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Review Article

Fake News Identification Using Recurrent Neural Network Augmented with Cellular Automata

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Abstract

Fake news propagation is identified as the most alarming problem in India. The use of social media has an immense effect on the business, culture and society; it is one of the sources/spread of fake news. We propose a novel, robust framework with Recurrent Neural Network Augmented with Cellular Automata (RNN-CA), which was trained and tested with standard datasets taken from Kaggle and other prominent news websites to identify the fake messages. The proposed approach meticulously identifies the set of features needed to predict the fake news and messages with an average accuracy of 89.76%. We have used various parameters like specificity, sensitivity and average accuracy for validating our classifier. RNN-CA performance is compared with the existing literature and it was found promising.

Keywords: Fake News; Recurrent Neural Network (RNN); Cellular Automata (CA)

Introduction and Literature

Social media is a flexible interface, where people can create and share content very easily through various platforms. Lots of changes has been evident in the way in which social media has been used. Lion's share of individuals looks and expend news from online media instead of customary news associations nowadays. At one side, where web-based media have become a ground-breaking wellspring of data and uniting individuals, on the opposite side it additionally put a negative effect on society. Take a gander at certain models herewith; Facebook Inc's well known informing administration, WhatsApp turned into a political fight stage in Brazil's political decision. Bogus gossipy tidbits, controlled photographs, de-contextualized recordings, and sound jokes were utilized for crusading. These sorts of stuff circulated around the web on the advanced stage without observing their birthplace or reach. A cross country block on significant online media and informing locales including Facebook and Instagram was done in Sri Lanka after numerous psychological oppressor assaults in the year 2019. The administration guaranteed that "bogus news reports" were circling on the web. This apparent the difficulties the world's most remarkable tech organizations face in diminishing the spread of falsehood.

Lazer., *et al*. has worked on various aspects of fake news [1], like identification, propagation and origin. Zellers., *et al*. has worked on what actions are initiated against fake news [2]. Tandoc Jr., *et al*. has researched on the topology of definitions [3] of the fake news, which will give future directions for fake news prediction. Shu Kai., *et al*. [4] has worked on how fake news can be identified and decimated. Karimi., *et al*. has worked on various classes of fake news [5], which gives future intuition for identifying fake news. Many authors [6,7] has worked on various fake news identification schemes.

Design of recurrent neural network augmented with cellular automata (RNN-CA)

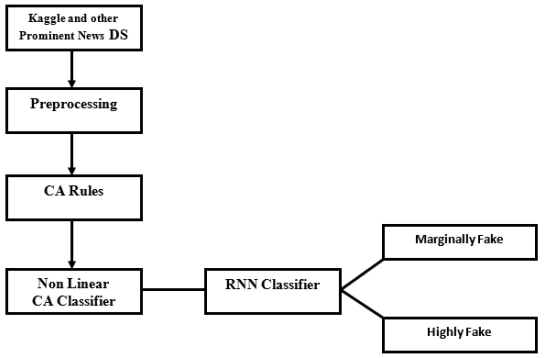

Figure 1: Design of RNN-CA.

As shown in figure 1, the input is taken from standard repositories like, kaggle and other prominent websites to process the data to find whether the message is fake or not. The input is pre-processed to identify the innate relations among the data. We use various hierarchical non linear rules for encoding the news. The encoded news is given as input to the Non Linear CA classifier, which indeed given to the Recurrent Neural Networks to identify the intensity of the fake messages as marginally fake or highly fake.

The rules of CA are represented as in equation 1. The rule of CA says, if there is a transition from one state to another, it can depend on its state, left neighbor and right neighbor.

F(T)= F(T-1)+F(T)+F(T+1): Equation-1.

For example the transitions of sample encoded input is 0.5, 0.9, 0.3, then if we apply he rule <Ti, Ti-1, Ti-1>, the transitions are:

Step 1: 0.5, 0.9, 0.3

Step 2: 0.5, 0.5, 0.9

Step 3: 0.5, 0.5, 0.5

Finally, we have arrived at the basin <0.5, 0.5, 0.5>.

Experimental results and comparisons

Figure 2 and 3 shows the results of RNN-CA. We have collected 5, 23,652 datasets from Kaggle and other prominent websites to train and test the classifier. We have compared the developed classifier (RNN-CA) with Support Vector Machine (SVM), K-Means algorithm (KM), Decision Tree (DT). RNN-CA has reported an accuracy nearing to 90% which is better compared to the existing literature.

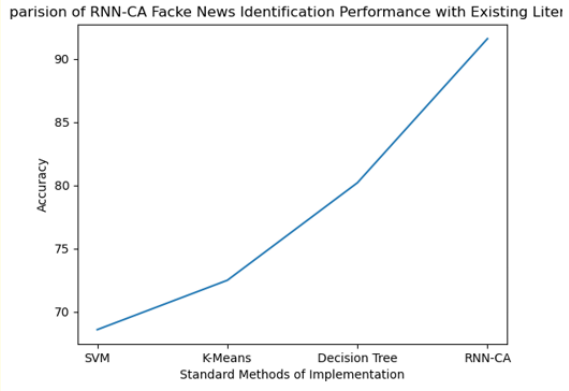

Figure 2: Comparison of RNN-CA with existing approaches.

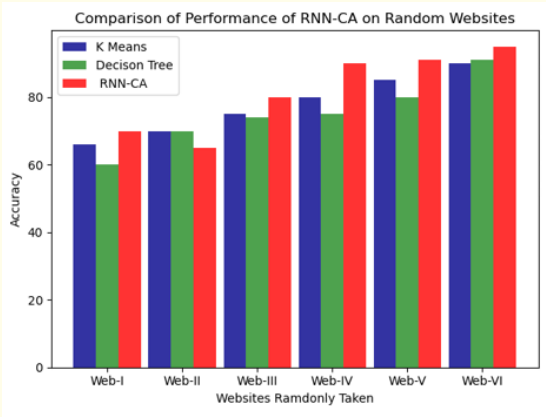

Figure 3: Performance of RNN-CA on various websites.

We have also validated our classifier with the standard messages collected from the prominent websites. We have collected 56,235 messages from the websites to check whether the message is fake or not. The fake detection rate of all the websites is reported more than 85.6 on an average.

In the model preparing, the RNN model endures disappearing inclination issue because of the profound organization order. CA-RNN tackles the evaporating angle issue. CA-RNN model has higher expectation exactness than the unique DT model.

Conclusion

We have successfully developed a classifier RNN-CA with an accuracy of 89.76%. The specificity, sensitivity reported as 0.91 and 0.92 respectively. The proposed model functions admirably for the decent and imbalanced high dimensional news informational collection. More exhaustive examinations will be required later on to additionally see how profound learning model with consideration can assist with assessing the programmed validity examination of News.

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