Outline

Analyzing the paper entitled "Automatic Detection of Fake News"

1. **Central Message:** The focus in this paper is the automatic detection of fake content in online news. Misleading information has been augmenting in recent years; therefore, it has been more challenging to find reliable news sources. An increasing need for computational tools that can verify the trustworthy of online content has arisen in recent years, in order to contribute to this purpose, the authors introduced two novel datasets for the task of fake news detection, where seven different domains are presented. Collection, annotation, and validation processes are described in detail, and exploratory analysis are performed with the objective of identifying linguistic differences between fake and legitimate news content. Also, the authors realized a set of different learning experiments to build accurate fake news detectors.

2. **Material and Methods:**
   a. Dataset of 240 legitimate news and 240 fake news in six different domains (sports, business, entertainment, politics, and education)
   b. Dataset of 100 legitimate news and 100 fake news in the celebrity domain
   c. Extraction of several sets of linguistic features: Ngrams, punctuation, psycholinguistic features, readability, and syntax.
   d. Machine Learning classification conducted with R by using a linear SVM classifier.
   e. Five cross-fold validation.

3. **Summarize the questions and problems:** Before the authors started this study, computational approaches for the detection of fake news have relied on satirical news sources and fact-checking websites. The disadvantages of using these were many, for example, using satirical content as a source for fake content can result into including confounding factors in the analysis, such as humor and irony; whereas fact-checking websites usually are limited to a single domain (e.g. politics) and require human expertise. Hence, an automatic method for detecting fake news that is accurate in several domains and relies on linguistic features must be created. New datasets of fake news needed to be created that included different domains and model the deceptive properties of fake news. Also, authors wanted to check if larger amounts of training data could improve the identification of fake news, and whether or not an unique method that contains all the features is accurate in the seven different domains proposed. Human ability for detecting fake news in both datasets was also evaluated.

   List the key points pertaining to the question(s) and problem(s):
   a. Can larger amounts of data improve the effectiveness of the identification of fake news?
   b. Is it possible to create a method for detecting fake news across different domains?
   c. Are humans better at spotting fake news than computational approaches?

   What did authors do to answer the question(s):

   a. They plot the learning curves of the best sets of features using incremental amounts of data.
   b. Several experiments were conducted using different combinations of features sets and an SVM classifier was used along with a five-fold cross-validation.

c. An annotation interface was created that showed an annotator either a fake or legitimate new and ask it if the new was "Fake" or "Legitimate". Two annotators labeled the news in both datasets, 480 news in the first dataset and 200 in the other.

4 **Define the principal findings and results:**
   a. Except for the decrease obtained by the results of the readability features on the Celebrity dataset, the trend in all the other feature sets on both datasets showed steady improvement, therefore it suggests that larger quantities of training data could improve the classification performance.
   b. Classifiers relying on semantic information encoded in the LIWC lexicon show consistently good performance across different domains.
   c. Results showed that humans are better at detecting fake news in the Celebrity domain whereas the system developed by the authors is better at detecting fake news in other domains.

5 **Describe the conclusions and implications:**
   a. Two new datasets were introduced, one obtained by crowdsourcing and covering six different domains, and another one obtained from the web covering celebrities.
   b. Classification models that rely on a combination of lexical, syntactic and semantic information were created.
   c. Features representing text readability properties were used for the development of classification models.
   d. The best performing models achieved accuracies that are comparable to human ability to detect fake content.