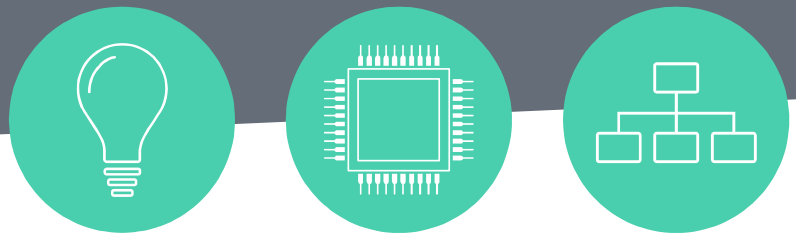
Extractive summarizer using BERT model

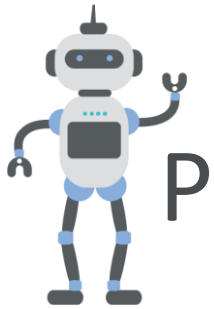
Project Capstone

Applied Artificial Intelligence

(Tech Immersion and Placement Programme)

3 April 2020





Presenters: Eugin Lee & Seng Tian

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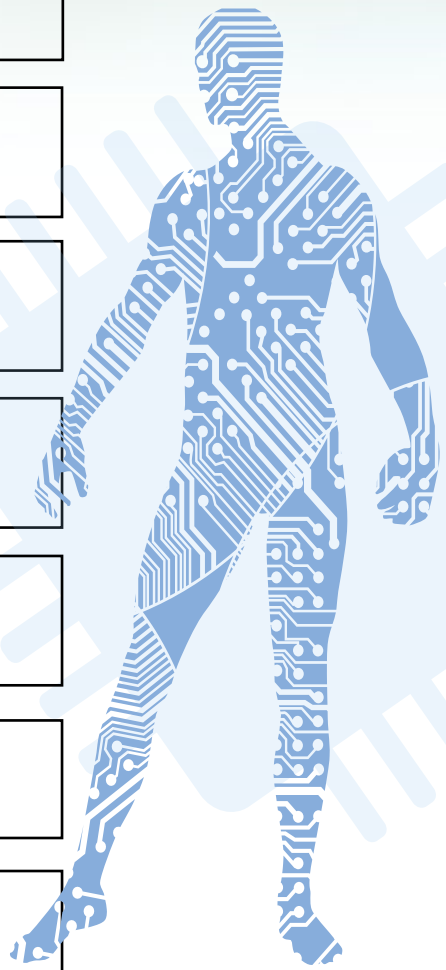
Agenda

1. Project Goal
2. Methodology and Design
3. Software Architecture
4. Insights: distill-BERT
5. Insights: ROGUE, not BLEU
6. Project Demonstration
7. Learnings & Recommendations
8. Questions and Answers



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Project Goal

To provide an annotation tool

To highlight key points in a text corpus

Use summarisation technique: **BERT**

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Methodology & Design

Input

- Present a webpage where user enters a URL as an input.
- This BERT model summarizer aims to extract key feature sentences of the main corpus.

Output

- These extracted features will then be presented as an annotated form
- Together with the main corpus as an output document

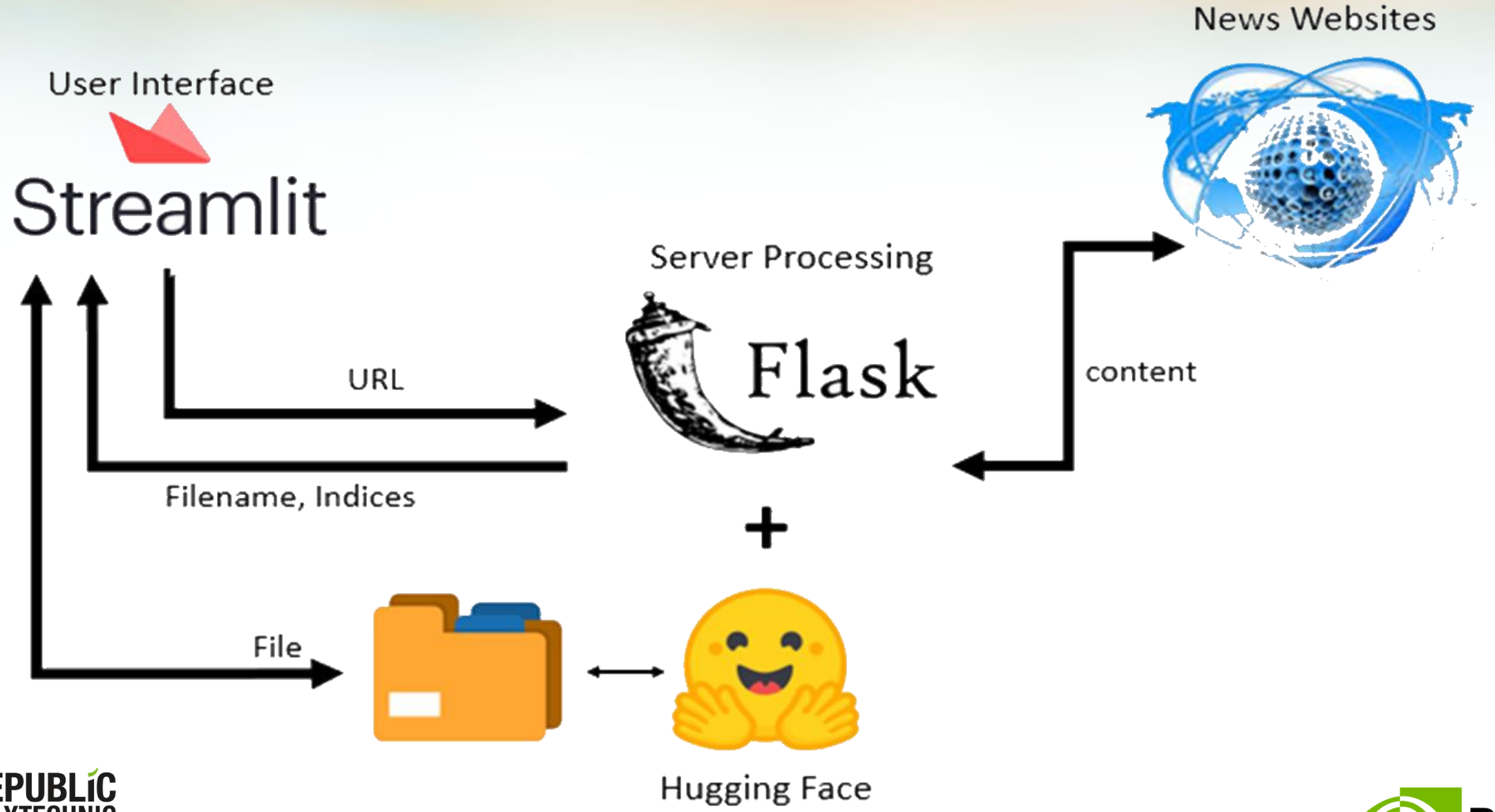
UI

- Use a client-server model, the web app provides a seamless transition between server (**Flask**), user interface (**Streamlit**) and the underlying Python code.

Evaluate

- ROUGE scoring

Software Architecture



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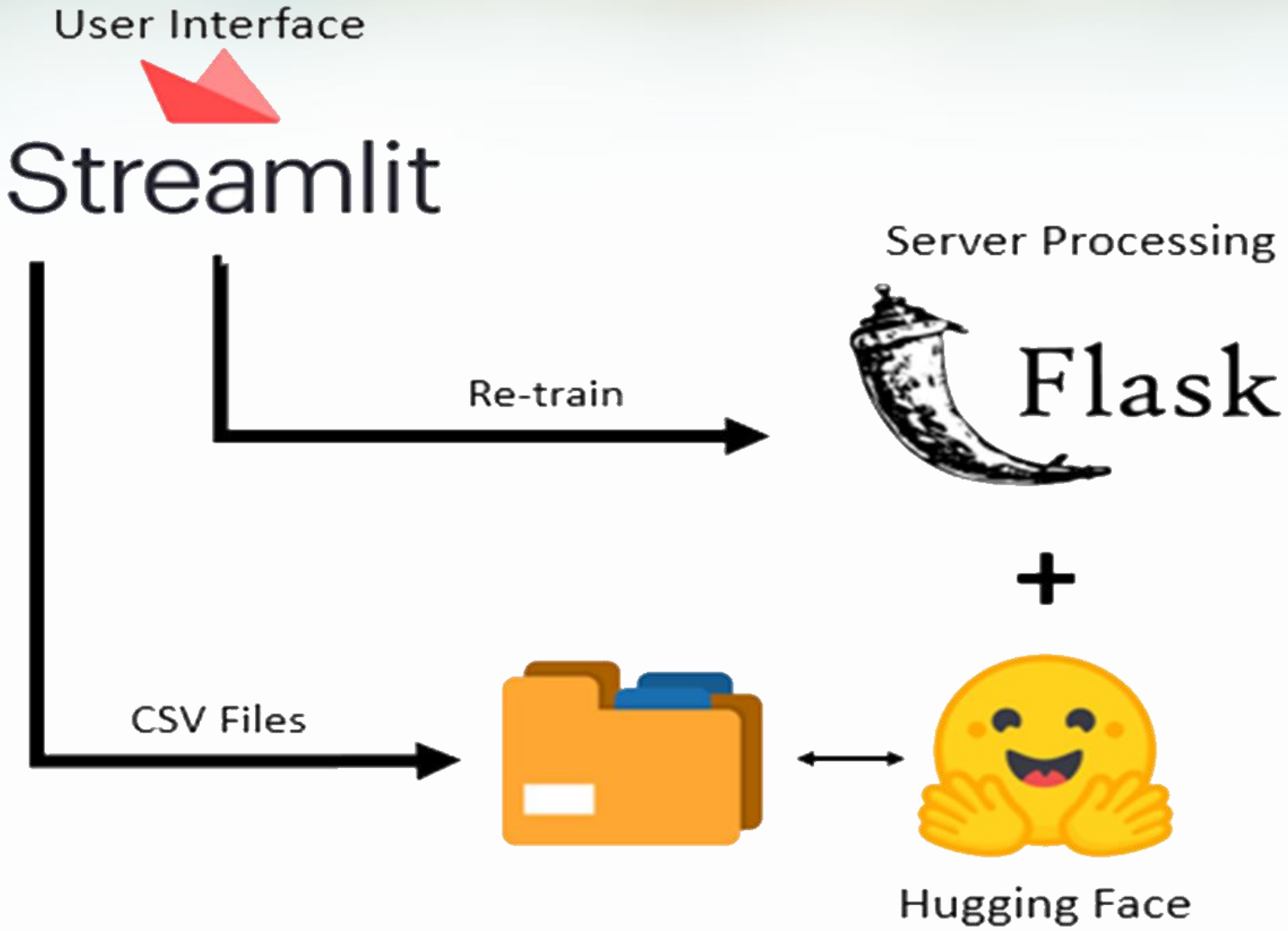
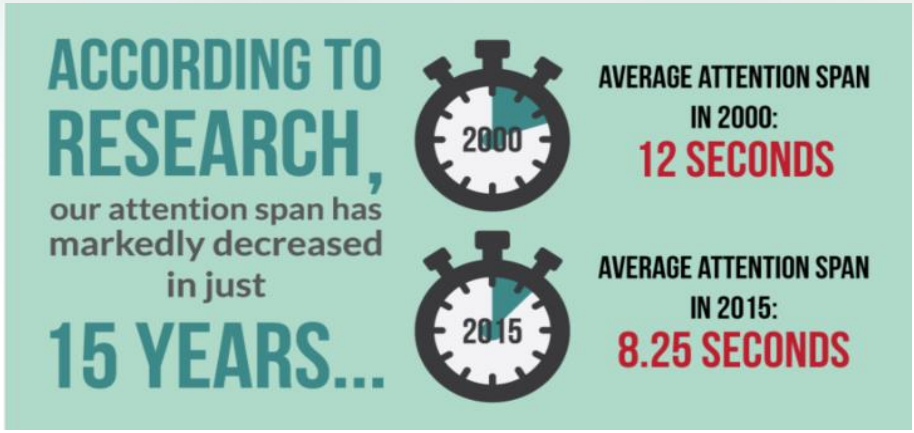
Fine Tuning Scenario



Insights: Choosing Distil-Bert



- Attention span: ranges between 8 and 12 seconds
- Original model: 17 seconds is too long

Solution:

- Use distill-BERT, faster, same performance
- Use “loading animation” to create loading illusion

```
bert-base-uncased : Completed in: 0:00:17.386839
Length of Summarised article: 1279 words
```

Original model (base BERT): 17 secs

```
xlnet-base-cased : Completed in: 0:00:19.332307
Length of Summarised article: 940 words

distilbert-base-uncased : Completed in: 0:00:10.977190
Length of Summarised article: 1189 words
```

New model (distill-BERT): 10 secs

```
albert-base-v1 : Completed in: 0:00:14.494028
Length of Summarised article: 1246 words
```

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Insights: ROGUE, not BLEU

Target Objective

- to compare BERT generated summary against user summary

ROUGE

- ROUGE provide us the recall, precision and the F-score which give us insights on whether the BERT summary is too vague or too rich.

BLEU

- BLEU only gives a BLEU score (between 0 and 1) and no insights on how to improve.

```
BERT: [0, 1]
USER: [0, 1, 2, 6]
ROUGE scoring:

Precision is :100.00%
Recall is :47.78%
F Score is :64.66%

Precision: how much BERT summary exceeds human summary, (if less than 100% means user removed sentences)
Recall: how much BERT summary explains the human summary, (if less than 100% means user added sentences)
F Score: aggregation of BERT performance,(if 100% means perfect match)
```

Set of Summarised corpus

User agrees with BERT

User selected more sentences

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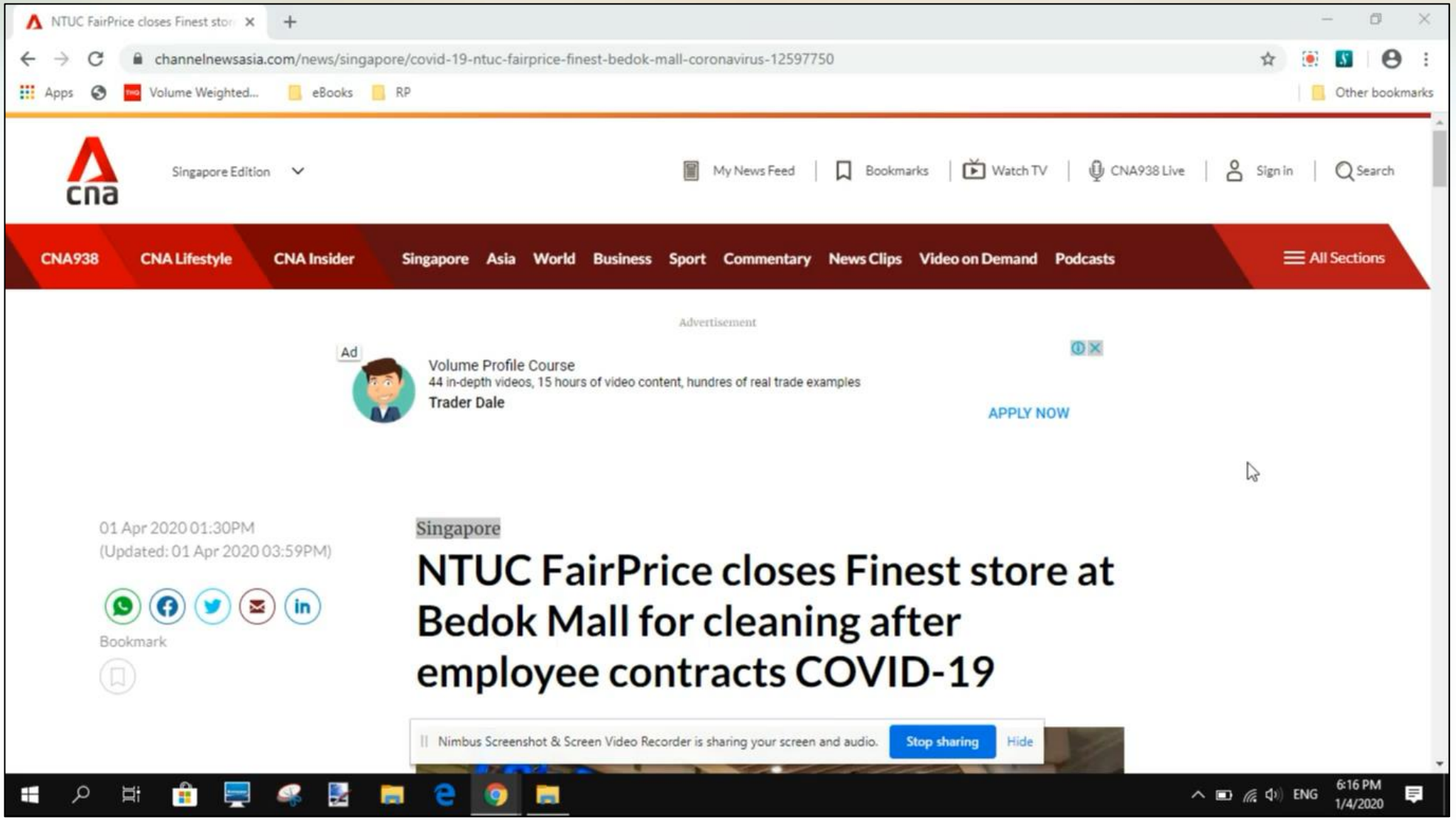
Demonstration - WebApp



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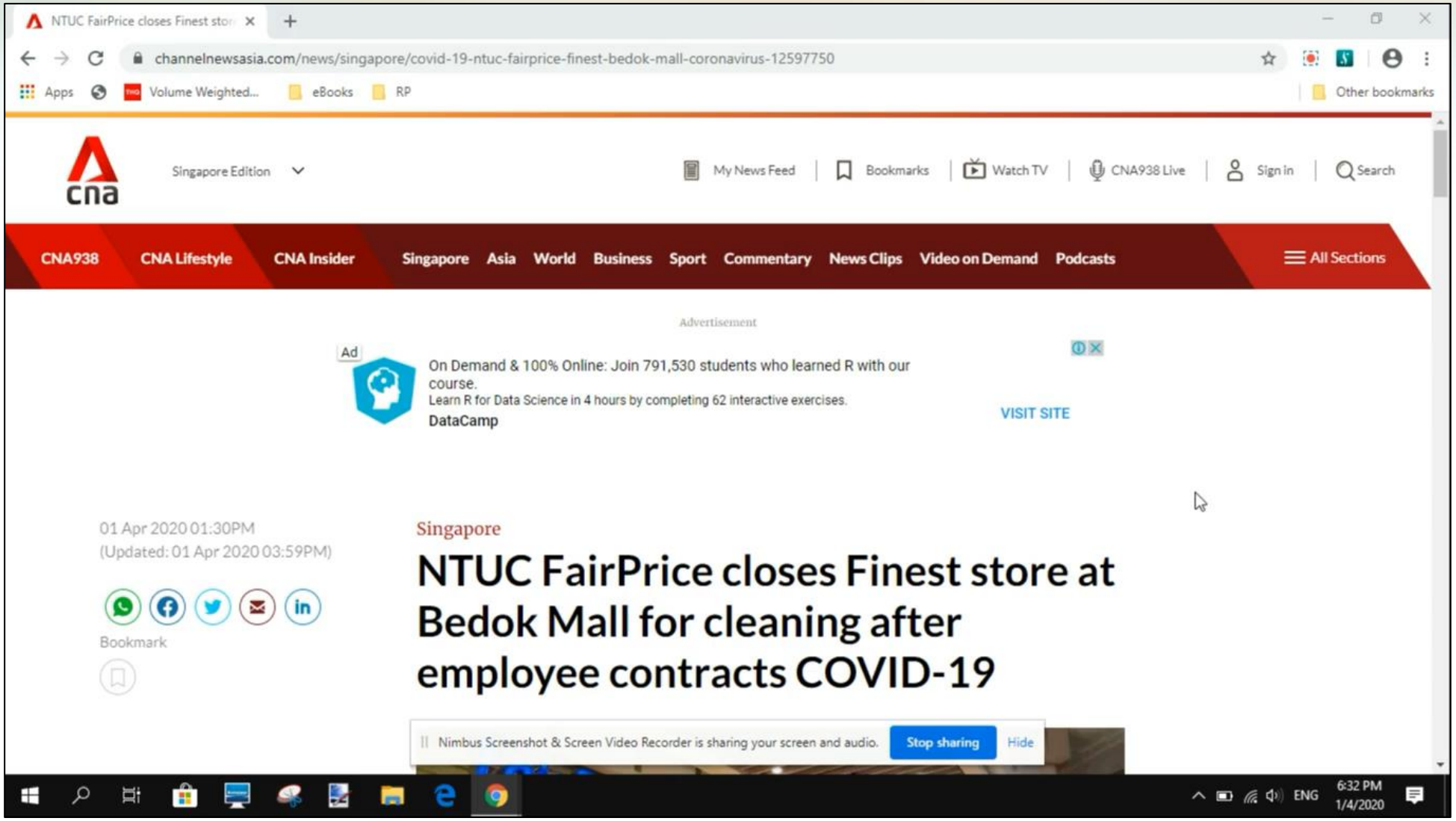
Demonstration – ROUGE Scoring



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Learnings & Recommendations

- Distill-BERT model is the optimal BERT model for a general news extractive summarizer.
- A ROUGE scoring model is the most appropriate scoring system as it provides more feedback.
- Using a modular coding style, a user could swop out and replace individual parts of the summarizer with minimum effort.
- As an improvement, the user can migrate to a full-fletch web development environment, probably using Javascript, HTML5, Bootstrap, jQuery, for example.

Acknowledgement

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Thank you guys! ☺

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Q & A

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