Machine learning for Engineering and Science Application
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Summary of RNN's

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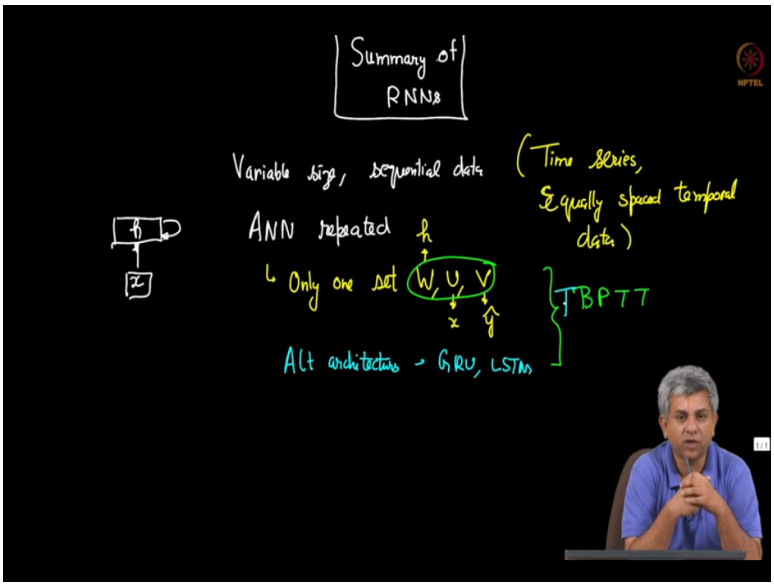

Welcome back this video summarizes what all we have learnt this week about RNN's, RNN's are recurrent neural networks we are basically used for variable size sequential data in engineering problem whenever you have time series and especially equally spaced temporal data RNN's can tremendously useful at least they are very powerful we still are discovering use case problem sometimes there is course on and there is a whole series of techniques for time series analysis and that might be sometimes in fact there are some recent papers that argue that time series analysis is actually much more powerful than.

Let us say LSTM or usual RNN's for engineering problem so this is still something that is still being discovered but typically this would be the best case scenario if you have equally spaced time series later then sometimes RNN's can be extremely powerful, so whenever you have variable size sequential data you use RNN's the basic structure of an RNN is simply an ANN repeated, which is why sometimes you will see this figure XH looping on itself basically means if you unroll it you have XH H XH going sequentially again and again we usually we use only one set of if it is not deep you use only one set of WUV W denotes the connection with the

previous H, U denotes the connection with X and V denotes the connection with the final predictive layer.

We saw that we have gradient problems the gradient problems can either be vanishing gradient or they can be exploding gradient for vanishing gradient we use alternate architecture specifically GRU and LSTM and for exploring we use gradient clipping we also saw that we have because this U V and W are the same, we are back propagation through time and sometimes it can get very expensive because you are just back probably getting through the whole thing which is why we sometimes do truncated back propagation through time in fact for when you have a large number of sequential steps you use truncated back propagation through time finally we also saw that you have slightly different more sophisticated versions of the same thing even using LSTM you can either use the RNN's or you can use bi-directional RNN's.

Now all these sequence of technique can be applied to several problems and they are being applied to several problems especially language task within engineering and science this is still something that is in development CNN and ANN's have actually got already got mature uses in engineering problem RNN's are still developing as far as engineering problem are concerned, we have not found too many uses for that, we will show you one more application in week 10 of this course thank you.