Applied Natural Language Processing
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Lecture - 53
Sequence Learning and its applications

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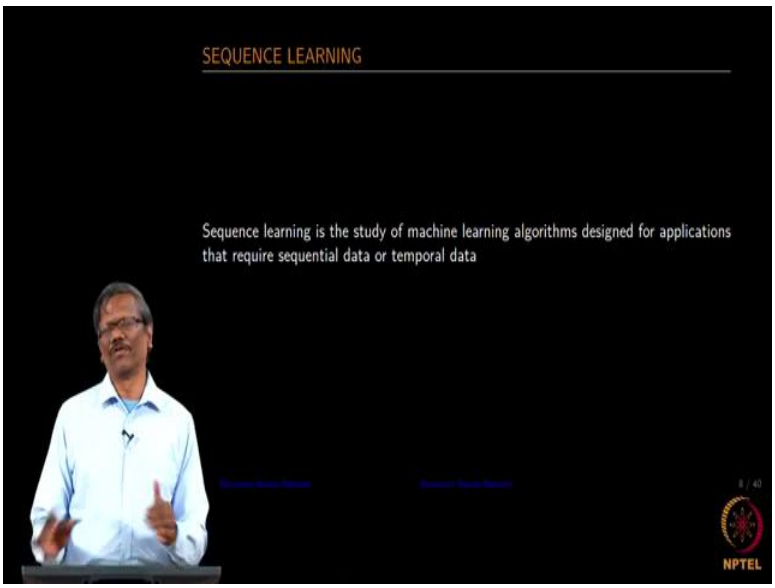

Sequence Learning is a study of machine learning algorithms, designed for applications that require sequential data or temporal data. For example, I am speaking right now, and then the machine should be able to recognize my voice and then recognize the sentences that I am speaking, split it in the words and then finally, translate that into any language. For example, I am speaking in English, the machine should be able to read and understand that I am speaking English and when the listener is a Chinese, you should translate that into Chinese, just in time. How cool it would be right if you could develop that. So, for that we definitely require sequence learning.

So, even when I say certain things at the beginning of the sentence and then when I want to mention it towards the end ok, I should be able to understand the context of what I am saying, in the last statement and it depends only on the sequence of sentences that I have spoken earlier. So, if I do not understand those sequences, the last part would be difficult. So, we model these speeches in the time series in the NLP as well and then see how that could be used to really input as part of the network and then later, the machine learning

model understand the sequence and then does whatever we are asking the machine to do in terms of translation, paraphrasing and so on so forth.

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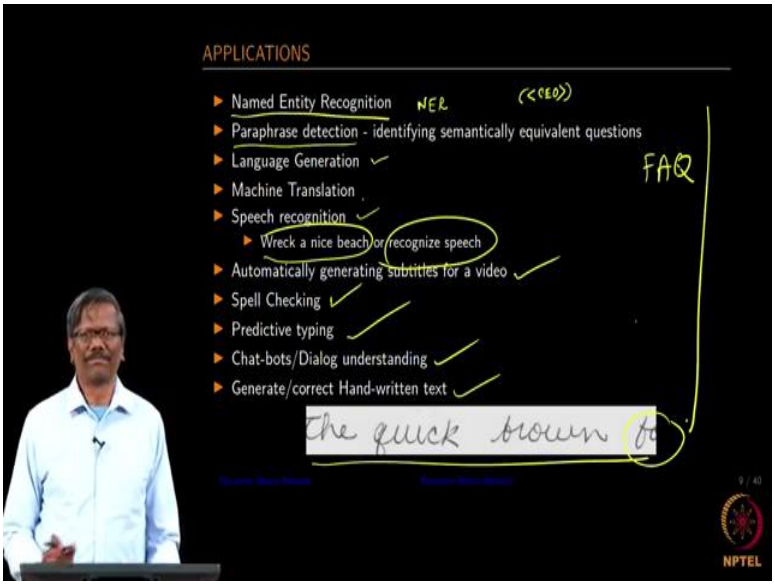

So, some of the applications that I have listed here, produce a newer model that we are talking about with respect to the time series. The first one is named entity recognition. I am sure you have understood what named entity recognition is NER right. So, we are talking about a company and then we say that Mister John is the CEO is of the company and he had done great things for the company. So, what does that he means there? Right. So, we should be able to say that the CEO is also mentioned as part of the conversation all over. That he also refers to this CEO. So, how many times the CEO as referred to in the particular document; so can we find that?

So, you require definitely some kind of a named entity recognition model, which recognizes that person as a C O and then wherever he is mentioned as part of the document and then if you are using a pronoun to refer him, you know the market as that person in the document ok, that is one. And then paraphrase detection is identifying semantically, equal in questions because this happens several times in the industry especially, in the IT industry, where you have you are providing a service and then if you have a call center to really handle your clients, you have some kind of a mechanism through which you capture the questions incoming from the clients and then later, what you do is you start creating frequently asked questions.

So, that a new person, who is joining the organization in the service industry should be able to look at this and then answer the query that is coming from the client, you know if it is part of the frequently asked questions. So, how do you actually capture the frequently asked question? As I mentioned earlier, as a human being, we are able to construct a sentence in so many different ways, even though they are semantically the same, but the answer from the survey side would be the same for so many questions, which are semantically the same right.

So, when you are able to identify those questions automatically and then if there is only one answer for all of those questions, I got the first frequently asked question right. For that answer there are so many different ways of asking and then now, I can say that this forms my first question and then you can rephrase that question. So, that it makes a lot more sense for people, who want to really look at your API or documentation or whatever all right. So, the next application is language generation. So, given a photograph if you are asked to write a line about the photograph. What do you do? You will look at the contents of the photograph, look at the objects and then give some title or caption to that right.

So, that is where we can use this model. So, when you do that again, the input is going to be different. It is not going to be the same right, there could be five objects in some cases, there could be ten objects, there could be two objects, and so on. So, we should be able to process that without really changing or adjusting our neural net size and so on, all right.

So, machine translation, I already spoke about the machine translation part. I was given a parallel corpus, we should be able to translate from one language to the other in this case. Again, in this case you do a sentence pattern sentence translation not a word by word translation.

So, the next one is speech recognition, should be able to really translate, what I say in one language to the other from the audio file that you get, and then based on the sound that you hear should be able to recognize or what the person is talking about. For example, if the person says recognize beach or recognize speech right. Based on the context, I should be able to really make use of this. Even though you hear something similar to recognize beach and it is not recognized beach, it is recognized speech right.

So, these sorts of things should be possible through the natural language processing application where these words are taken as a time series, automatically generating subtitles for all the videos right. So, every frame you look at it and then try to create the subtitles for each of those or take about a few frames you know about 200 frames or whatever number that you are looking at when there is a change you should be able to do the subtitle for that particular a series of the frame.

Spell checking nothing, we spoke about this already right. So, as in when you type you should be able to really figure out the distance between the characters that you have typed so far and the words in the dictionary and then start suggesting what could be the right word and then if you had made some mistake while typing, ignoring what the suggestions are given, the application would be able to provide you the right spellings for the word that you are typing.

Again, we spoke about this at the beginning of the lecture the predictive of typing. This again is an interesting application, where you would like to have a chat bar ah, to have a conversation with on certain services or you want to have a certain application that I understand to read dialogues and then provides certain input to the user based on what is understood and then generate correct handwritten text.

So, this could be done through the OCR right. OCR is not always perfect especially, with respect to the handwritten text especially, the one that you are seeing on the screen unless you know what this is all about you will never be able to recognize accept the first one is, it a frown or is it quack and what is this.

So, in the NLP you would have heard this sentence several times, the quick brown fox right. So, if you have trained your network to understand these kinds of phrases and words, it could suggest that this is the quick brown fox. It is, it could give you an option there to pick right. So, these are all the various applications that one can develop using the neural network, where time is considered.