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Hierarchical Propagation Networks for Fake News Detection

Background

Social media has become a primary source of news and can play a large role in the spread of fake news. Fake news can disturb the authenticity balance of the news ecosystem and persuade consumers to accept false information as true. To combat its spread, research into the detection of fake news has accelerated. However, the performance of detecting fake news from only news content is generally limited as fake news pieces are written to mimic true news. To make matters more complex, social media data is also large-scale, multi-modal, mostly user-generated, and sometimes anonymous and noisy.

Currently there is a lack of understanding of (1) how fake news and true news propagate differently on micro- and macro-levels; (2) whether features extracted from hierarchical propagation networks are useful for fake news detection; and (3) how discriminative these features are. Therefore, fake news detection methods can benefit substantially from the above investigations.

Invention Description

Researchers at Arizona State University have developed a new hierarchical propagation network from macro-level (e.g. global cascade of retweets) and micro-level (e.g. local sharing) networks of fake news and true news. Through a comparison analysis of the structural, temporal, and linguistic aspects of the propagation network, features were found to be consistently different for fake and real news. Fake news detection tests demonstrate that the hierarchical propagation network outperforms competing methods on most metrics. Additionally, with sufficient information, the performance of the hierarchical propagation network is not sensitive to the choice of learning algorithm.

Potential Applications

- Fake news detection
- Social media content verification

Benefits and Advantages

- Novel – To the best of the inventors' knowledge, this innovation is the first in-depth investigation of hierarchical propagation networks for fake news detection
- Accurate – Model outperforms state-of-the-art methods to classify fake news
- Versatile – Propagation network can accommodate different learning algorithms

Related Publication (PDF)

Homepage of Professor Huan Liu