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FEVER

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-way 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.

Excerpt from the LIAR-PLUS dataset

Statement: “Says Rick Scott cut education to pay for even more tax breaks for big, powerful, well-connected corporations.”

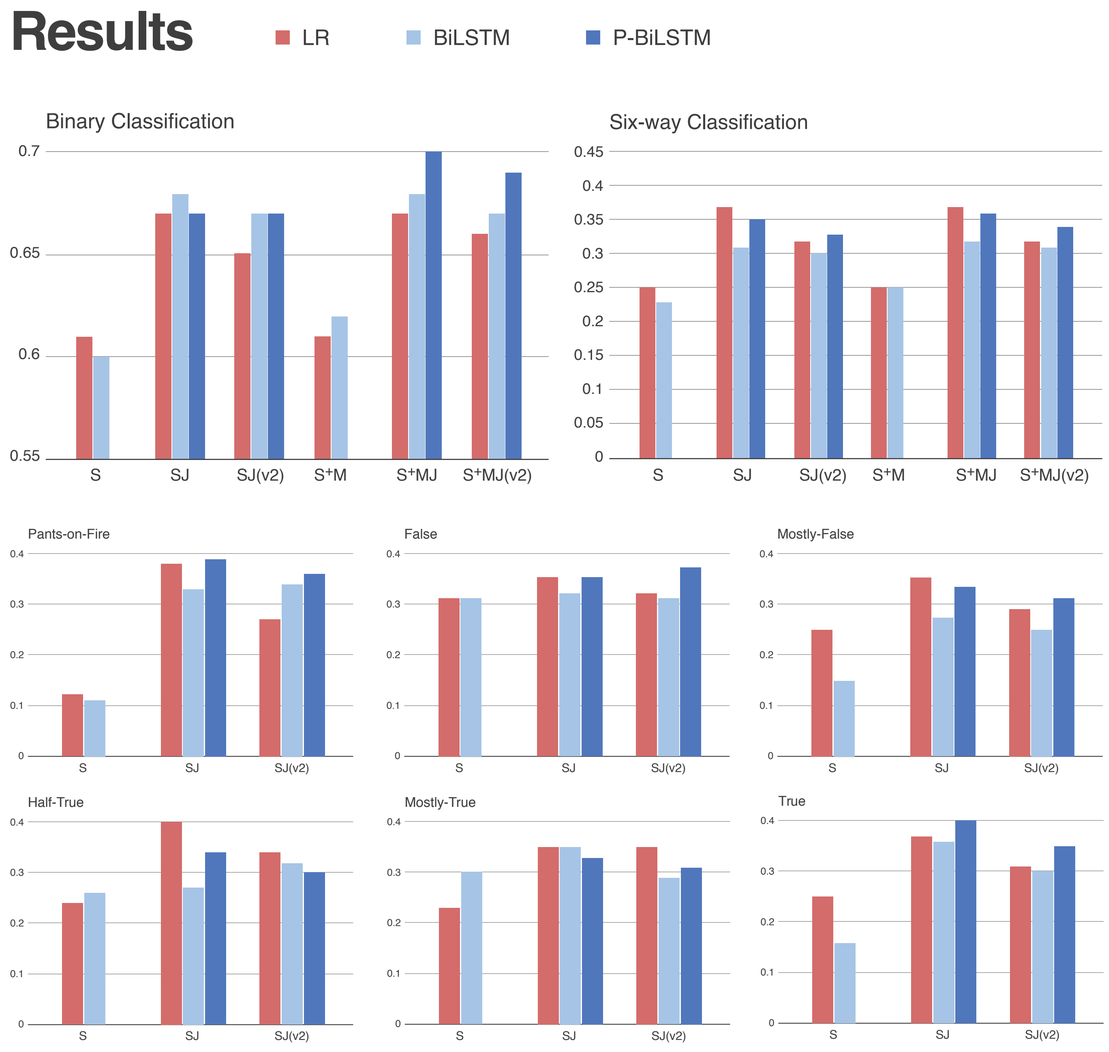
Speaker: Florida Democratic Party

Context: TY Ad

Label: half-true

Extracted Justification: A TY ad by the Florida Democratic Party says Scott “cut education to pay for even more tax breaks for big, powerful, well-connected corporations.” However, the ad exaggerates when it focuses attention on tax breaks for “big, powerful, well-connected corporations.” Some such companies benefited, but so did many other types of businesses. And the question of whether the tax cuts and the education cuts had any causal relationship is murkier than the ad lets on.

Results



Error Analysis

ID	Statement	Justification	Label	S	S+M	SJ	S+MJ
1	We have the highest tax rate anywhere in the world.	Trump, while lamenting the condition of the middle class, said the U.S. has “the highest tax rate anywhere in the world.” All sets of data we examined for individual and family taxes prove him wrong. Statutory income tax rates in the U.S. fall around the end of the upper quarter of nations. More exhaustive measures - which compute overall tax burden per person and as a percentage of GDP - show the U.S. either is in the middle of the pack or on the lighter end of taxation compared with other advanced industrialized nations.	false	✗	✓	✓	✓
2	Says Donald Trump has given more money to Democratic tcandidates than Republican candidates.	but public records show that the real estate tycoon has actually contributed around $350,000 more to Republicans at the state and federal level than Democrats. That, however, is a recent development. Fergusons statement contains an element of truth but ignores critical facts.	mostly-false	✗	✗	✓	✓
3	Obamacare provision will allow forced home inspections by government agents.	But the program they pointed to provides grants for voluntary help to at-risk families from trained staff like nurses and social workers. What bloggers describe would be an egregious abuse of the law not whats allowed by it.	pants-fire	✗	✗	✗	✓
4	In the month of January, Canada created more new jobs than we did.	In November 2010, the U.S. economy created 93,000 jobs, compared to 15,200 for Canada. And in December 2010, the U.S. created 121,000 jobs, compared to 22,000 for Canada. ”But on a per capita basis, in recent months U.S. job creation exceeded Canada’s only in October.” January happened to be a month when U.S. job creation was especially low and Canadian job creation was especially high, but it is the most recent month and it reflects the general pattern when you account for population.	true	✗	✗	✗	✗

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-way 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.

Wang, W. Y. (2017). “ Liar, Liar Pants on Fire”: A New Benchmark Dataset for Fake News Detection. In Proceedings of the 55th Annual Meeting of the Association for Computational Linguistics