Abstractive Text Summarization

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Baseline Model:

RNN based Sequence2Sequence model using GRU as encoder and decoder

Proposed Model:

Bidirectional Encoder Decoder and Bidirectional Beam Search model using RNN (GRU) as encoder and decoder with attention and coverage and input is reversed

Dataset:

We are using Google sentence compression dataset, which is a large corpus of uncompressed and compressed sentences from news articles.

Link: https://github.com/google-research-datasets/sentence-compression

Tasks Completed So Far:

- Implemented and trained our baseline model
- Built web interface to interact with model
- Implemented Bidirectional Encoder Decoder model along with attention and coverage according to the proposed paper
- Develop end to end system to train the model with every new input coming from user interface

Tasks Remaining:

- Implement Bi Directional Beam Search
- Improve UI for better user experience
- Look over improvement over coverage for large paragraphs.

Results:

Input Text	Five people have been taken to hospital with minor injuries following a crash on the A17 near Sleaford this morning.
Original	Five people have been taken to hospital with minor injuries following a crash on the A17 near Sleaford.
Baseline **(ROUGE-1 0.233)**	five people have been stabbed to hospital after five
Bidir_Rev **(ROUGE-1 0.647)**	five people have been taken to hospital with minor injuries following a crash the car with angela

Input Text	A woman was injured by a falling tree in the Gresham neighborhood, according to the Chicago Fire Department.
Original	A woman was injured by a falling tree.
Baseline **(ROUGE-1 0.68)**	a woman was injured by a fire in richmond
Bidir_Rev **(ROUGE-1 0.81)**	a woman was injured by a company

Input Text	Markets continued to remain under pressure on Thursday morning as financial heavyweights like ICICI Bank, HDFC, and HDFC Bank declined by 1-2% each.
Original	markets continued to remain under pressure
Baseline **(ROUGE-1 0.523)**	markets continued to 8 lower billion
Bidir_Rev **(ROUGE-1 0.77)**	markets to remain under pressure

Performance Metrics:

Baseline Model:

- Average **F1 ROUGE-1** Score : 11.12 %
- Average **F1 ROUGE-2** Score : 9.56 %
- Average **F1 ROUGE-L** Score : 15.89 %

Bidir_rev:

- Average **F1 ROUGE-1** Score : 25.15 %
- Average **F1 ROUGE-2** Score : 21.01 %
- Average **F1 ROUGE-L** Score : 28.23 %

Code Link: https://github.com/pnjha/Text_Summarization

References:

[1] Kamal Al-Sabahi, Zhang Zuping, Yang Kang
Bidirectional Attentional Encoder-Decoder Model and Bidirectional Beam Search for Abstractive Summarization. Link: https://arxiv.org/pdf/1809.06662v1.pdf 2018

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[3] *Bidirectional Beam Search: Forward-Backward Inference in Neural Sequence Models for Fill-in-the-Blank Image Captioning*. Link : https://arxiv.org/abs/1705.08759

[4] *When to Finish? Optimal Beam Search for Neural Text Generation* (modulo beam size)
Link : https://arxiv.org/abs/1809.00069