

Text Summarization using Deep learning

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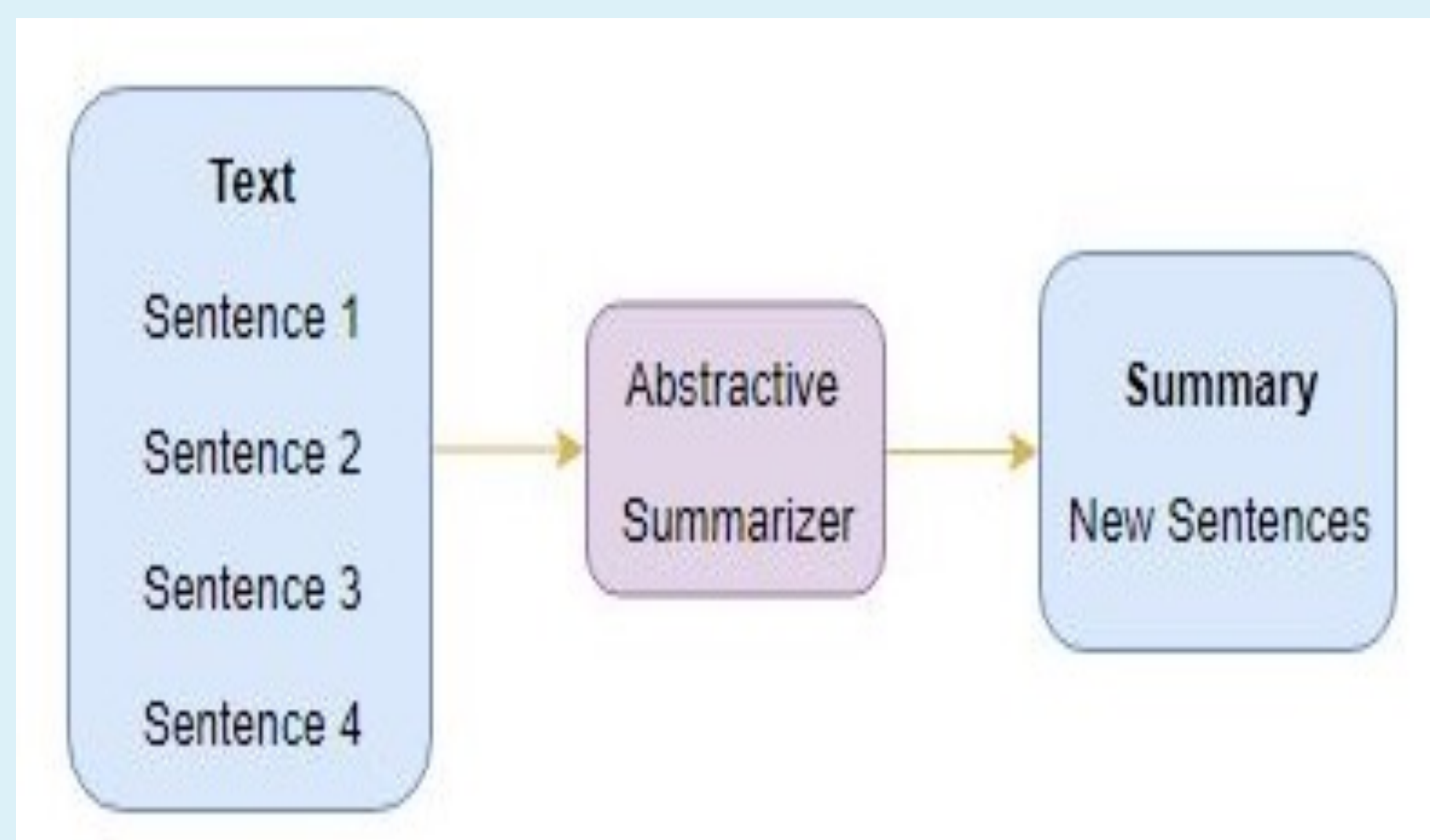
Motivation



- In academia, we read long paragraphs of text just to get the main idea presented within it. There is an enormous amount of text material available online as well as offline for any topic which is continuously growing day by day.
- We aim to tackle this problem by building a deep learning model which can understand the context and provide a contextual summary of the paragraph.

Problem/Task

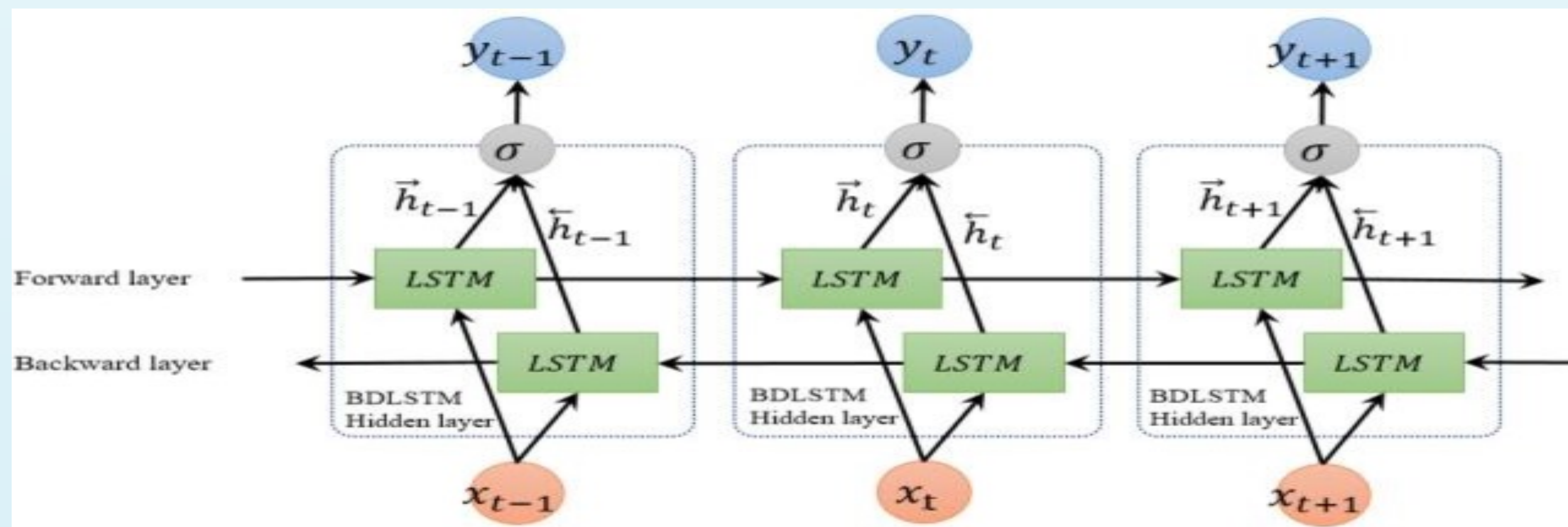
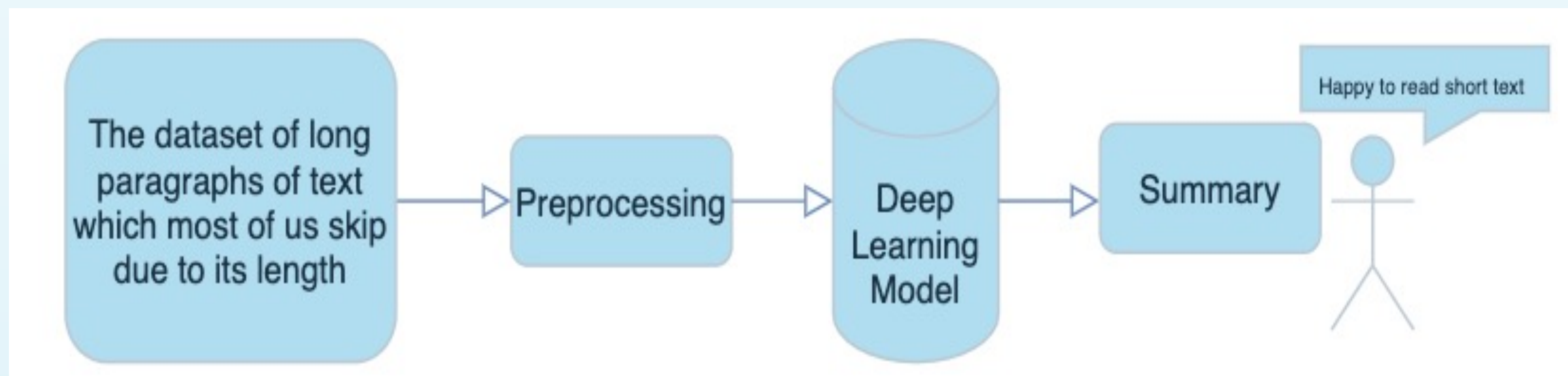
A lot of times we prefer to skip reading the text after going through its length and so we miss getting some great content. This is where the magic of Natural Language Processing can be utilized to shorten these long texts into short, crisp and readable summaries.



Dataset and Preprocessing

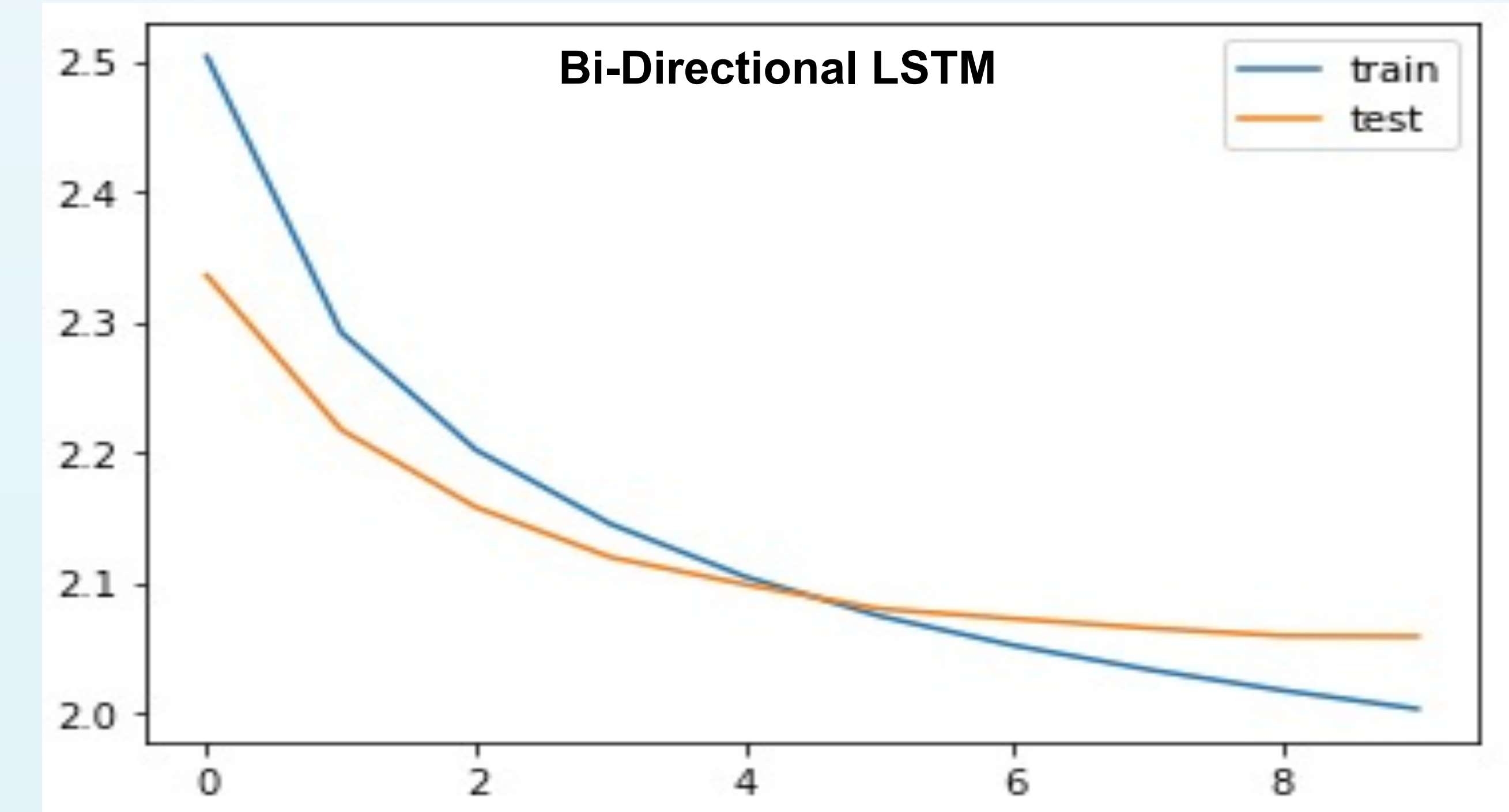
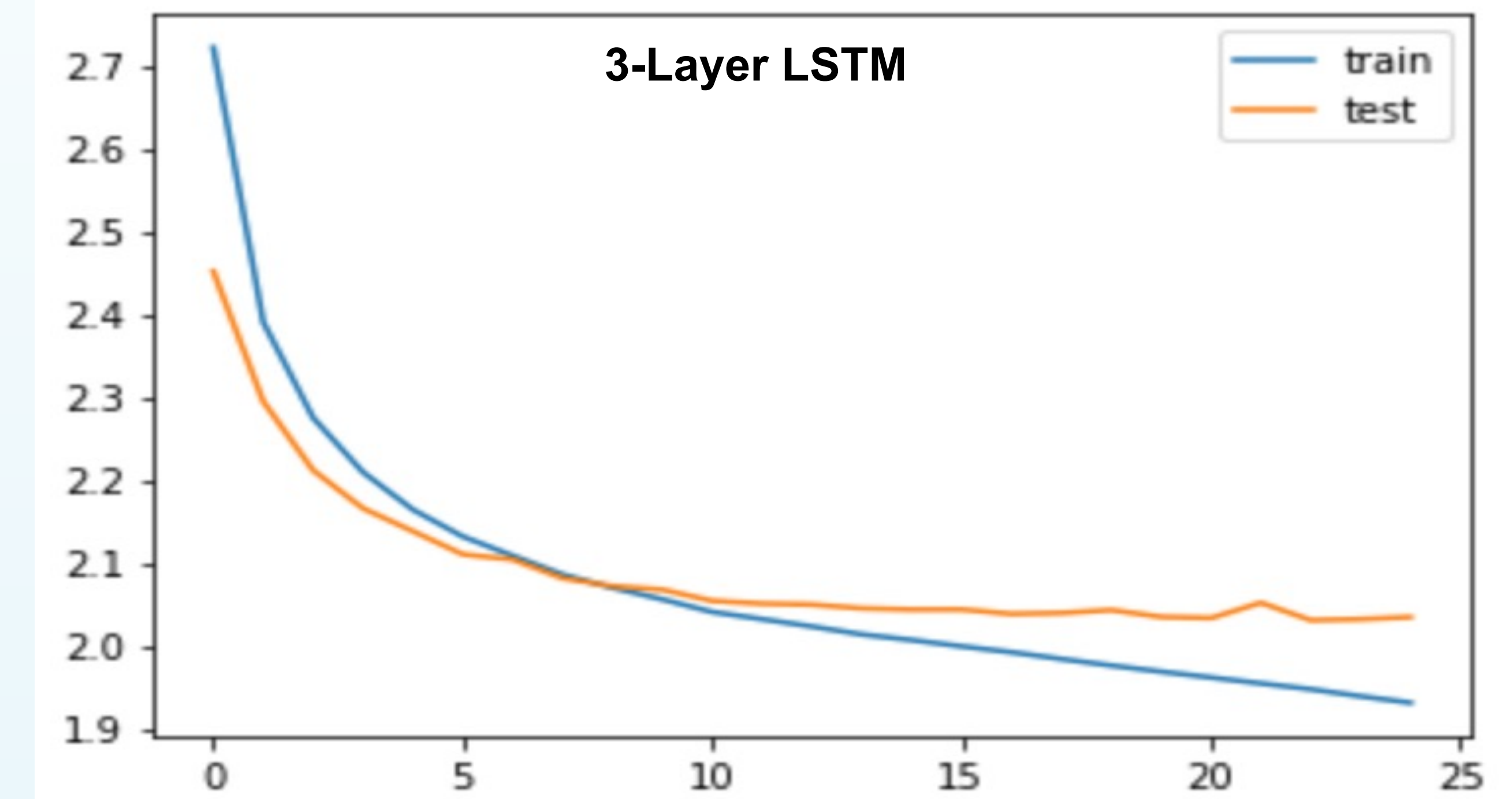
- We are using Amazon food reviews dataset from Kaggle which includes 568,454 samples that contain product and user information, ratings, long plain text review, and their brief summary.
- Remove all unwanted rows, do basic text preprocessing like removal of punctuation, stop words, special characters, conversion to lower case, etc.
- Tokenizing, padding of sentences and removal of rare words

Methodology



- We implemented 3-layer LSTM and Bi-directional LSTM to generate abstractive text summarization. After training both models, we compare their outputs to the original summary and with our baseline model (spaCY).
- Stacking multiple LSTMs (3 layers in our case), helps in more complex representation of features of the inputs.
- In Bidirectional LSTM, the data is feed from both forward and backward layers which allows the model to capture the context from both the directions and produce more accurate abstractive summary.

Results



Multi-Layer LSTM and Bidirectional LSTM performs better than single Layer LSTM which was implemented earlier. Bidirectional LSTM is able to generate more accurate summary.

The below summary results shows the comparison between Single-layer LSTM, Multi-Layer LSTM and Bi-LSTM.

- **Review** – one of the best choices so far. If you like chocolate coffee and good aroma you will like this one Will definitely buy again
- **Summary (Single Layer LSTM)** – good coffee
- **Summary (3 – Layer LSTM)** – great coffee buy again
- **Summary (Bi-directional LSTM)** – best chocolate coffee good aroma buy again
- **Summary (spaCY)** – great coffee and aroma