Where is your Evidence? Improving Fact-checking by Justification Modeling

Problem
Approaches for fact-checking based on the LIAR dataset (Wang, 2017) model only the claim and the associated metadata. Can we improve these approaches by modeling the justifications the journalists provide when fact-checking a claim?

Contribution
Extend the LIAR dataset by automatically extracting the justification sentences provided by humans in the fact-checking articles. www.github.com/Tariq60/LIAR-PLUS

Show that modeling the justification helps both in the binary and the six-classification tasks regardless of the machine learning approach (feature-based or deep learning).

Method
Features:
- words from statement (S condition)
- words, emotion lexicon (EmoLex), sentiment lexicon (SentiStrength), LIWC and metadata (S*M condition)
- words from justification (J condition)

Feature-based Machine Learning Models:
- Logistic Regression
- Support Vector Machine

Deep Learning Models:
- BILSTM: one BiLSTM for both the statement & justification.
- P-BILSTM: Two BiLSTM layers, one that reads the statement and the other that reads the justification.

Error Analysis

Conclusion
- Modeling the human-provided justification from the fact-checking article leads to significant improvements for all the machine learning methods in both the binary and the six-classification tasks.
- Releasing LIAR-PLUS, the extended LIAR dataset that contains the automatically extracted justification sentences.
- The current simple method for extracting the justification sentences is slightly noisy.
- Future Work: Develop methods for evidence extraction from the web and compare the results against the human-provided justification for the task of fact-checking.