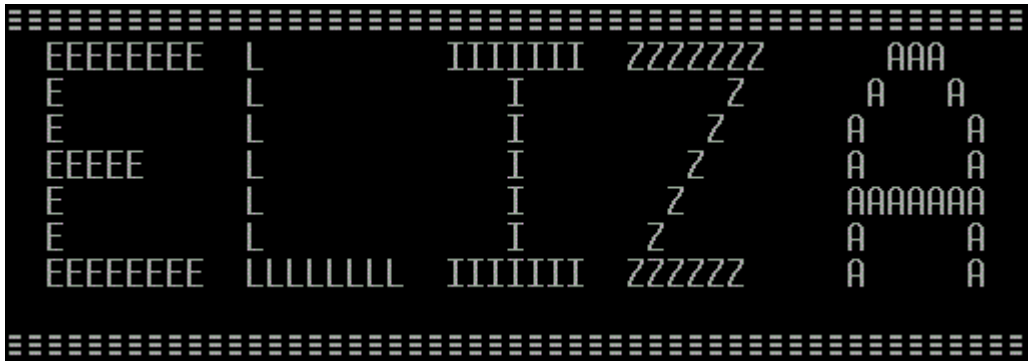
A Neural Conversation Model

Aadil Hayat (13002)
Masare Akshay Sunil (12403)

Problem Statement

- To create a chatter bot capable to chat in natural language as humans do.

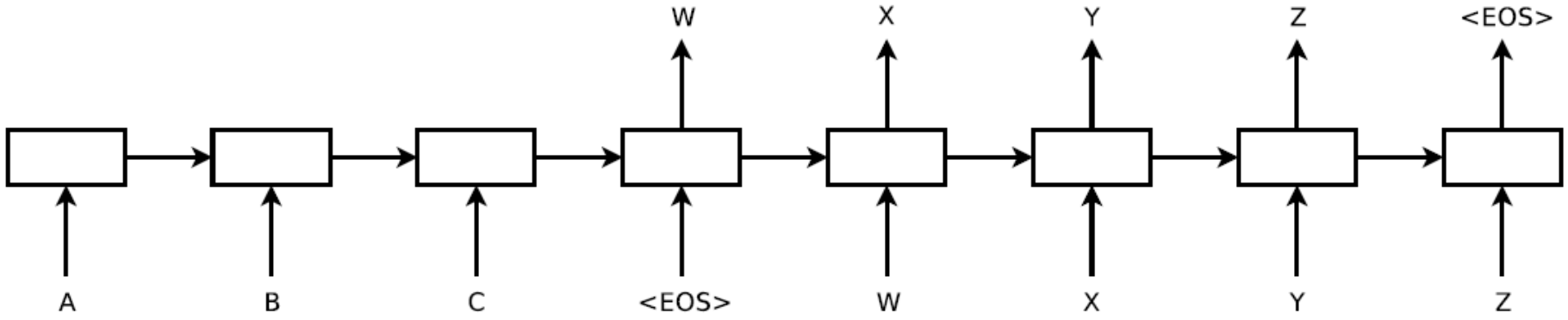


DNNs in Conversations

- The inputs and targets are required to be of fixed dimensionality
- Many problems that deal with sequence of inputs or targets where the dimensionality can not be predicted a-priori
- Eg. Speech Recognition, Machine Translation and Question-Answering

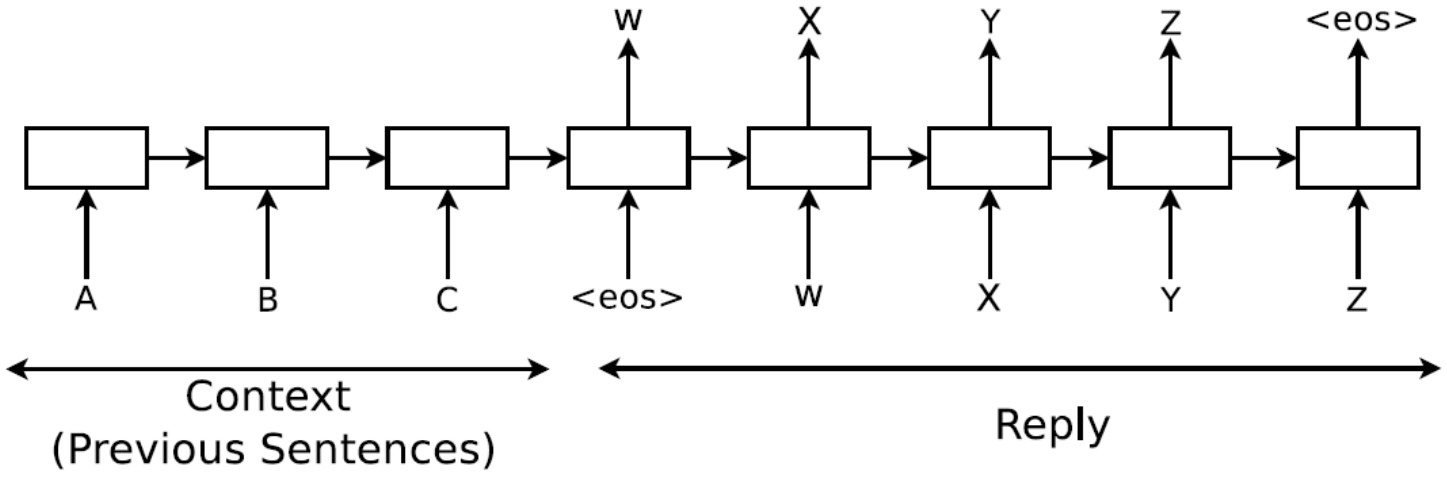
Seq2Seq

- One LSTM reads a whole Sequence at a time to generate a single vector with a large dimensionality.
- The Second LSTM is a RNN which is conditioned on the input sequence.



A Conversational Model

- A Translation Model using Seq2Seq will be easier than a conversational model due to no context required.
- Input sequence is the concatenation of what has been conversed so far.
- Lack of general world knowledge is another limitation of the purely unsupervised model.



IT Helpdesk Troubleshooting

VPN Issue

Machine: *hi*
Human: *hello*
Machine: *could you please let me know what are the operating systems you are using ?*
Human: *i am using linux*
Machine: *ok it was in the ssl vpn on which you stated it was broken*
Machine: *please check if you are logged in to corp network*
Machine: *what is the error that you are running please*
Human: *i am seeing an error related to vpn*
Machine: *what is the error message that you are getting when connecting to vpn using network connect ?*
Human: *connection refused or something like that*
Machine: *may i know the version of network connect you connect ?*
Human: *i am not sure i know that*
Machine: *is the network connect prompting for any user certificate*
Machine: *?*
Human: *yes*
Machine: *are you at home or at work at the moment ?*
Machine: *office ?*
Human: *i am at home*
Machine: *try this*
Machine: *goto <URL> page and enter your name and password*
Human: *done*
Machine: *try logging in with <NAME> and check if its working fine now*
Human: *yes , now it works !*
Machine: *great*
Machine: *anything else that i can help*
Human: *no , that was very useful*
Machine: *you are other than <NAME> :)*
Machine: *have a nice night*

The Dataset

- OpenSubtitles dataset Tiedemann 2009.
- Movie conversations in XML format.
- Training Dataset : 62M sentences (923M tokens)
- Validation Dataset : 26M sentences (395 tokens)
- Quite large but noisy
- This is an open-domain conversation dataset so expected results are quite fascinating.

Cleverbot vs NCM

Cleverbot

Human: *What do you think about tesla ?*
CleverBot: *I am tesla.*
Human: *What do you think about cleopatra ?*
CleverBot: *Cool is cool.*
Human: *What do you think about england during the reign of elizabeth ?*
CleverBot: *I like him. Do you ?*
Human: *What do you think about bill gates ?*
CleverBot: *Lets talk about Link.*

Neural Conversational Model

Human: *what do you think about tesla ?*
Machine: *he 's a good conductor .*
Human: *what do you think about bill gates ?*
Machine: *he 's a good man .*
Human: *What do you think about messi ?*
Machine: *he 's a great player .*
Human: *what do you think about cleopatra ?*
Machine: *oh , she 's very regal .*
Human: *what do you think about england during the reign of elizabeth ?*
Machine: *it was a great place .*

References

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Questions?