Detect Fake News and Bias jointly by Multi Task Learning

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What is Fake News

- Fake news is a term that has been used to describe very different issues, from satirical articles to completely fabricated news and plain government propaganda in some outlets. It is a problem that is heavily affecting society and our perception of not only the media but also facts and opinions themselves.
- This project mainly tries predicting whether a given news article is a Fake news or not and the kind of bias the news publisher has using Multi-task architecture.

Multi Task Learning

- Existing studies, mainly regard fake news detection and bias classification as separate tasks.
- Enlightened by the multi-task learning scheme, we implement a joint framework that unifies the two tasks, i.e., fake news detection and bias classification. The idea is to jointly learn shared embeddings and then use them for multi-task prediction.

Problem formulation

- We have FakeNewsNet dataset that contain both the news contents and social context information.
- The fake news ground truths are collected from two platforms: BuzzFeed and PolitiFact.
- Every article also contains source which indicates the author or publisher of the news article.
- This is used to find the bias information of the author or publisher using Media Bias/Fact Check - Search and Learn the Bias of News Media website.

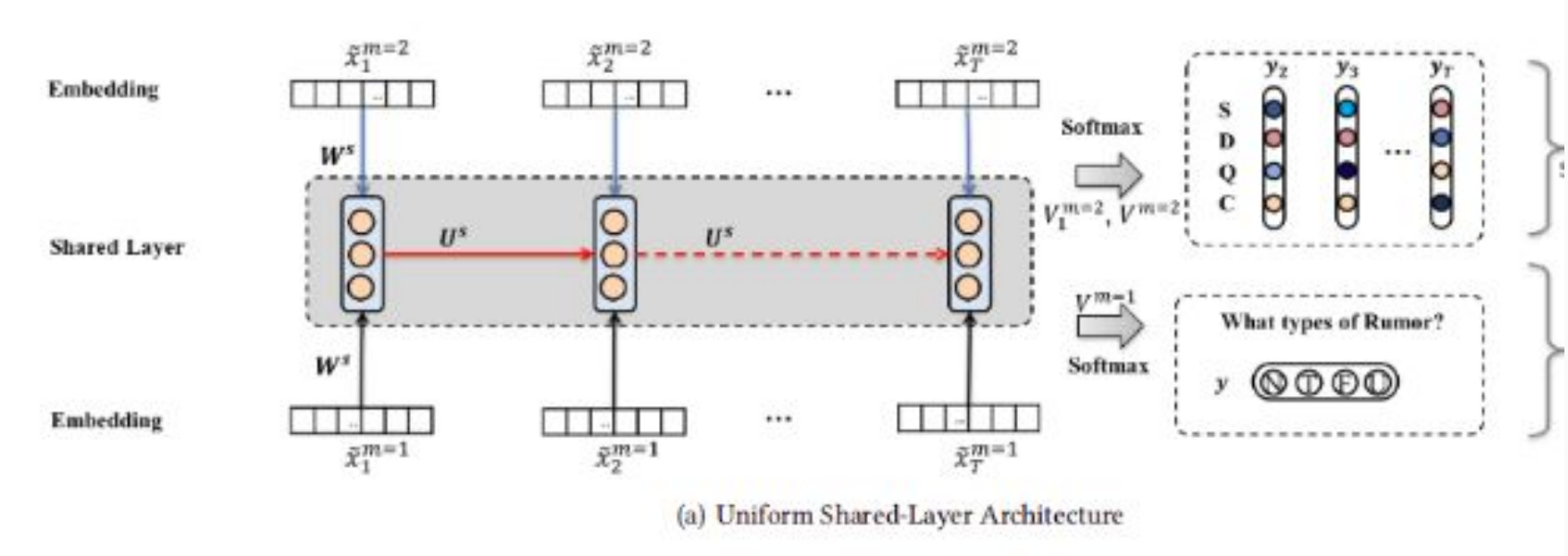
Dataset

- Real and Fake News data is collected from FakeNewsNet
- Using their source information we extracted the bias of each article using MediaBias/Fact Check.
- Some didn’t have source information and some sources aren’t reviewed and they are give No Source label.
- Our Final bias labels are Satire,Questionable Source, Right Bias, Left Bias, Conspiracy-Pseudoscience,Left-Center Bias, Least Bias, No Source.

Real/Fake Detection(Single Task)

- Trained a LSTM model to classify a news article into Real and Fake News.
- The data was initially divided into 80% training and cross validation and remaining 20% for testing.
- 5-fold cross validation was used to get appropriate parameters.
- Then it was finally tested on the test data and the accuracy reported was around 57% with a training accuracy of 60.2%.

Uniform Shared Layer Architecture



Multitask Learning

- We train both tasks jointly using weight sharing to extract the common and task- invariant features while each task can still earn its task -specific features.
- This model contains only a single shared layer.
- 5-fold cross validation was used to get appropriate parameters.
- Then it was finally tested on the test data and the accuracy reported was around 60% with a training accuracy of 72% to predict real or fake and 25% training accuracy and 33.3% testing accuracy on Bias prediction.

References

1. FakeNewsNet: https://github.com/KaiDMML/FakeNewsNet
2. Media Bias/Fact Check: https://mediabiasfactcheck.com/
3. An Overview of Multi-Task Learning in Deep Neural Network https://arxiv.org/abs/1706.05098
4. Detect Rumor and Stance Jointly by Neural Multi-task Learning : https://dl.acm.org/citation.cfm?id=3188729

Thank You