation of course you know you can speak a lot through your eyes you can listen a lot through your eyes okay, but for this course quote-unquote we will not call them organs of articulation organs of articulation constitute the lists given here jaws lips etcetera okay some of these organs.

You know they do not have the same function they do not have they do not have the same function but the function in unison the function in collaboration with one another okay there are some organs which are static they do not move look at your two jaws do both of them move in the case of human beings it is the lower jaw that moves you can only slightly open it and see you can fully open it and South you can say wow do it please .

I want you to do it come on do it please everybody together okay first whispered okay and now shout lovely that is great you see so you are it that sound is not possible the shout is not possible if your jaws do not open hold your jaws and now try and South you cannot you see but in the case of other creatures like somebody said crocodiles upper jaw opens their lower jaw does not in some other cases snakes both their Gorge expand that is why they can swallow a huge thing okay the only swallow they do not know how to chew.

Because they do not have teeth for chewing they have a fan which you know you know which secretes venom otherwise you know that they cannot chew anything so in their case both their jaws open or expand that they are the elasticity but in the case of human beings only the lower jaw opens up to a certain you know distance or closes tongue look at the tongue, you know the

tongue can move in a variety of different ways and slightest difference in the position of the tongue can produce many different kinds of sounds say for example.

You know produce a sound like a do it you the blade of your tongue expands towards your molar teeth okay you cannot stop it if you do not let it expand you cannot produce a do it say a everybody please do you feel that blade of your tongue expands okay but when you say you do it is somewhere in the back of your tongue the root of your tongue okay or for example, when you say sure as in church say or jail adding judge.

Your tongue rises towards the hard palate but when you say ah your tongue sits firmly on the lower jaw and also opens with the lower jaw letting the air pass similarly you know lips lipstick variety of shapes to produce different kinds of sounds when you produce a sound like e as in cheese say cheese your lips expand you know like you so if you do not expand your lips you cannot produce if you do not spread your lips you cannot produce the sound like e can you okay but on the other hand there is a sound like seit you have to round your lips.

If you do not round your lips you cannot produce e spread your lips and say you cannot if you want to produce ooh you have to round your lips if you want to produce e you have to spread your lips and there are intermediate positions there are intermediate positions slight rounding lot of rounding no rounding absolute round you know total you know for example when you are happy and you say oh my God thank you.

I made it through the je okay or something like that god bless you okay so you know there are some organs of articulation which perform in one manner and there are some others which perform in another manner the first revision is some organs of articulation can move and take a variety of shapes can you look at the list and underline those organs which move can you look at the list and underline those organs of articulation.

Which move which do not remain static which change position even if slightly even if very little but they move they are not static they are dynamic they move underline those you can talk to each other no problem please you can take the list in the camera okay, just focus the zoom on the list okay who can now tell me the names of organs of articulation that move say yes or no do jaws move lower jaw does.

So right lower jaw not both the jaws lower jaw okay, no lips move yes does tongue move yes do teeth move not until you are very old if you lose your teeth you have difficulty producing certain sounds we will talk about them does alveolar Ridge move where is alveolar Ridge behind this behind the upper teeth sorry we are not behind and above the upper teeth you know behind the upper gum behind the upper gum this is where alveolar Ridge is behind and above.

The upper teeth does hard palate move okay you can feel it take your finger inside I hope you have a clean finger .I want you to do it actually please feel the difference is it hard or soft so in the front half of the mouth the palate is hard take your finger inside if you do not have if you have clean nails if you do not have clean nails keep them out okay, put your finger inside and see is it hard or soft okay now you know go for the palate in the rear half of the mouth and touch it there is your soft or hard it is soft.

Now wipe your fingers clean please okay do they move no neither hard nor soft palate moves they are where they are they stay put okay does uvula the little tongue does it move it does it has a very versatile role in the production of speech sounds you know it is uvula it is the gatekeeper all the air all the air that comes out of lungs come to a particular pass here you know the lung air comes this way comes up to here and here.

This uvula the gatekeeper okay just as the on our campus you have a main gate etcetera here it is the gatekeeper the uvula decides whether you are going to produce a nasal sound or you are going to produce an oral sound okay what is the difference, when you produce a nasal sound the air comes out through your nose keep your hand here and say do you feel warm they are coming through your nose okay.

But when you say when you produce oral sound then air comes out of your mouth not from your nose keep your hand here again and see where does air come from come true it comes through the oral passage comes through your mouth it is uvula that decides whether air goes through the oral cavity oral passage or through the nasal cavity nasal passage how does uvula do that uvula can either rise and when it rises it blocks the nasal passage.

So all speech air only has one escape all his speech air escapes through the oral passage but when it is lowered then oral passage is blocked okay there is no passage here it is blocked and this passage becomes wide open okay, it is this thing this particular thing okay uvula if it is

Lord do you get a nasal sound or an oral sound if it is lowered once again everybody please are we together if uvula is lowered do you get a nasal sound or an oral sound nasal sound.

If uvula is raised do you get a nasal sound or oral sound oral sound obvious you know it blocks so uvula also moves more than anything else more than any of these things it is this box extremely you know this is one of the heights of nature's engineering to have designed a box the kind of material the kind of alignment you know if you have to learn a lesson in engineering design the this is one of the marvels of nature.

How could nature place it produce it keep it in such a place and the kind of elasticity and the kind of functions it does we are able to hear one another because vocal cords vibrate you know I will have an entire session on the function of vocal cords but at the moment. I only want to tell you keep your fingers here do not press, please you know you might choke just keep your fingers gently and say and now please say it alternately again and do you notice any difference here do you notice any difference here what is the difference.

When you produce it vibrates when you produce it does not vibrate it is the vibration of these vocal cords these vocal folds that carry that carries your voice to me my voice to you that we are able to talk to one another actually many people call it by very different names vocal cords in some books are also known as please write for nater p H o n 8 e of are for later oh thank you so kind of you vocal folds in many books are also known as phone ater or by another name a resonator.

You know the resonance that you produce there are some unfortunate people who through some you know disease like if there are people you know unfortunate people who get cancer of glottis cancer of throat in their case surgeons remove the voice box they carry still speak but they would not be audible at a distance you have to stand next to them to be able to hear them their lips move the a this the air strain comes out uvula is still decides whether it the air will come out through the nose or through the mouth.

But there is no resonance so vocal cords also move right now have you made a list of organs of articulation that move okay let us check our list you will have to say yes or no yes means it moves no means it does not move yes means everybody means yes means moves and no means it does not so, I will now call out each organ of articulation and you will say yes or you will say

no okay jaws everybody together we something was sleeping early in the morning okay jaws lips yes nose no tongue yes teeth no you are rich hard and soft palate uvula yes pharynx.

They can swell they can contract but they do not move epiglottis yes it can go high up low down glottis yes vocal cords yes please write.

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Articulators

- Active : Lips, Tongue, Uvula, Vocal Chords
- Passive : All Else

Organs that move are called active articulator lips tongue you have life vocal cords there these are all active articulator others are there for passive articulate no passive is not a good term you know. I am not happy with this term but because these terms are used in the book so that is why I am also using these terms they are not exactly passing the better description will be static articulate errs they stay.

Where they are without those articulate errs without the teeth without the upper jaw without the hard and soft palate without a lot of other things we would not be able to speak yet in literature you will find some things mentioned as active articulator and some other things mentioned as passive articulator.

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How Speech Sounds Differ from One Another

- Vocal Chord Features
- Oral Features/Nasal Features
- Obstruction Features : Obstructed, Partially Obstructed, Free Flow
- Release Features : Sudden, Gradual, Not Required

So let us take a recap a speech arises in the lungs. I have not shown the lungs here speech air rises in the lungs and from lungs it comes to vocal folds the first obstruction is at the vocal folds vocal folds may be wide open may be closed if it is closed then speech air strikes the vocal folds and produces noise from hook after crossing the vocal folds his speech air meets next obstruction at uvula, uvula may be lowered or uvula may be raised if it is raised all his speech air passes through the oral passage and you get oral sounds.

If it is lowered then all his speech air passes through the nasal passage you get nasal sounds but it may be in the medial position as well it may be partly raised partly lowered then you get nasalized oral sounds say for example when you say what is the telugu word for mother among so, on you know oh is that the uvula is partly raised partly lowered so part of the air just say it you feel air coming out both through the oral passage as well as through the nasal passage.

These sounds are called what are oral sounds oral sounds are those sounds that the production of which is possible because speech air comes through the oral passage what is the position of what is the position of uvula here you realize raised then we have nasal sounds what is the position of uvula here uvula is lowered and then we have an intermediate sound that is we call it nasalized sounds what is the example of nasalized sound lot of vowels.

Which are nasalized like oh okay like II you know Hindi has lots of them yeah I think even Telugu has lots of them you know right when you say mama you do not say mama do you we do not say mama we say mom all you know or when you say eat brick in Hindi okay lots of

sounds where you have nasalized on what is the position here uvula is partially raised or partially lowered uvula is partially raised or partially lowered so that you get nasalized sounds how do we get different kinds of sounds.

So that you know we have a variety of Kaka, kiekie cuckoo cha-cha TT Tata you know we get all kinds of sound that is the manipulation of these organs of articulation if lips are rounded we get ooh if lips are spread we get e if the tongue rises towards the hard palate touches it we get if it does not we get sure okay they are all within the same limited space but the versatility of those organs of articulation is such that slightest movement.

One against the other active articulator moving towards the passive articulator you know you get a variety of sound whoo and lower lip moves towards the upper teeth you get as in fan as in van but when both lips come together you get pop can you have part without both lips coming together try you cannot okay similarly you know when you want to say what lips have no role they do not participate.

So in a variety of ways one interacting with the other the other interacting with one in close contact or in close approximation various kinds of movements of the organs of articulation produce a variety of speech sounds in the next half a dozen classes or so we will look at how these organs of articulation move and how we get different kinds of sounds but before.

We do that it is very important that you and I know the relative position of organs of articulation in other words the diagram of the vocal apparatus it will be a wonderful thing if you draw it at least once a day for the next four or five days so that you know it gets implanted in your head then you will be better able to understand the mechanism of production of speech sounds if you want to change your pronunciation if you want to see why somebody sounds different from another person why lot of people do not sound like one another this is the difference in Sun in the cases of some lips spread and nanos Nano inch a nanometer more than somebody else.

It is these miniscule differences in the movements of organs of articulation that not only give us different sounds that also indicate different people there is a reason why Lata Mangeshkar sounds different from her sister Asha Bhosle though they sing the same songs they are both

great singers they are both great vocalists okay, but each of us does it slightly differently if you want to design a machine tomorrow.

Which you want which you know want to have you know the machine to have the ability to talk like human beings then machine will also have to produce all of these variety of sounds before it can produce human language in the next few classes ,we will be talking about mechanism of speech reduction they have any questions do you have any questions okay ,thank you have a good day.

Online Video Editing /Post Production

K.R.Mahendra Babu

Soju Francis
S. Pradeepa

S. Subash
Camera

Selvam
Robert Joseph
Karthikeyan
Ramkumar
Ramganes
Sathiaraj

Studio Assistants

Krishnakumar
Linuselvan

Saranraj

Animations

Anushree Santhosh
Pradeep Valan .S.L

NPTEL Web & Faculty Assistance Team

Allen Jacob Dinesh
Bharathi Balaji
Deepa Venkatraman

Dianis Bertin
Gayathri
Gurumoorthi
Jason Prasad
Jayanthi

Kamal Ramakrishanan
Lakshmi Priya
Malarvizhi
Manikandasivam
Mohana Sundari

Muthu Kumaran
Naveen Kumar

Palani
Salomi
Senthil
Sridharan
Suriyakumari

Administrative Assistant

Janakiraman .K.S

Video Producers

K.R Ravindranath

Kannan Krishnamurty

IIT Madras Production

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