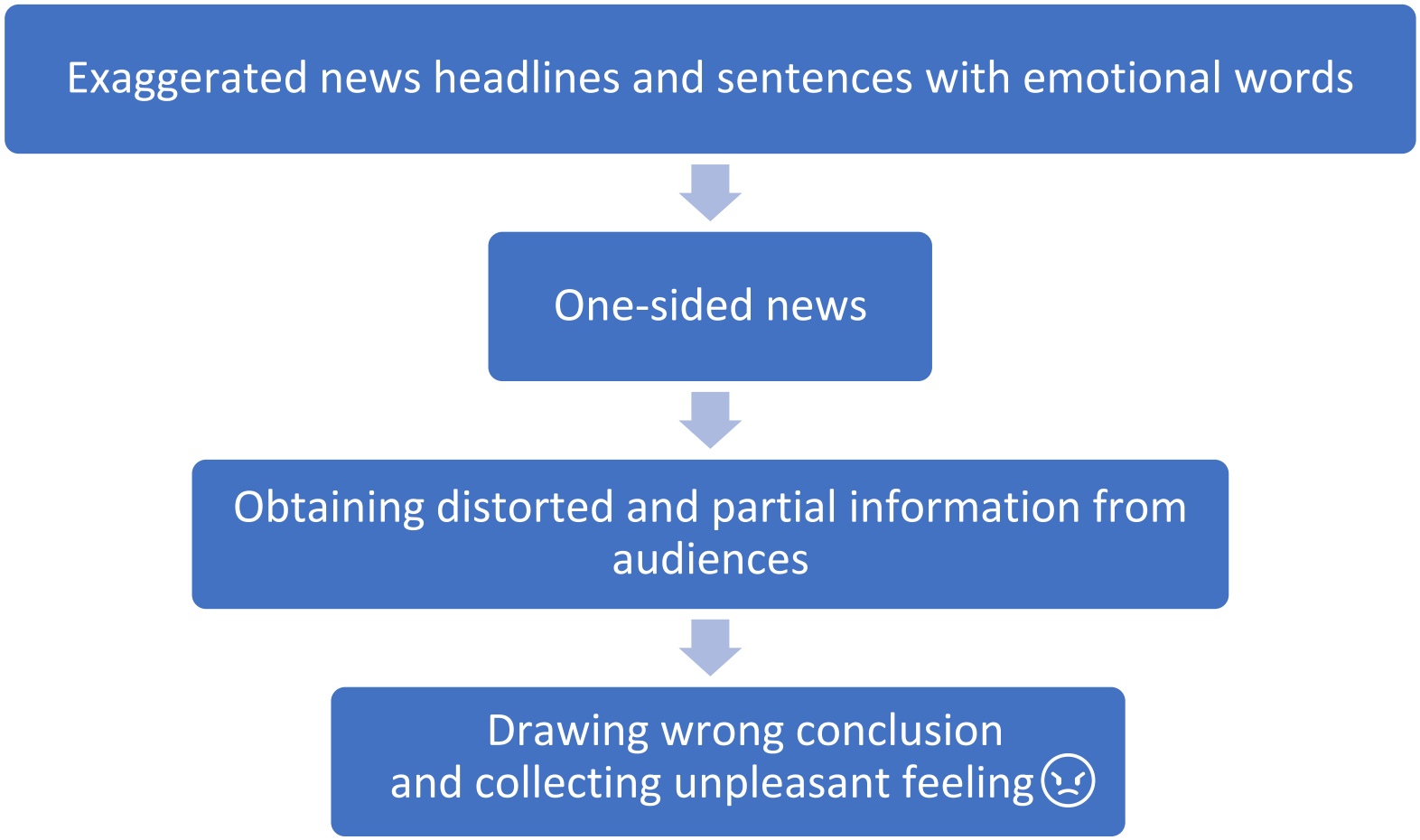
Preventing One-sided News on Social Platforms Using Deep Learning and Transfer Learning Methods

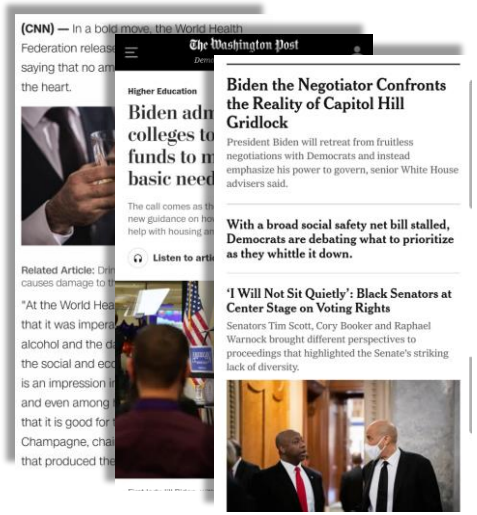
Computer and Information Engineering

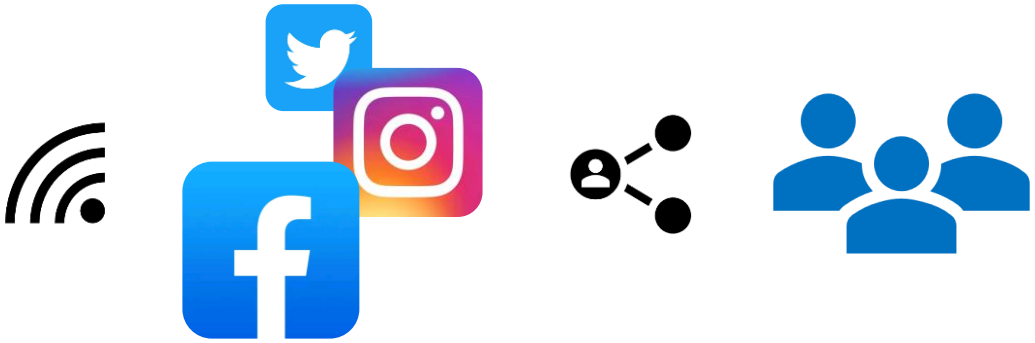
What News Reading May Go Wrong



Focused Problem

- Short sentences are the most immediate and intuitive information obtained by readers in social platforms
- AI assists users to instantly identify the quality between short sentences on social media post and news content
- Improving the public's media literacy ability and prevent the dissemination of one-sided information.





Methodology

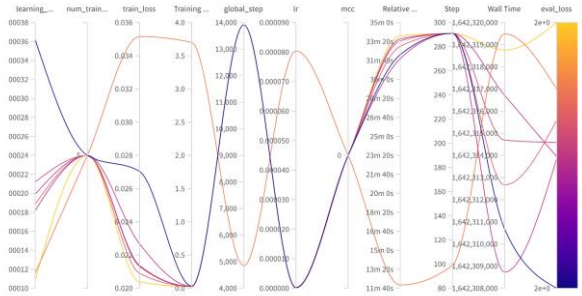
- **Data Collection (Train and evaluate)**
  - Using Stance Detection dataset for FNC-1, provided by the Fake News Challenge (FNC)
  - The data set contains 2578 news.
  - The goal is to detect news positions and predict the correlation between news headlines and contents.

Category	Label (stance)	Details
Unrelated	Unrelated	The body text discusses a different topic than the headline.
Related	Discusses	The body text discuss the same topic as the headline, but does not take a position.
	Agrees	The body text agrees with the headline.
	Disagrees	The body text disagrees with the headline.

Table 1: Label category and content

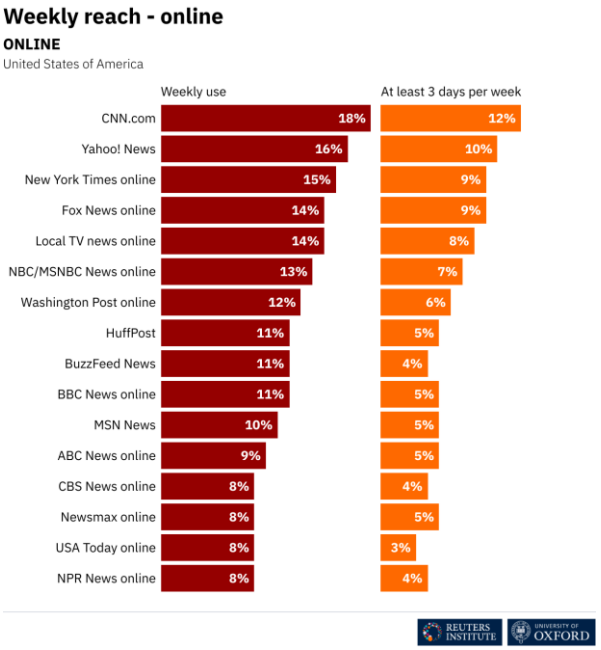
Methodology

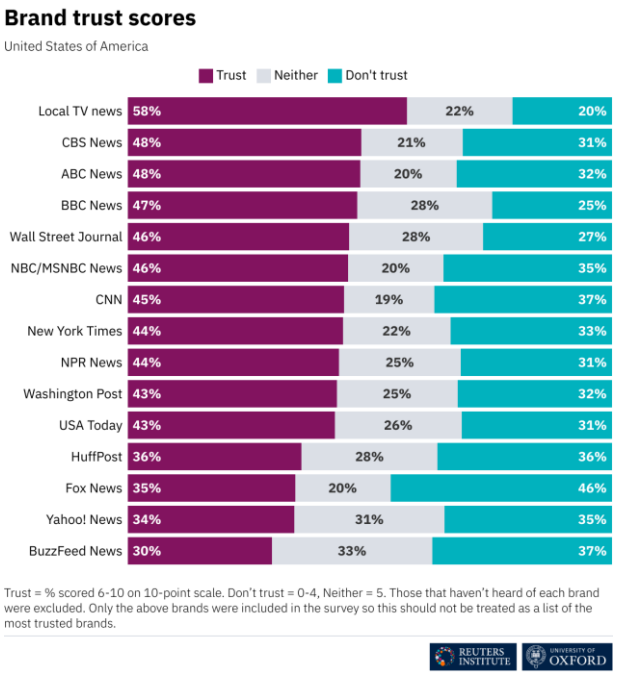
- **Natural Language Processing with Deep Learning**
  - No or very little preprocessing.
  - Large number of parameters.
  - The interpretability of the model is poor.
- **Simple Transformers**
  - This library which is based on the Transformers library by HuggingFace.
  - It can quickly train and evaluate Transformer models.
  - This can improve the efficiency of our work.
  - Transfer learning using BERT, XLNet and RoBERTa.
- **Weights & Biases / scikit learn**
  - Obtaining f1 macro, accuracy, mcc and confusion matrix.
  - Evaluating and tune the model parameters using wandb.



Methodology

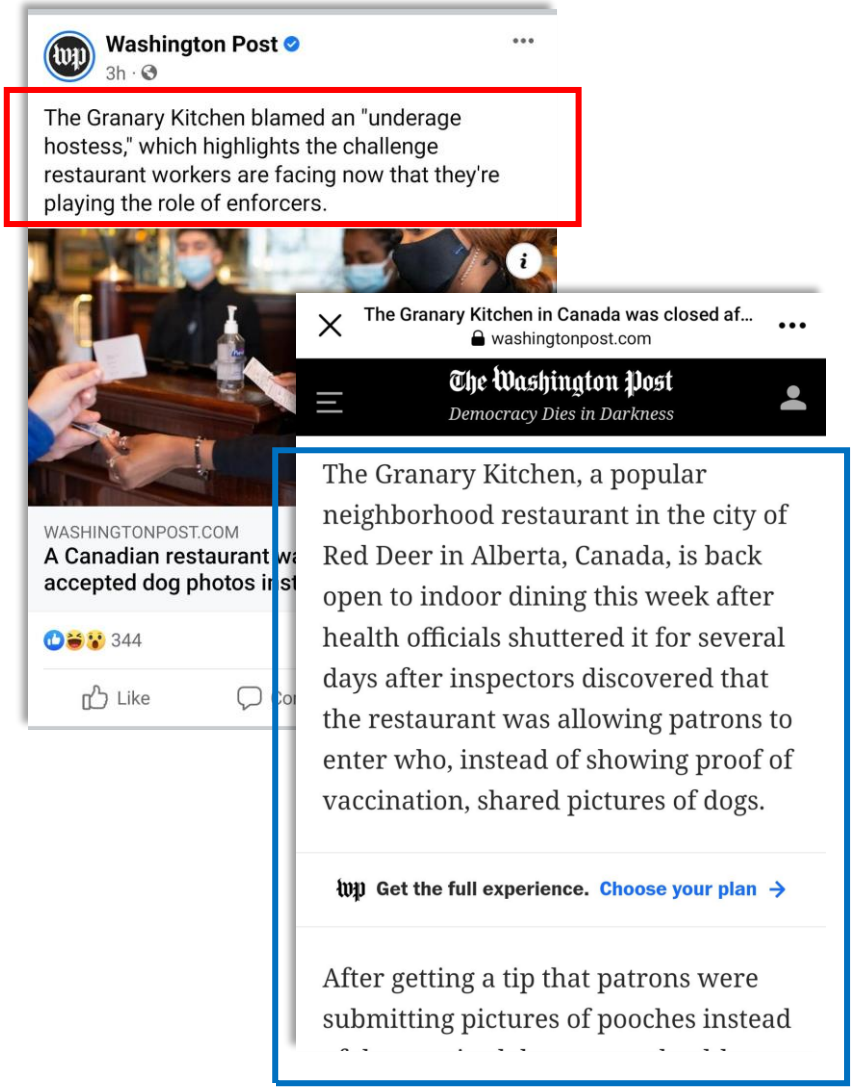
- **Applications and Predicts**
  - We apply the model with the best experiment performance to our dataset.
  - Get the text and news contents of American digital media Facebook posts through crawler.





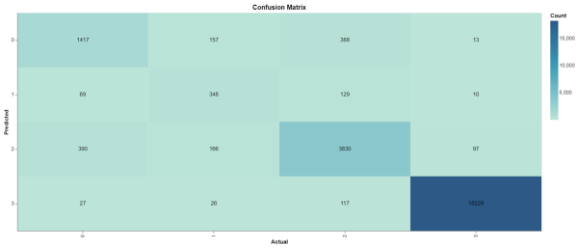
Methodology

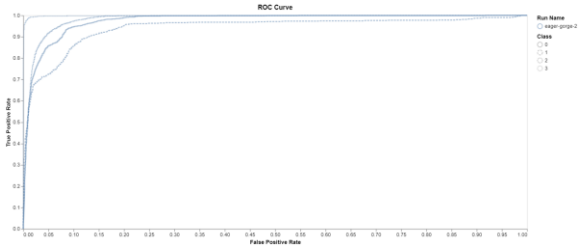
- **Applications and Predicts**
  - Using RoBERTa model to predict the US media dataset we collected from Facebook.
- Prediction function with GUI
  - Tkinter method
  - Let more users understand and experience the benefits of this Natural Language Processing model.

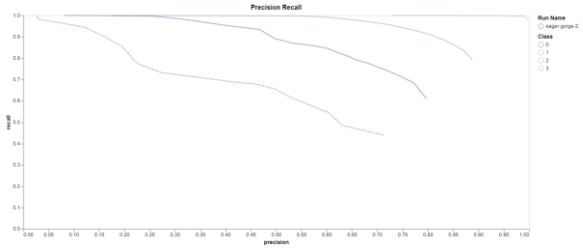


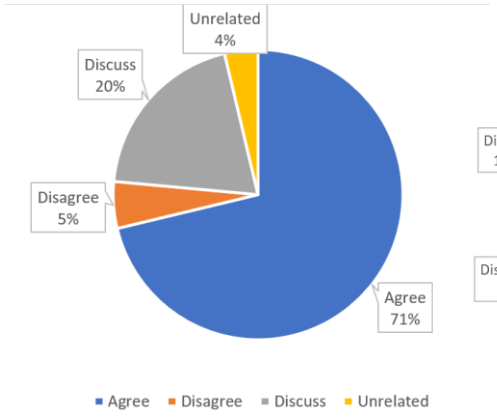
Results

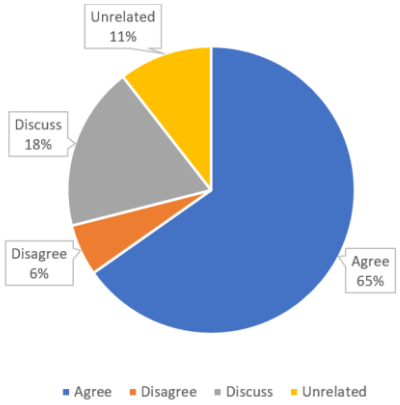
- We try to adjust model parameters such as learning rate, gradient accumulation steps to avoid “CUDA out of memory”.
- The picture below shows us tune the model parameters according to the W&B analysis chart, and our final RoBERTa model performance evaluation.











- F1 macro: 78.536%

Interpretation of these results

- There is a slight influence between the data of these media's public use and trust in the United States.
- Analysis of the emoji sentiment feedback of viewers on Facebook is expected to further understand more dimensions of influence.
- Solution for hardware limitations

Conclusions

- Excessively exaggerated, misleading, unjust or untrue text information are negative impact of media.
- To make real-time quality predictions for these large amounts of real-time news, it can help users achieve the media literacy ability.
- Avoiding the dissemination of one-sided information can enable news media to actively improve news quality, supervise reporters.
- Enhancing the culture and value of news media and help promote overall social development.

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