CSE-842 Natural Language Processing
Dr. Kordjamshidi

Title Generation

Kuldeep Singh, Reza Khan Mohammadi, Ye Ma

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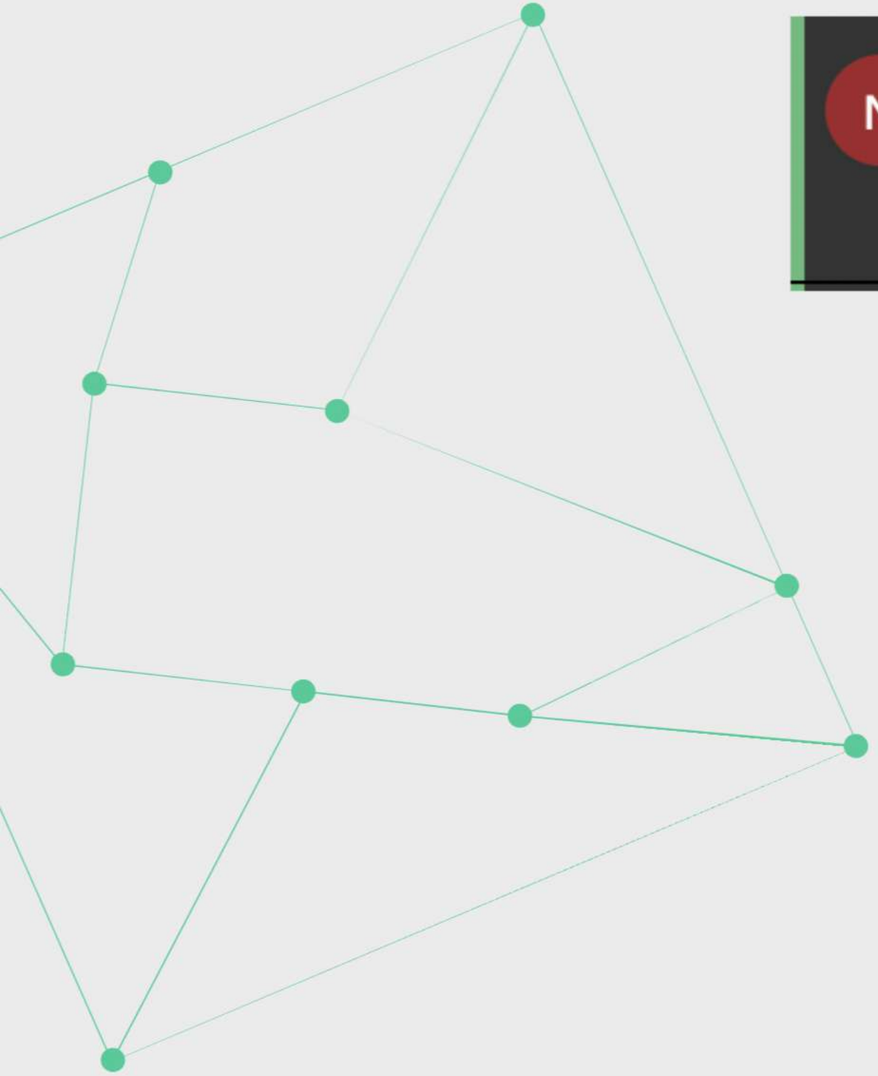
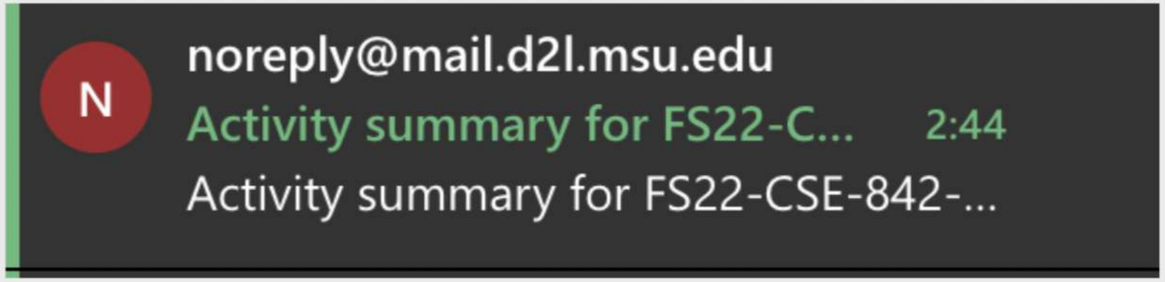
The Problem

more than 5,000
articles are published
online every day

On average,
8 out of 10 people
only read the headline.

Oh... I have a new email... let me see...





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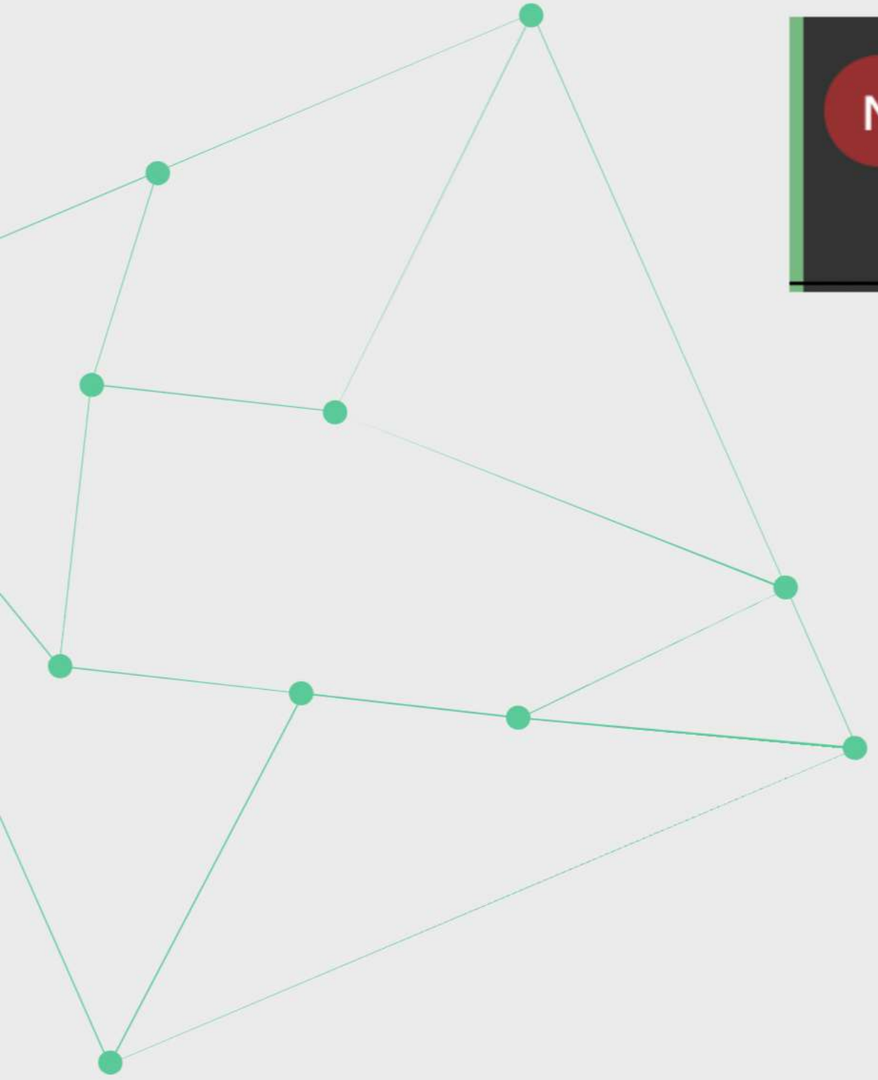

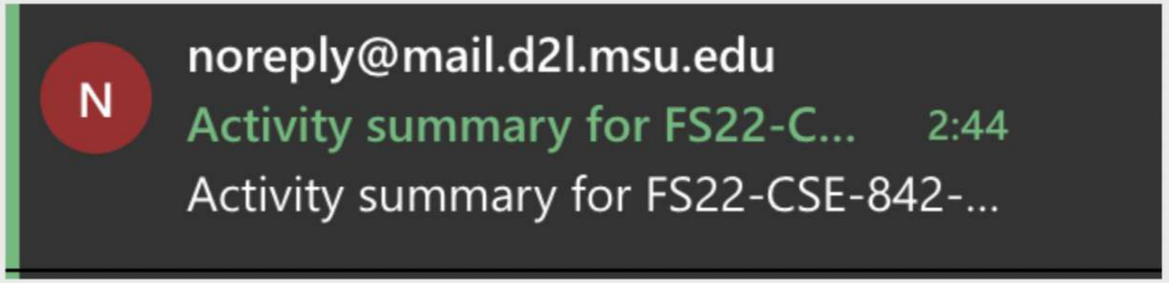

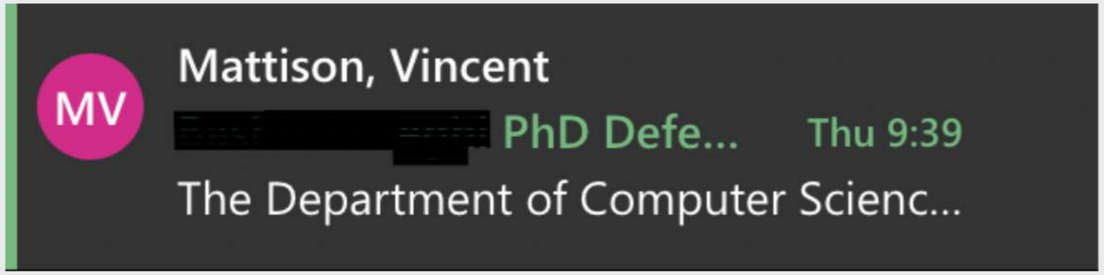

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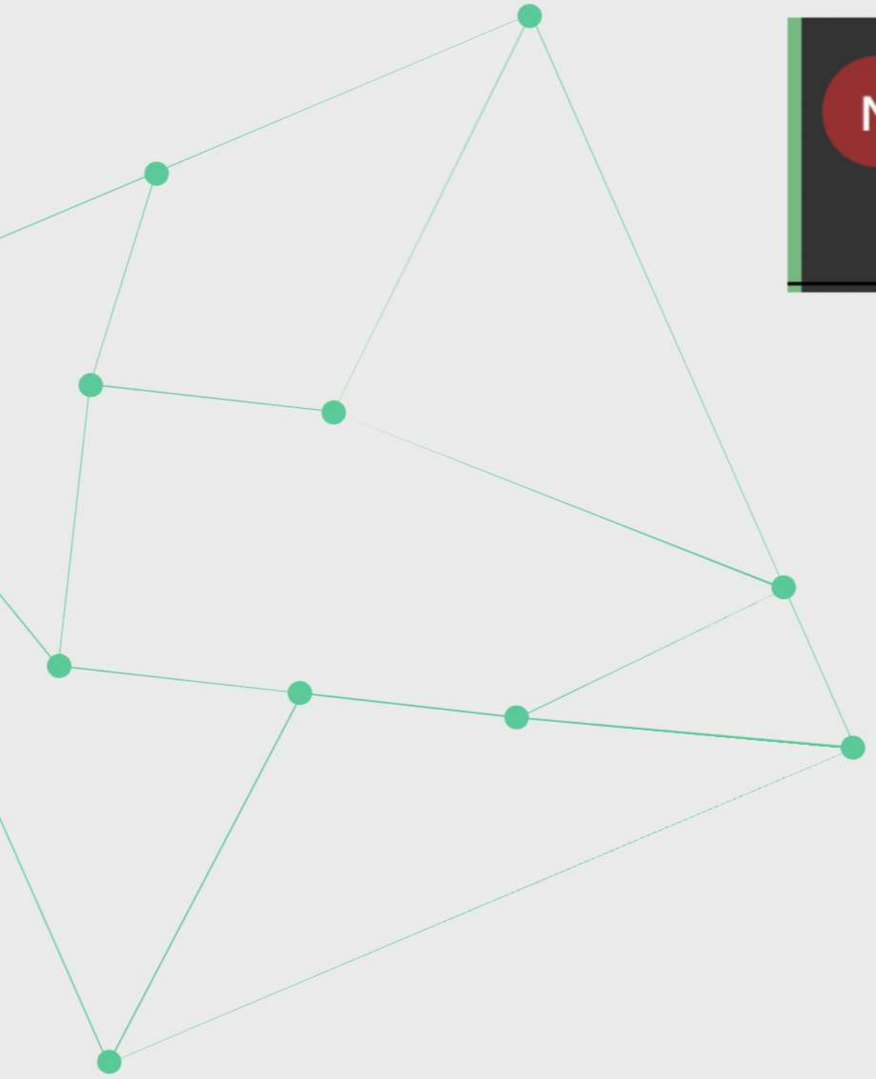

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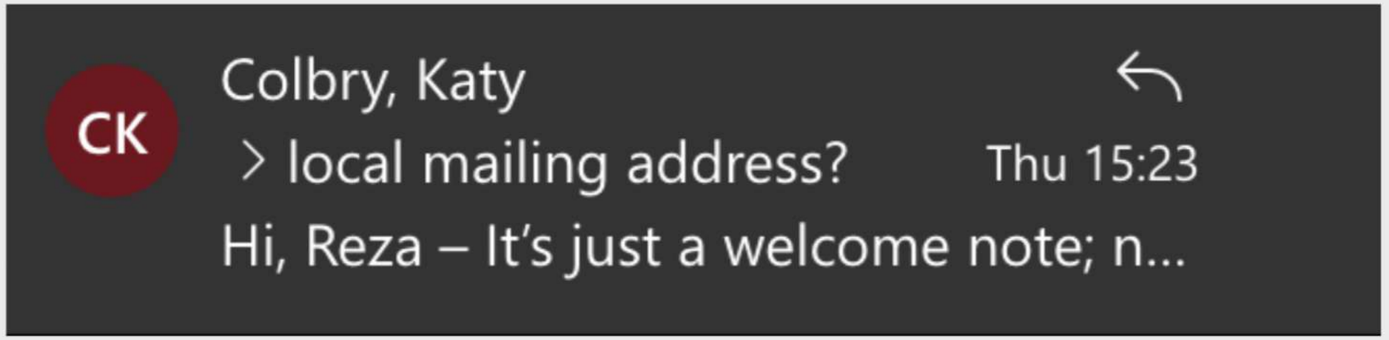
noreply@mail.d2l.msu.edu
Activity summary for FS22-C... 2:44
Activity summary for FS22-CSE-842-...

MV
Mattison, Vincent
[redacted] PhD Defe... Thu 9:39
The Department of Computer Scienc...

CK
Colbry, Katy
Monday Motivation #127 Mon 11/28
Happy Monday! We had a "small" T...

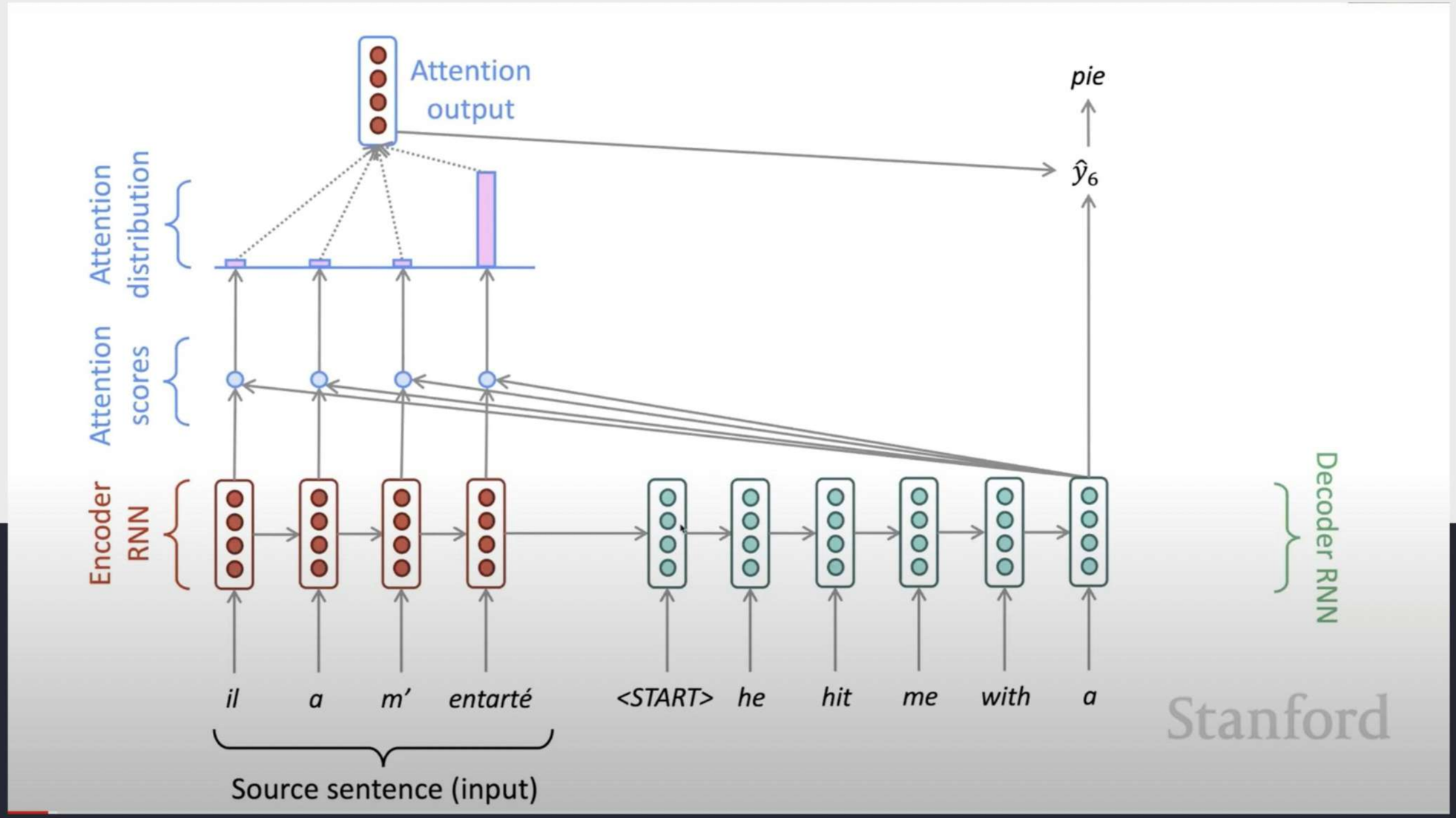
Oh... I have a new email... let me see...



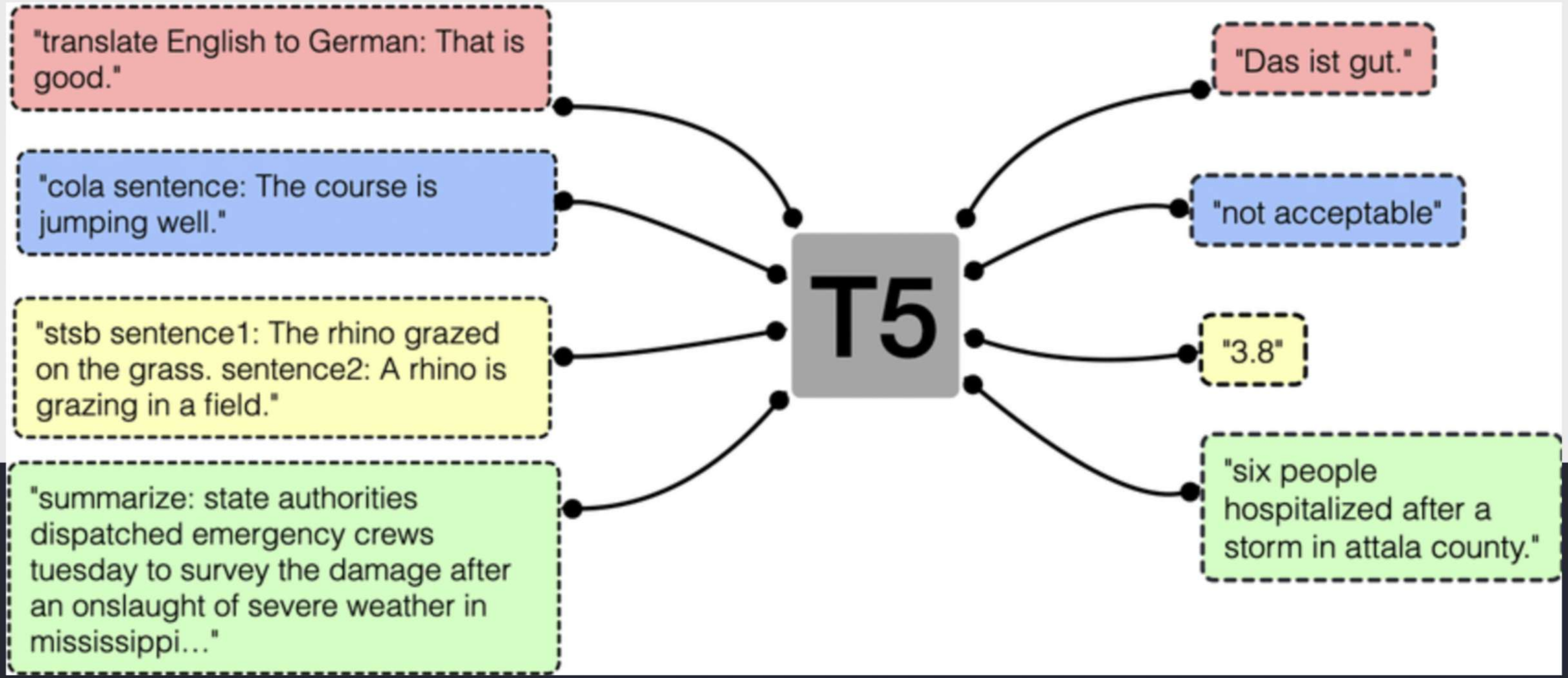
Textual Bias can be deadly.

The Solution

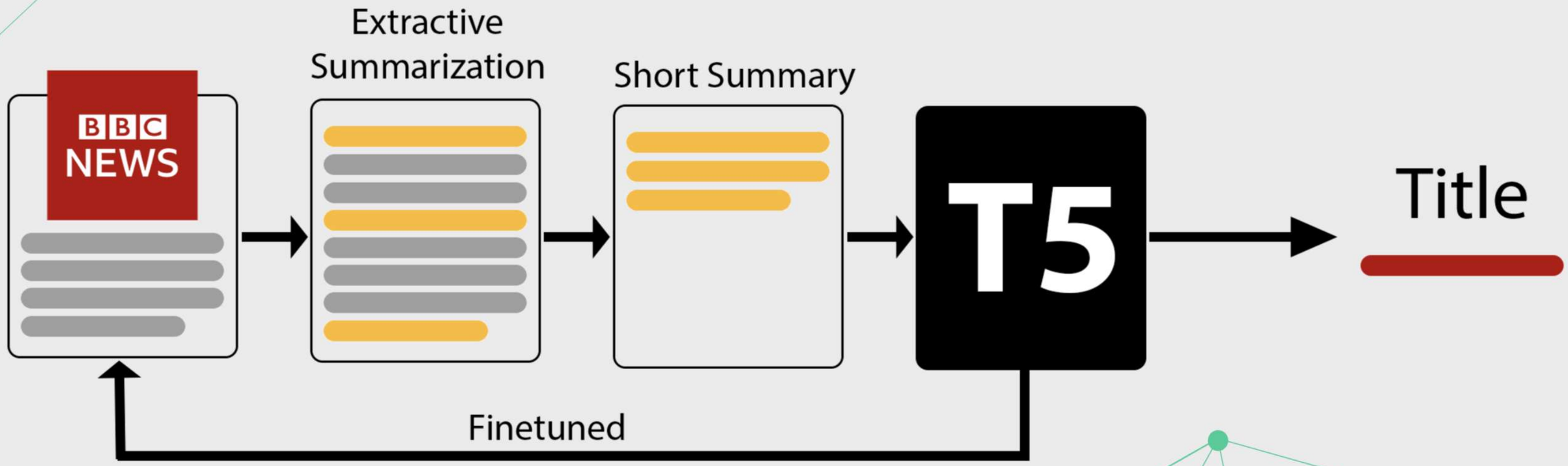
Baseline: Sequence-to-sequence + Attention



T5



Our Method



The Outcome

Table 1: A comparison between different title generation models.

Text Portion	ROUGE-1			ROUGE-2			ROUGE-L		
	r	p	f	r	p	f	r	p	f
Sequence-to-sequence	0.032	0.1776	0.0546	0.0	0.0	0.0	0.0323	0.1776	0.0546
Sequence-to-sequence + Attention	0.19	0.24	0.21	0.10	0.10	0.10	0.19	0.23	0.21
T5 (finetuned)	**0.3582**	**0.3616**	**0.3560**	**0.1220**	**0.1230**	**0.1211**	**0.3405**	**0.3442**	**0.3386**
T5 (First paragraph only)	0.3337	0.3372	0.3308	0.0989	0.1009	0.0984	0.3166	0.3208	0.3142
T5 + Short Summary	0.2971	0.3051	0.2965	0.0887	0.0911	0.0879	0.2844	0.2923	0.2838

Table 2: Human evaluation results.

Method	Fluency	Informativeness
T5 + pretrained weights	1.5234	1.8657
T5 + finetuned weights	2.2885	2.2684
T5 + First Paragraph	2.4362	**2.3758**
T5 + Short Summary	**2.4362**	2.2348

Conclusion

1. Titles are important.
2. We can generate them using proper deep learning architectures.
3. Finetuning T5 can significantly help us.
4. The first paragraph is enough!
5. Automatic and Human evaluations have shown the effectiveness of our methods.

NATURAL LANGUAGE PROCESSING COURSE (FALL 2022) FINAL PROJECT: TITLE GENERATION USING A TWO-PHASED SUMMARIZATION TECHNIQUE

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ABSTRACT

The generation of titles is an interesting process. The generation of titles is a challenging process due to the significance of the title, especially in the news. There is no straightforward approach to generating the proper title. Still, titles are known to play the initial most crucial effect on the reader. In this project, we tackle title generation in the news domain. We explored several summarization techniques, mostly revolving around sequence-to-sequence architectures. Finally, we develop a two-phased title generation technique that first generates a short summary of the raw input news and, from that, generates the final title using a finetuned version of T5. We evaluated our approach using the ROUGE metric. Our final results demonstrate the significance of news' first paragraphs in generating proper titles. Our final technique yielded a ROUGE score of 0.3582.

Index Terms— title generation, text summarization, abstractive summarization, extractive summarization, T5

1. INTRODUCTION

Generating a title for a given text is not an easy task. From a literature perspective, the title of a text is supposed to have certain charactaristics. For instance, it has to be expressive, meaning that it is expected to convey the heart and soul of the text's content. It also should be interesting enough to grab the attention of the audience. Also, titles can intentionally/unintentionally cause bias and be written in a way that directs readers' mindset towards a specific perspective which can act as a double-edged sword. This may cause either grab the audience's attention and cause a stream of views

summarization techniques. We also experiment with transformers such as BERT [1] and T5 [2]. We perform several experiments and ablation studies to determine means of improving the efficiency of our method. We used ROUGE [3] as our primary metric of assessing generated titles.

The remaining of this paper is organized as follows: first, we describe previous studies in section 2. Then, we fully describe our approach in section 3 and performed experiments and ablation studies in section 4. Finally, we conclude the paper in the section 5.

2. RELATED WORK

Researchers have been using the task of Title Generation to provide an apt summary for a blog, a news title for a blog, commit message for a code snippet, generate a Youtube video title using description, create a generic title for clustered documents, the title for Spoken Broadcast news, generating StackOverflow Questions given the code snippet and description, etc. To put in simple words it is basically a model which produces a one-liner summary or representation for a longer document. A document can be multiple text files, code snippets, or news articles. It can be looked at as a similar task to summarization.

One of the earlies studies in title generation is [4] which was published in 1999. This paper discusses the generation of one-sentence length summarizations by statistically learning models of both content selection and realization. Given an appropriate training corpus, they try to generate summaries similar to the training ones, of any desired length. They use news-wire articles from Reuters and the Associ
from the LDC. This is basically a statistical summarization

Any Questions?

Thank you!

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