# Abstractive Text Summary

## Abstract

Neural networks models have shown a lot of progress despite they possessed some challenges like unnatural and repetitive. . This paper takes an abstractive neural network model and suggest 6 improvements to improve its summarization output, it explains the model they considered and the metrics they use to measure the suggest improvements ,

## Baseline Attention Model

Abstractive Text Summarization is an Encoding – Decoder implementation, where the text is encoded into hidden layer and then the decoder decodes the hidden layer to produce the summary

Both encoder and Decoder use LSTM Recurrent Neural Network with Attention Mechanism that calculates the importance of each input , creating context vector that is used to generate probability distribution over the target vocabulary

## Metrics

Similarity will be used as a matric, If target summary is absent, they will use Topic Modeling to measure the similarity

If they have Target summary exists, they will use ROUGE Metric where ROUGE-N measure N-Gram similarity , ROUGE-L which measure Sentence level similarity and ROUGE-S which is Skip-gram Similarity

## Suggested Improvements

* Large Vocabulary
  + Use more linguistic rich features for the imput like POS (Part of speech), named-Entity and TF-IDF
* Hierarchical Attention
  + Use of -Bi-Directional RNN on the word and Sentence level
* Pointer Generator Network
  + Solves the out of vocab problem (UNK) by copying from (Pointing) the source
* Coverage Mechanism
  + This technique solve the problem of Repetitive Attention by penalizing Attention on repetive words making the model focus on words that was not covered, thus “Coverage”
* Intra-Attention on Decoder Output
  + Same like Coverage Mechanism but consider also Decoder output , this avoids repeating words that has been generated already
* Learning From Mistakes using reinforced learning
  + The model output is compared to the reference summary using ROUGE metric , we iterate using Reinforced learning till we get a high score ROUGE score

## Our Findings

To prepare for this classwork we have went through several research papers, we found that most of the papers ,including this one, focus on the technology and not the user , none of them suggested any improvements based on the user preferences, without any customization to the user location, mother tongue or preferences . we believe text summarization should incorporate user preferences and the context and adjust the model accordingly