Data Analytics for Fake News Detection

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The spread of fake news on the internet is presenting increasing threats to national security, with the potential to incite public unrest and violence. Given Singapore's multiracial society, fake news carries a greater destructive capability, potentially threatening racial harmony. However, detecting fake news is challenging as they are intentionally written to mislead. Current methods to detect fake news can be classified as knowledge-based, propagation-based, credibility-based and style-based. Knowledge and propagation-based approaches cannot detect fake news early, while credibility-based methods require external information like the source to assess articles. This investigation tackled these challenges by adopting a style-based machine learning approach through (i) obtaining lexicon-level features, (ii) extracting attribute-based features of sentiment and subjectivity and counting number of spelling errors and (iii) removing proper nouns to improve generalisability of the models. Two types of models were built. The first is the bag-of-words model, made more robust by stacking two levels of models. The second is neural networks that utilise pre-trained GloVe word embeddings, including: (a) one-dimensional convolutional neural networks (CNN) and (b) bidirectional long short-term memory networks (BiLSTM). All models were assessed on various metrics (accuracy, recall, precision and F1), and achieved over 90% on the test set, making this an effective location independent approach to detect fake news at an early stage without reliance on external information. Future work includes implementing the models as a browser extension that would provide a credibility rating of the articles users read.

Awards Won:
Fourth Award of $500