Detection Of Social Interaction With Rumor Through Social Network Using "NLP" And "Random Forest Classifier"

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Outline

- Introduction.
- Rumors
- Related Work.
- Data Collection.
- Methodology.
- Results.
- Conclusion.

Overview

1. Detection Of Social Interaction With Rumors Through Social Network .
2. Collecting and analyzing user posting behaviors on Facebook and Twitter about a specific rumor. Based on users' interaction.
3. Make use of Text Processing and Artificial Intelligence.
4. Classify user comments into 5 categories(Support, Deny, Joke, Neutral, Asking).

Rumors

- Circulating story of questionable veracity, which is apparently credible but hard to verify, and produces sufficient skepticism and/or anxiety so as to motivate finding out the actual truth.

- Item of circulating information which not verified from veracity at the time of posting.

Rumors

- When posting important information, users seek to get more data about this information and increase their comments on the publication.

- We will analyze this publication after a certain period of user response.

- To study the rumors propagation on Facebook and Twitter, we need the following elements:

  1) A rumor.

  2) Posts about this rumor.

  3) Comments about this rumor.

Related Work

- Many studies have focused on identifying false rumors, but very few papers have concentrated on analyzing them. inspected various topics discussed on Facebook. analyzed the statements users made in response to an infamous rumor that spread through Sina Weibo and observed that throughout the lifetime of the rumor, different response types could become more popular depending on their functional role. Maddock et al. analyzed four rumors that spread through Twitter after the 2013 Boston Marathon Bombings.

Data Collection

- We collected the dataset from Facebook and Twitter, and analysis it to set the target.

- We collected dataset for all emotions and set the target to help us and set the target for each one. Second, this is dataset for (post, comment count, comments, and target)

- Target = (Support, Deny, Joke, Neutral, or Asking)

- Collecting and analyzing user posting behaviors on Facebook and Twitter Based on users' interaction, this data collected from Facebook and Twitter in range of 2012 to 2018, contain 2000 record, this data from public pages which contain (post, comment count, comments, and target)

Methodology

- **Approach To Analysis:**

We explored data in order to bring important aspects of that data into focus for further analysis. We used an ordinal variable which is a type from the categorical variable. An ordinal variable has a clear ordering. For Example. In our research, social interaction with rumors divides into 5 categories (Support, Deny, Joke, Neutral, and Asking).

Users Categories

User Category	Description
Support	People who believe the rumor is true and is usually very short and had no backup evidence or explanation
Deny	People who believe the rumor is false and many comments are very thoughtful and providing the in-depth explanation.
Joke	Usually made a sarcastic comment or joke to refute this rumor.
Neutral	Not dining or supporting either side in an opinion.
Asking	People want to get more information

System Architecture

- Collection dataset from different sources.
- Input will be textual rumor (posts and comments) and will apply text preprocessing on it (Tokenization, Normalization, and Noise Removal).
- Appling text mining technique and content analysis.
- Creating bag of words model.
- Feature extraction by classifying users' comments.
- Splitting the data into training set and testing set.
- Filling random forest classification to the training set.
- Predicting the test set result.
- Making the confusion matrix.
- Tell now the dataset is classified into 5 categories (Support, Deny, Joke, Neutral, and Asking). After that
- Calculate the count in each category.
- Calculate the percentage in each category relative to the number of total comments.
- Visualize the results on a graph

Text Preprocessing

- We used Text Preprocessing framework.
1. Tokenization.

   is a step which splits longer strings of text into smaller pieces or tokens. Larger chunks of text can be tokenized into sentences, sentences can be tokenized into words

2. Normalization.
   - converting all text to the same case (upper or lower).
   - removing punctuation.
3. Noise removal.
   - Remove text file headers, footers.
   - Remove URLs and username with '@' tags
   - Leave important clues such as hashtags and some special characters. Question marks and exclamation marks.

Random Forest Classifier

- Random forest algorithm is an ensemble classification algorithm. Ensemble classifier means a group of classifiers. Instead of using only one classifier to predict the target, In ensemble, we use multiple classifiers to predict the target.

- In case, of random forest, these ensemble classifiers are the randomly created decision trees. Each decision tree is a single classifier and the target prediction is based on the majority voting method.

- To build the random forest algorithm we are going to use the dataset which collected from Facebook and Twitter. We are going to build a random forest classifier to predict users categories which interact with rumors.

Example

- [1] U1: Mohammed went to school today and then fell off from his bicycle and was wounded in the leg #Yes I visited him today and he is injured–[support] u2: @u1 apparently a hoax. Best to take Tweet down. [Deny] u3: @u1 He attended the camp and was not injured. [Deny] u4: @u1He is a cheerful and lovable boy. [Joke] u5: @u4 I called him to make sure, I cannot believe this. [Neutral] u4: @u5 I need more details about Mohamed's injured. [Asking]

Example

| Category	Description
Support	"Yes, I visited him today and he is injured".
Deny	" Apparently a hoax"?" " He attended the camp and was not injured"
Joke	" He is a cheerful and lovable boy"
Neutral	"Maybe yes maybe not, I called him to make sure I can't believe this. "
Asking	" I need more details about Mohamed's injured"

Frequency Table

Rumor-discussing Users	User Count	Percentage
Support	95	22.5 %
Deny	155	36.8 %
Joke	60	14.25 %
Neutral	100	23.7 %
Asking	90	21.3 %

- All comments equal 421 comment.
- Percentage = (User_count_in_each_category / count_all_comments) * 100.

Results and Discussion

- Visualizing the result on a Gephi tool.

- Show users which (support, deny, joke, neutral, asking) in a graph.

- **Fig.1**: an example of a user interaction graph. Blue nodes: users in SUPPORT category, Red nodes: users in DENY category, Yellow nodes: users in JOKE category, Green nodes: users in NEUTRAL category, and White nodes: users in ASKING category
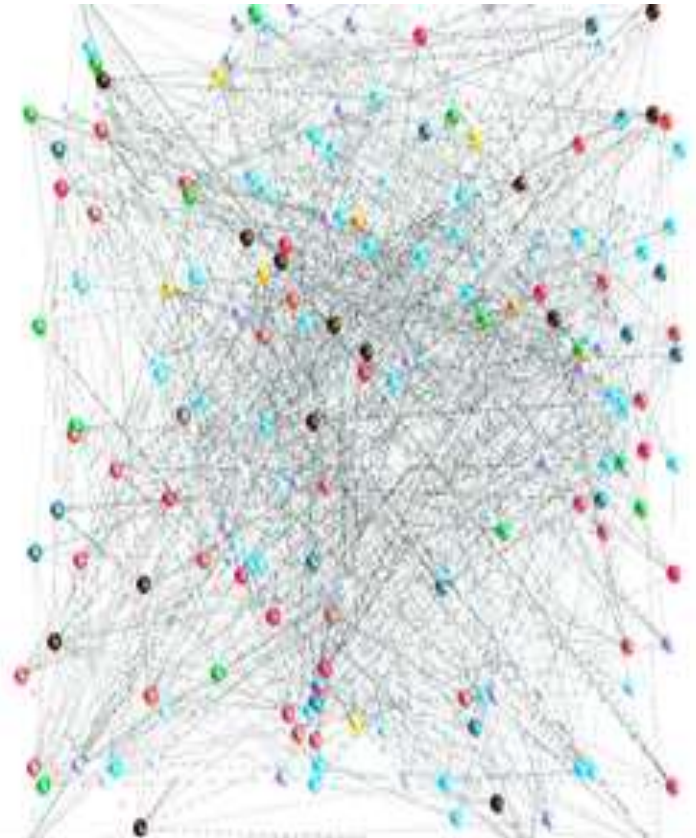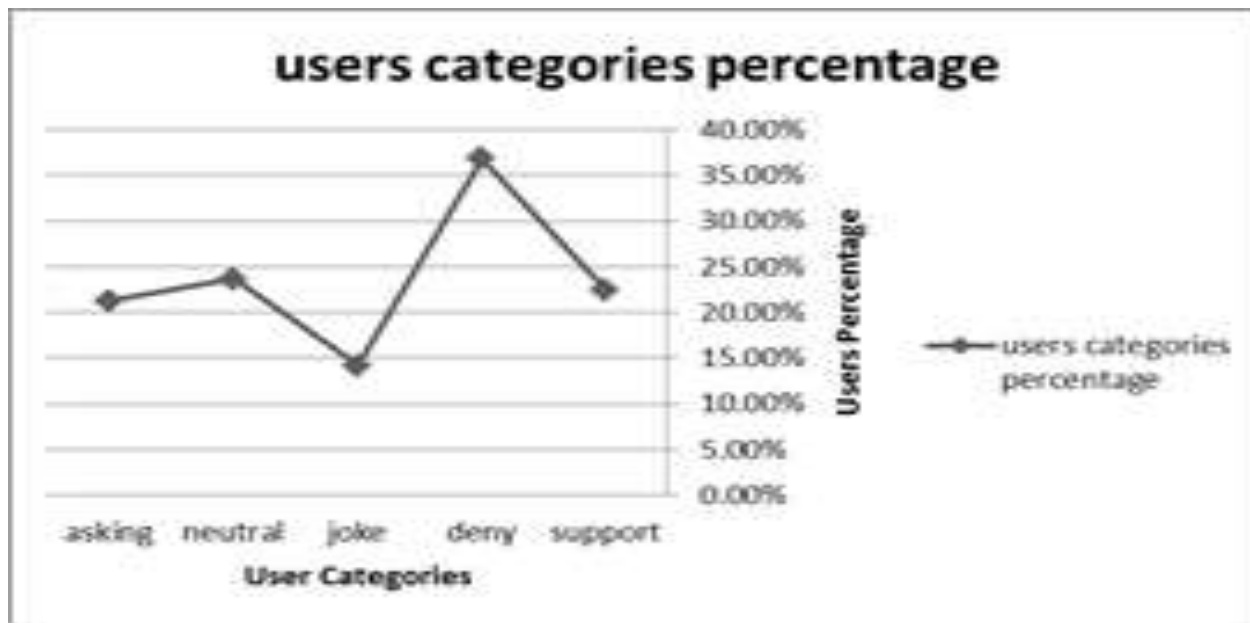
Results and Discussion
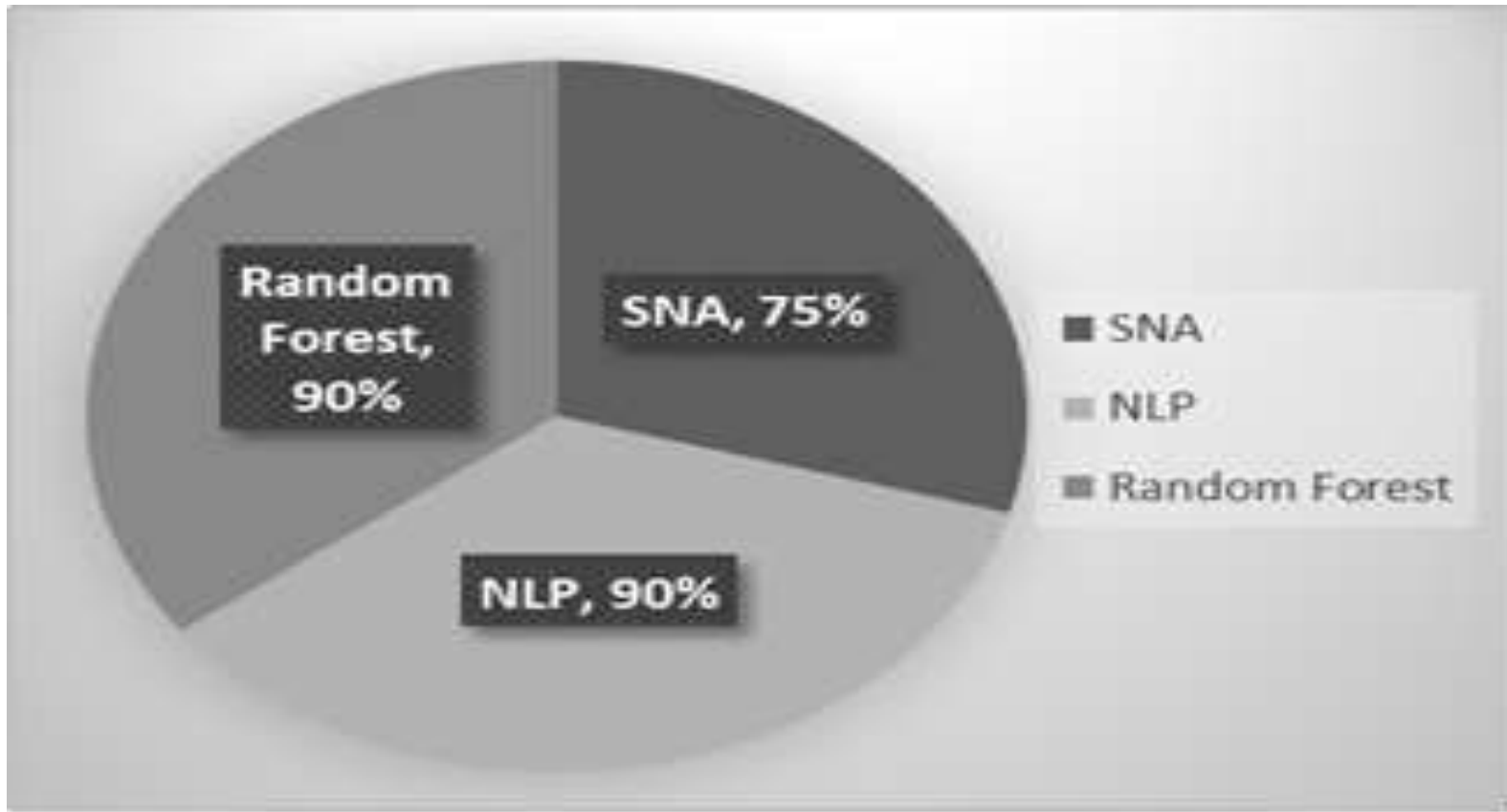
3. Calculate the count in each category.
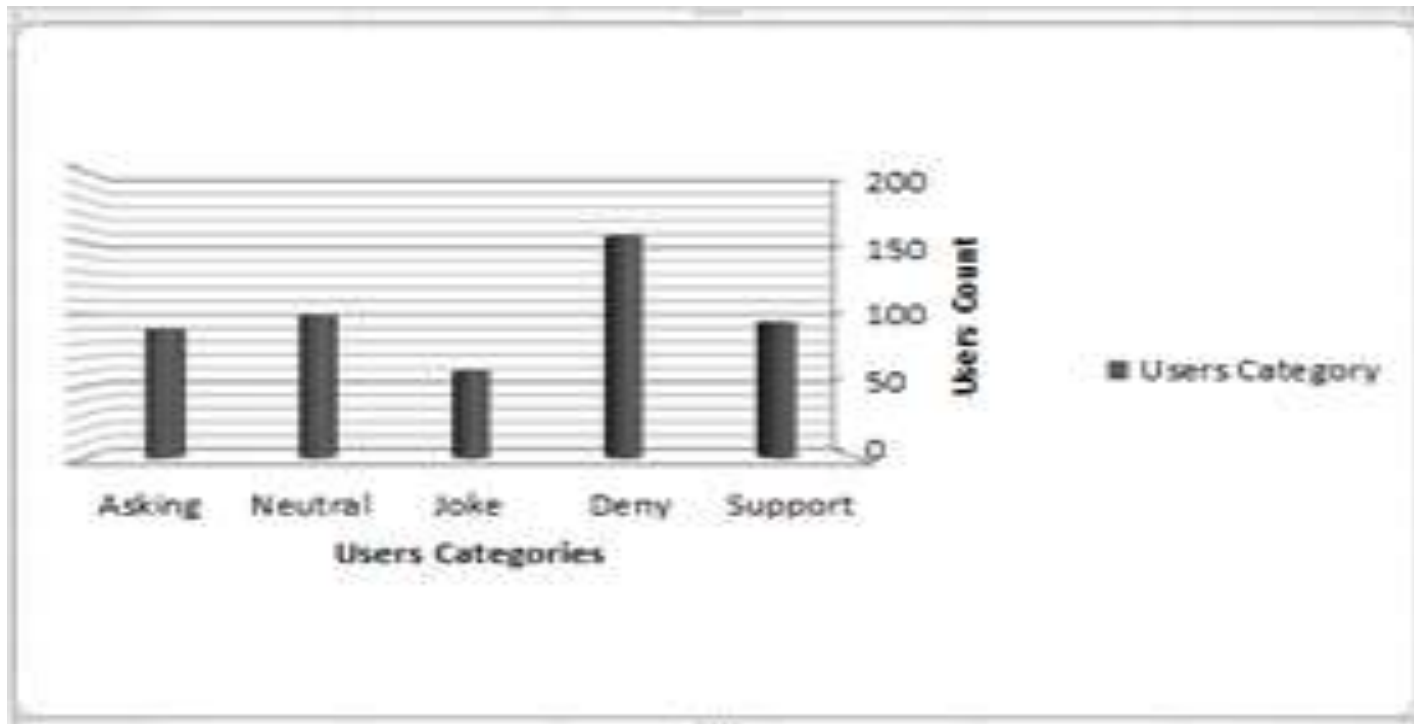
Results and Discussion

4. Calculate the percentage in each category

Results and Discussion

5. Performance

Conclusion

- In this research, we developed a framework to detect social interaction with rumors through the social network. Using a set of 2000 distinct rumors, we organized the study around capturing various semantic aspects of rumors. We proposed a methodology to characterize Belief and captured how it evolves with time. We characterized rumor usage and determined the roles various user-types play, and how they vary with respect to Beliefs. Ultimately, our characterization covers usage analysis of rumors and aids in creating systems that uncover news from the Social network by eliminating rumors automatically.

Thanks!