

# A Survey on – Early Detection of Rumors Techniques in Social Media- Recent Approaches

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**Abstract** – Social media had new impact because it provides a perfect platform for completely share information. Social Media is used by many people; however Social Media also leads to the publication and spreading of rumors. One of the major and important recent research tasks is rumor identification on social media. Some time Rumors can spread and affect Social Media people. This rumor can affect significant harm to society and result in huge economic losses. In past few years, numerous researchers proposed different type of solutions for rumor identification and detection in Social Media but this technique are not provide better effective solution for detect Rumors in social media. In this survey, recent approaches and techniques for Early Detection of Rumors is discussed effectively.

**Keywords:** Rumor, Social Media, Early Detection, Social networks.

## I. INTRODUCTION

Rapid development of social network platforms such as Face book, Twitter identification rumor has been a challenging topic. Rumors can spread within a short time before contradict or detected. Detect rumors at an initial stage of spread is very critical to prevent these damages. However, it is difficult for normal Social Media people to classify or differentiate rumors from huge amounts of information, due to the lack of knowledge [1]. Detect rumors at an early stage is more important task. Therefore, many organizations and social media providers pay huge efforts to collect rumor reporting such attempt needs a huge human effort to gather and verify rumors more effectively. To address these issues, some research works effectively propose to detect rumors automatically using machine learning techniques. Achieve early rumor detection, propose needs to make a reliable prediction as early as possible before it's widespread. Rumor detection in social media aims to decide whether a someone post message on social media platform is a rumor or not based on its relevant information, this information such as text content, repost patterns details, profiles. Based on the types of information and methods used, research approach split the rumor detection methods into different categories. Some of three categories are Traditional classification methods, deep neural networks and Propagation methods [2].

### 1.1. Traditional classification methods:

This is important and most traditional proposed rumor detection models this models highly depend on manually designed features. These features are only considered in text content and user's information. Most of these Traditional classification methods are biased, more time taken and limited. They are usually designed for particular scenario. Some time these methods lead to unstable and unreliable results.

### 1.2. Deep neural networks:

These deep neural networks approaches introduce for to address above issues of traditional methods. This model proposed to learn multi-modal features automatically for rumor detection. But this Deep Neural Networks Related Methods not paying sufficient attention to Early Detection of Rumors. *Deep neural* Models detect rumors with the significance of the entire or fixed proportions of repost information, which is not able to detect rumors as early as possible in real time application.

### 1.3. Propagation methods:

Previous Traditional classification and deep neural networks methods which completely focus on the use of the text content information, the propagation mode focus on the differences in the uniqueness of real and false information transmission. Propagation methods link messages and social networks users into a whole network and completely evaluate their credibility's these work can considerably enhance the performance [3].

## II. LITERATURE REVIEW

In [4] authors propose to detect online rumors automatically using machine learning techniques. Most of the machine learning techniques tend to design effective features from various information sources, this include profiles of publisher's, text content information and propagation pattern. However machine learning techniques are fully based on feature engineering-based methods. This type of approach biased and time-consuming cannot make sure the flexibility when applied to social media rumor detection scenarios.

### Technique:

Feature engineering-based.

### Advantages:

- Detect online rumors automatically from massive amounts of online information.
- No needs of human effort to collect and verify rumors.
- This approach design effective features from various information.

### Disadvantages:

- Feature engineering-based methods are biased.
- Time-consuming.
- This scheme cannot ensure the flexibility.

In [5] Similarly, Zhao et al proposed Effective rumor detection model based on the decision tree algorithm. They completely tried to find signature text phrases used by a only some people to express uncertainty about realistic. They used these as features in rumor detection. However, because social media contain lot of information, extracting content-based features requires extreme time and effort. Sometimes it is difficult to extract in deep-seated underlying features in complex and dynamic social situation.

### Technique:

Decision Tree Model.

### Advantages:

- Decision Tree Model accurately classify the online rumors.
- Proposed Decision Tree method can detect rumors effectively and efficiently in their early stage.
- Decision Tree Model is valuable to identify trending rumors as early as possible.

#### **Disadvantages:**

- Drawback of this scheme is requires excessive time and effort.
- Not suitable for large social media information.
- This Decision Tree Model generally leads to overfitting of the data which ultimately some time leads to wrong predictions.

In another study in [6], presented User-Based Features Model this exploited age, number of users posted messages, followers details, and some other most relevant and important attributes of users to detect rumors. Specifically, this proposed work analyze microblog postings related to important trending topics, and effectively classify them as Rumors or not Rumors, based on features extracted from them. We use features from users' posting tweet and re-tweeting behavior, from the text of the posts, and from citations to external information sources. Finally result shows that there are detectable difference in the way messages propagate, this can be used to classify them automatically as Rumors or not Rumors.

#### **Technique:**

User-Based Features Model.

#### **Advantages:**

- This User-Based Features Model improves the performance of rumor detection.
- This approach only needs manually designed features are mainly text content and users' information. .
- No Need to analyze any external features for early rumor Detection.

#### **Disadvantages:**

- Drawback of this scheme is only evaluate the credibility of a message on specific topics.
- Not suitable for complete social media information.
- This Model generally takes more time consumption because of design various types of features to identify rumor on specific topics.

Ma et al. [7], proposed end-to-end model to rumor detection. This model learns continuous representations of micro blog events for identifying rumors. Proposed end-to-end model is fully based on Recurrent Neural Networks (RNN) for learning the hidden representations that take over the dissimilarity of contextual information of relevant posts over time. Recurrent Neural Networks (RNN) based method detects rumors quickly and more accurately than previous techniques

#### **Technique:**

Recurrent Neural Networks (RNN).

#### **Advantages:**

- Recurrent Neural Networks to learn efficient features automatically for rumor detection.
- This model can remarkably reduce the detection time.

- No Need to analyze features manually so that this provides better detection accuracy.

**Disadvantages:**

- Drawback of this scheme not able to detect rumors as early as possible in practice.
- This Model not paying enough attention to early detection.
- RNNs Difficult to process longer sequences.

In another study in [8], proposed a rumor detection method based on CNN, which flexibly extract key features spotted among an input sequence and shape high-level interactions among important features, which completely help more and more effectively recognize misinformation and achieve practical early detection. This model fully qualified for practical early detection of misinformation.

**Technique:**

Convolutional Neural Network (CNN)

**Advantages:**

- Convolutional Neural Networks effectively identify misinformation and achieve practical early detection.
- This model automatically detects the important features without any human supervision.
- Provides high rumors detection accuracy.

**Disadvantages:**

- Drawback of this scheme Lots of training features is required.
- CNN has several layers then the training process takes a lot of time.
- CNN methods which only focus on the use of the text content information.

In [9] J. Ma, W. Gao, and K.-F. Wong, proposed kernelbased method, which completely captures high-order patterns differentiating dissimilar types of rumors by evaluate the similarities between their propagation tree structures. Proposed model by considering propagation paths from source tweet to subtrees to capture the context of transmission. Compute the syntactic similarity between two sentences by counting the common sub trees. This model classification for each source post such as false rumor, true rumor. Detect rumor as early as possible. However, the rumor detection methods based on propagation model have still not yet been fully developed.

**Technique:**

Kernel Based Method.

**Advantages:**

- finer-grained classification for each source post.
- This model automatically detect rumor as early as possible.
- Kernel Based Method improves the rumor detection task.

**Disadvantages:**

- Rumor detection methods based on propagation model have not yet been fully developed.

- Need to investigate the characteristics of important propagation modes to achieve more reliable rumor early detection.

In [10] L. Wu, J. Li, X. Hu, and H. Liu, proposed Emerging Rumor Detection Framework, order to detect rumors at an early stage. This paper proposes to directly train a classifier based on readily available labeled data from prior rumors. So those identify and utilize patterns from prior labeled data to help reveal emergent rumors.

#### **Technique:**

Emerging Rumor Detection Framework.

#### **Advantages:**

- This Rumor Detection Framework detects rumors at an early stage.
- Rumor Detection Framework Much earlier can detect an emerging rumor than traditional approaches.
- Kernel Based Method improves the rumor detection task.

#### **Disadvantages:**

- Heavily depend on well-designed features.
- This approach is similar to feature-based methods.

### **III.LIMITATIONS OF THE EXISTING SYSTEM**

The existing research is to achieve rumor detection and emerging rumor separately, but this leads lot of issues such as heavily depend some features, Lots of training features is required, Difficult to process longer sequences and biased, time-consuming, some scheme is complex. In most of the existing work distinguish a rumor as early as possible based on its repost information. The main drawback existing works can only build a prediction with the entire or fixed proportions of repost sequence information. Existing methods normally study semantic representation of all repost to a rumor candidate for prediction. It is more crucial to efficiently detect rumors as early as possible. The future extension from this survey is completely providing assurances to reduce the scope of this above-mentioned problem, and successfully detect rumors at an early stage.

### **IV CONCLUSION**

With these analysis and summary, the limitations of existing Early Detection of Rumors Techniques in Social Media are studied in this survey. This survey aimed at improving the Detection of Rumors existing techniques with high detection efficiency, in future a set of effective techniques can be deployed in social networks to detect Rumors. This survey gives the complete knowledge about the Detection of Rumors and recent techniques proposed to overcome those issues. This shows the maximum number of works used to detect rumors using only repost information. This has several future directions to ensure our existing scheme can exclude other important information into early rumor detection, such as profiles information and propagation information, repost information and original blogs. This survey concludes existing none of the work not satisfied effective credible prediction.

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