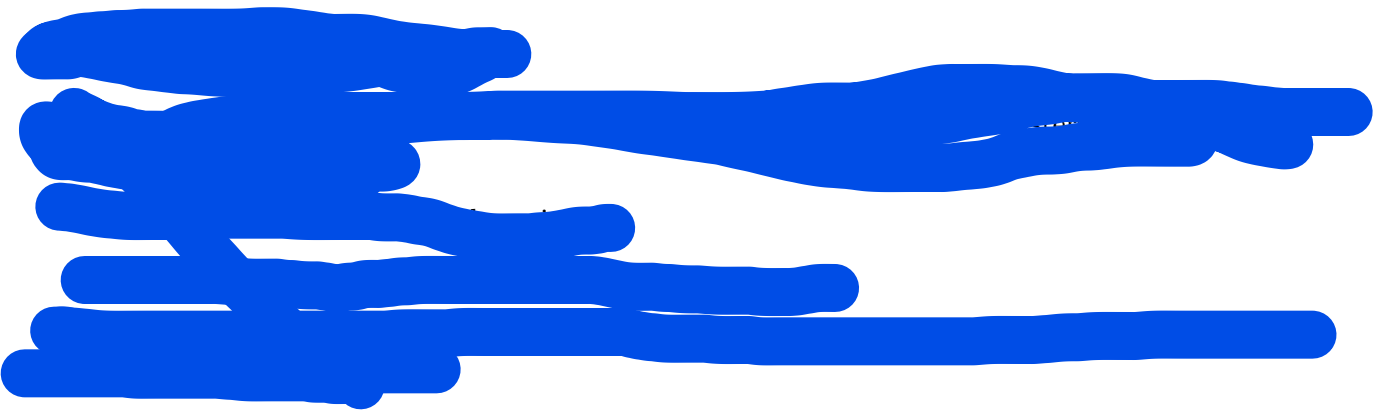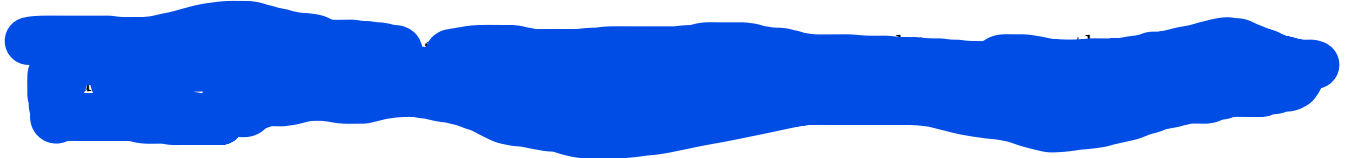# CS 579: Online Social Network Analysis
Project II

1.1 Task: Fake News Classification

Social media has become one of the major resources for people to obtain news and information. For example, it is found that social media now outperforms television as the major news source. However, because it is cheap to provide news online and much faster and easier to disseminate through social media, large volumes of fake news or misinformation are produced online for a variety of purposes, such as financial and political gain. The extensive spread of fake news/misinformation can have a serious negative impact on individuals and society: (i) breaking the authenticity balance of the news ecosystem; (ii) intentionally persuading consumers to accept biased or false beliefs; and (iii) changing the way people interpret and respond to real news and information. Therefore, it is important to detect fake news and misinformation in social media.

We formally define the task as follow. Given the title of a fake news article A and the title of a coming news article B, participants are asked to classify B into one of the three categories:

- **agreed:** B talks about the same fake news as A.

- **disagreed:** B refutes the fake news in A.

- **unrelated:** B is unrelated to A.

1.2   File Descriptions

In the attached folder, you are provided with 3 CSV files:

- **train.csv:** Training data

- **test.csv:** Test data

- **sample_submission.csv:** Expected submission format

The training data includes the "label" of each news pair, while the test data doesn't. Validation data can be split from **train.csv**. Students should use the training data to train a classifier and evaluate their model's performance with the validation data. Finally, by using the trained model, you are required to predict the results for the test data. The format of your output file should be the same as "sample_submission.csv" with your prediction replaced in "`lable`" column.
The columns in train and test data are as follows:

- **id**: the id of each news pair.

- **tid1**: the id of fake news title 1.

- **tid2**: the id of news title 2.

- **title1_en**: the fake news title 1 in English.

- **title2_en**: the news title 2 in English.

- **label**: indicates the relation between the news pair: agreed/disagreed/unrelated.

- **Explainable graph neural networks.** Machine Learning (ML) has achieved great success with the development of deep neural networks. However, conventional deep models are often treated as black-boxes and lacking in transparency of their inner mechanisms, which leave users with little understanding of the rationale of predictions and it is hard to gain users' trust. Therefore, research on interpretable ML methods is attracting increasing attention. One branch of explainable ML is to design explanation models for GNN (graph neural network). We would like to reproduce some published GNN explanation models and then design more effective GNN explanation models.

- **Fairness-aware disinformation detection.** Despite the great successes of machine learning, extensive studies have revealed that training data may include patterns of previous discrimination and societal bias. Machine learning models trained on such data can inherit the bias on sensitive attributes such as ages, genders, skin color, and regions. We would like to analyze the bias in misinformation data and then design fairness-aware detection models.

- **Evidence-enhanced disinformation detection.** External KB such as Wikipedia contains a large amount of high-quality structured subject-predicate-object triplets and unstructured entity descriptions, which could serve as evidence for detecting fake news. We need to crawl evidence data from the Web to help fake news detection.