

Background Study

Paper-01

This paper aims at investigating the principles, methodologies and algorithms for detecting fake news articles, creators and subjects from online social networks and evaluating the corresponding performance. This paper addresses the challenges introduced by the unknown characteristics of fake news and diverse connections among news articles, creators and subjects. This paper introduces a novel automatic fake news credibility inference model, namely FAKEDETECTOR.

The key motivations of this survey are summarized as follows:

- Fake news on social media has been occurring for several years; however, there is no agreed upon definition of the term “fake news”. To better guide the future directions of fake news detection research, appropriate clarifications are necessary.
- Social media has proved to be a powerful source for fake news dissemination. There are some emerging patterns that can be utilized for fake news detection in social media. A review on existing fake news detection methods under various social media scenarios can provide a basic understanding on the state-of-the-art fake news detection methods.

METHODOLOGY

The first step was to locate a credible clickbaits database, then compute the attributes and produce the data files for WEKA. That was not easy, therefore, we crawled the web to collect URLs for the clickbaits. We focused on social media web sites that are likely to have more fake news or clickbaits ads or articles, such as: Facebook, Forex and Reddit. The second step, after gathering URLs in a file, a python script computed the attributes from the title and the content of the web pages. Finally, we extracted the features from the web pages. The features are: keywords in Arabic and English, titles that starts with numbers, all caps words, contains question and exclamation marks, if user left the page immediately, and content related to title.

The main contributions can be summarized as:

- (1) To the best of our knowledge, we propose the first model that explicitly captures the three common characteristics of fake news, text, response, and source, and identifies misinformation both on the article and on the user side.
- (2) The proposed model, which we call CSI, evades the cost of manual feature selection by incorporating neural networks. The features we use capture the temporal behavior and textual content in a general way that does not depend on the data context nor require distributional assumptions.

(3) Experiments on real world datasets demonstrate that CSI is more accurate in fake news classification than previous work, while requiring fewer parameters and training.

The fake news detection problem studied in this paper is a new research problem, and a formal definition and formulation of the problem is required and necessary before studying the problem. To resolve these challenges aforementioned, in this paper, we will introduce a new fake news detection framework, namely FAKEDETECTOR. In FAKEDETECTOR, the fake news detection problem is formulated as a credibility score inference problem, and FAKEDETECTOR aims at learning a prediction model to infer the credibility labels of news articles, creators and subjects simultaneously.

Summary: In this work, we study the timely problem of fake news detection. While existing work has typically addressed the problem by focusing on either the text, the response an article receives, or the users who source it, we argue that it is important to incorporate all three. It is important that we have some mechanism for detecting fake news, or at the very least, an awareness that not everything we read on social media may be true, so we always need to be thinking critically. This way we can help people make more informed decisions and they will not be fooled into thinking what others want to manipulate them into believing. For this reason, this research may be used to help other researchers discover which combination of methods should be used in order to accurately detect fake news in social media. The proposed method described in this paper is an idea for a more accurate fake news detection algorithm.

Paper-2

The paper provides a typology of several varieties of veracity assessment methods emerging from two major categories – linguistic cue approaches (with machine learning), and network analysis approaches. We see promise in an innovative hybrid approach that combines linguistic cue and machine learning, with network-based behavioral data. Although designing a fake news detector is not a straightforward problem, we propose operational guidelines for a feasible fake news detecting system

The key motivations of this survey are summarized as follows:

- Fake news detection on social media is still in the early age of development, and there are still many challenging issues that need further investigations. It is necessary to discuss potential research directions that can improve fake news detection and mitigation capabilities.

Methodology

We introduced the features we use in section 4 and 5. Table 4 summarizes them and introduces the acronyms that will be used in the rest of the document: Feature Acronym Statements Domain Score SDS

Similarity among Titles ST Similarity among Snippets SS Similarity between Titles and Snippets STS
 Sentiment Analysis using LIWC SA Text Analysis using TF-IDF TA Speakers Credit History SCH Table 4.
 Features List Before starting the experiments we pre-processed the data. To begin with, since we had to train the models with a high number of features, we performed features scaling and mean-normalization in order to rescale all data into a range between 0 and 1. Subsequently, we chose appropriate machine learning algorithms for our problem. Because of the type of data (textual and numeric), the number of samples and the number of features, we chose the following machine learning classification algorithms: Multinomial Naive-Bayes (MNB) with basics sklearn settings, Support Vector Machine (SVM) with polynomial kernel, and Neural Networks (NN) with 2 hidden layer of 25 neurons each and adam as weight optimization solver [35], [36]. We tuned each feature by experimenting with different parameters. For each new experiment, we trained all algorithms and then tested them on the validation and finally on the test (holdout) set. Based on the tests, we fine-tuned our features until obtaining optimal F1-Score values. In the following section, we introduce the most important experiments and we discuss their results.

Our major contributions of this survey are summarized as follows:

- We discuss the narrow and broad definitions of fake news that cover most existing definitions in the literature and further present the unique characteristics of fake news on social media and its implications compared with the traditional media;
- We give an overview of existing fake news detection methods with a principled way to group representative methods into different categories; and
- We discuss several open issues and provide future directions of fake news detection in social media

Techniques arising from disparate approaches may be utilized together in a hybrid system, whose features are summarized:

- Linguistic processing should be built on multiple layers from word/lexical analysis to highest discourse-level analysis for maximum performance.
- As a viable alternative to strictly content-based approaches, network behavior should be combined to incorporate the ‘trust’ dimension by identifying credible sources.
- Tools should be designed to augment human judgement, not replace it. Relations between machine output and methods should be transparent.
- Contributions in the form of publicly available gold standard datasets should be in linked data format to assist in up-to-date fact checking