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BIDIRECTIONAL RNN

Bidirectional RNN:

- BRNNs is a type of deep learning neural network that processes sequences in both the forward and backward directions simultaneously.
- when the future inputs affects the past output.
- example: Named entity Recognition.

"I love [arrazon], it's a great website."

"I love [arrazon], it's a beautiful river"

ORG/LOC ambiguity.

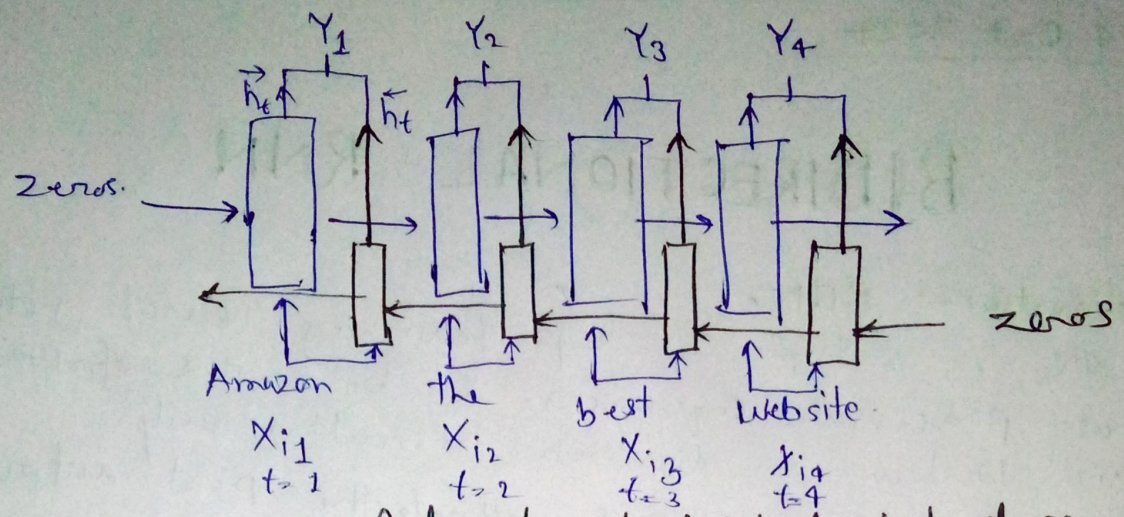
to resolve this ambiguity which is not possible with RNN (simple) hence we use the bidirectional RNN

Bidirectional RNN Architecture:

Sentence-1 "Arrazon the best website"

Sentence-2 "Arrazon the beautiful rivers"

- the Bidirectional RNN have a two RNN forward RNN ($\overrightarrow{RNN}$) backward RNN ($\overleftarrow{RNN}$)
- what ever we got the output from the both the RNN we concatenate the both of them



Bidirectional RNN Architecture.

$$\vec{h_t} = \tanh(\vec{W}\vec{h_{t-1}} + \vec{U}X_t + \vec{b})$$

$$\overleftarrow{h_t} = \tanh(\overleftarrow{W}\overleftarrow{h_{t+1}} + \overleftarrow{U}X_t + \overleftarrow{b})$$

$$Y_t = \sigma(V[\vec{h_t}, \overleftarrow{h_t}] + b)$$

— Bidirectional RNN is also applicable on LSTMs and GRUs

Applications:
— used in Named entity Recognition (NER)
— Part of speech tagging (pos tagging)
— Machine translation based application.
— Sentiment Analysis
— Time Series Forecasting

Drawbacks:
— Complexity (weights and biases becomes double).
— where we ~~have~~ not have all the data. example. real time speech recognition.