Fake Review Detection Using Machine Learning

[1] K.Rithika, [2]S.Karthikeyan

[1] Student: Department Of Mca, Er Perumal Manimekalai College Of Engineering(Autonomous) ,Hosur, Tamil Nadu, India

[2] Assistant Professor, Department Of Mca, Er Perumal Manimekalai College Of Engineering(Autonomous),Hosur, Tamil Nadu, India

Abstract: Fake reviews detection attracts many researchers' attention due to the negative impacts on the society. Most existing fake reviews detection appr oaches mainly focus on semantic analysis of review's contents. We propose a novel fake reviews random forest technique. The increasing popularity of online review systems motivates malevolent intent in competing sellers and service providers to manipulate consumers by fabricating product/service reviews. Immoral actors use Sybil accounts, bot farms, and purchase authentic accounts to promote products and vilify competitors. Facing the continuous advancement of review spamming techniques, the research community should step back, assess the approaches explored to date to combat fake reviews, and regroup to define new ones. This paper reviews the literature on Fake Review Detection (FRD) on online platforms. It covers both basic research and commercial solutions, and discusses the reasons behind the limited level of success that the current approaches and regulations have had in preventing damage due to deceptive reviews.

I. INTRODUCTION

Predictive analytics tools are powered by several different models and algorithms that can be applied to wide range of use cases. Determining what predictive modeling techniques are best for your company is key to getting the most out of a predictive analytics solution and leveraging data to make insightful decisions in the statistical context, Machine Learning is defined as an application of artificial intelligence where available information is used through algorithms to process or assist the processing of statistical data. While Machine Learning involves concepts of automation, it requires human guidance. Machine Learning involves a high level of generalization in order to get a system that performs well on yet unseen data instances

Machine learning is a relatively new discipline within Computer Science that provides a collection of data analysis techniques. Some of these techniques are based on well-established statistical methods (e.g. logistic regression and principal component analysis) while many others are not.

Most statistical techniques follow the paradigm of determining a particular probabilistic model that best describes observed data among a class of related models. Similarly, most machine learning techniques are designed to find models that best fit data (i.e. they solve certain optimization problems), except that these machine learning models are no longer restricted to probabilistic ones

II. SOFTWARE ANALYSIS
- Processor – Intel(r) Core ™ i3 Processor
- RAM - 8 GB
- Hard Disk - 500 GB
- Operating System : Windows 10
- Software   : python Idle

III.EXISTING SYSTEM

In the existing method, fake Reviews detection multi-task learning model has been presented which is based on the following observations:
(1) Some certain topics have higher percentages of fake reviews;
(2) Some certain news authors have higher intentions to publish fake news. FDML model investigates the impact of topic labels for the fake reviews and introduce contextual information of news at the same time to boost the detection performance on the short fake reviews. The existing methods and regulations have not yet been able to eradicate the damaging effects of fake review activity in practice. In doing so, we point at the difficulties associated with combating the different types of malignant influencers.

PROPOSED SYSTEM

In the proposed method, we proposed the Fake reviews detection technique with architecture.
A proposed fake review Random forest algorithm system would involve several steps to detect fake reviews and prevent them from being published on online marketplaces or review sites.
After that the classification, Random forest Algorithm is take places in order to perform operations.

IV. MODULES

DATA SET COLLECTION
Collect a dataset of reviews from various sources such as e-commerce websites, social media, and review websites.
PREPROCESSING
Clean and pre-process the data by removing irrelevant information such as HTML tags, punctuation, and stop words. Also, convert the text into a numerical format that can be used as input to the Random forest model.
DATA SPLITTING
Split the dataset into training, validation, and test sets to train and evaluate the Random forest model.
RANDOM FOREST MODEL CREATION
Create an Random forest model with multiple layers that can learn the patterns in the reviews and detect fake reviews.
The model should have an input layer, multiple Random forest and an output layer with a sigmoid activation function to predict whether a review is fake or genuine.
MODEL TRAINING
Train the Random forest model using the training dataset and optimize the hyper parameters to achieve the best performance.
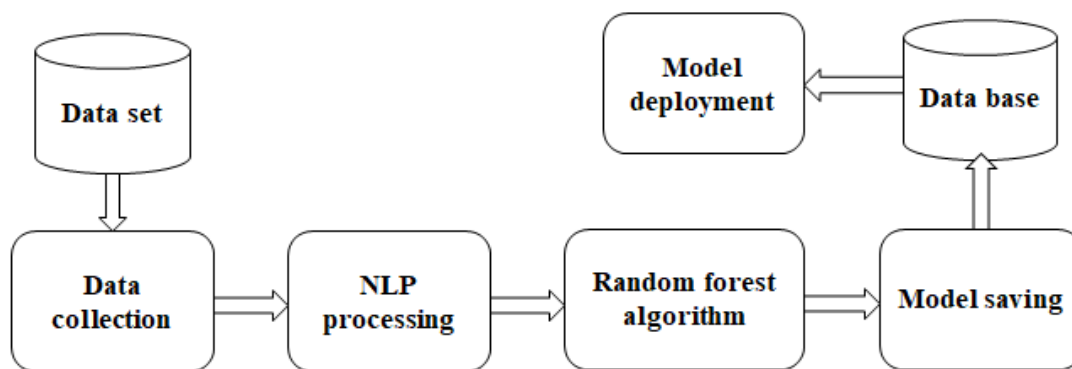**MODEL TESTING**
Test the final model on the test dataset to ensure that it can generalize well to new reviews.
DEPLOYMENT
Deploy the Random forest model in a web application or mobile app that can automatically detect fake reviews and warn users about potential scams.

ARCHITECTURE DIAGRAM

V. CONCLUSION

We focused on the task of identifying spam reviews. After analyzing the reviews in the datasets, we propose a hypothesis that fine-grained aspect information can be used as a new scheme for fake review detection and reconstructed the representation of reviews from four perspectives: users, products, reviews text, and fine-grained aspects. We proposed a multilevel interactive attention neural network model with aspect plan; to optimize the model's objective function, we transformed the implicit relationship between users, reviews and products into a regularization term. To verify the effectiveness of the MIANA, we conducted extensive experiments on three public datasets. Our experiments showed that the

classification effect has been significantly improved, that the MIANA outperforms the state-of-the-art methods for fake review detection tasks, and proved the effectiveness and feasibility of our proposed scheme.

REFERENCE

[1] R. Filieri and F. McLeay, ''E-WOM and accommodation: An analysis of the factors that influence travelers' adoption of information from online reviews,'' J. Travel Res., vol. 53, no. 1, pp. 44–57, Jan. 2014.

[2] E. Kauffmann, J. Peral, D. Gil, A. Ferrández, R. Sellers, and H. Mora, ''A framework for big data analytics in commercial social networks: A case study on sentiment analysis and fake review detection for marketing decision-making,'' Ind. Marketing Manage., vol. 90, pp. 523–537, Oct. 2020.

[3] N. Jindal and B. Liu, ''Review spam detection,'' in Proc. 16th Int. Conf. World Wide Web, 2007, pp. 1189–1190

[4] A. Mukherjee, V. Venkataraman, B. Liu, and N. S. Glance, ''what yelp fake review filter might be doing,'' in Proc. ICWSM, 2013, pp. 409–418.

[5] S. Rayana and L. Akoglu, ''Collective opinion spam detection: Bridging review networks and metadata,'' in Proc. 21st ACM SIGKDD Int. Conf. Knowl. Discovery Data Mining, Aug. 2015, pp. 985–994.

[6] F. Li, M. Huang, Y. Yang, and X. Zhu, ''Learning to identify review spam,'' in Proc. IJCAI 22nd Int. Joint Conf. Artif. Intell., vol. 3, 2011, pp. 2488–2493.

[7] X. Hu, J. Tang, H. Gao, and H. Liu, ''Social spammer detection with sentiment information,'' in Proc. IEEE Int. Conf. Data Mining, Dec. 2014, pp. 180–189.

[8] S. Kc and A. Mukherjee, ''on the temporal dynamics of opinion spamming: Case studies on yelp,'' in Proc. 25th Int. Conf. World Wide Web, Apr. 2016, pp. 369–379.

[9] Y. Ren and Y. Zhang, ''Deceptive opinion spam detection using neuralnetwork,'' in Proc. 26th Int. Conf. Comput. Linguistics, Tech. Papers COLING, Dec. 2016, pp. 140–150.

[10] X. Wang, K. Liu, and J. Zhao, ''Handling cold-start problem in review spam detection by jointly embedding texts and behaviors,'' in Proc. 55th Annu. Meeting Assoc. Comput. Linguistics (Long Papers), vol. 1, 2017, pp. 366–376. [Online]. Available: https://www.aclweb.org/anthology/P17- 1034.pdf

[11] C. Yuan, W. Zhou, Q. Ma, S. Lv, J. Han, and S. Hu, ''Learning review representations from user and product level information for spam detection,'' in Proc. IEEE Int. Conf. Data Mining (ICDM), Nov. 2019, pp. 1444–1449.

[12] Y. Lu, M. Castellanos, U. Dayal, and C. Zhai, ''Automatic construction of a context-aware sentiment lexicon: An optimization approach,'' in Proc. 20th Int. Conf. World Wide Web - WWW, 2011, pp. 347–356.

[13] G. Ji, S. He, L. Xu, K. Liu, and J. Zhao, ''Knowledge graph embedding via dynamic mapping matrix,'' in Proc. 53rd Annu. Meeting Assoc. Comput. Linguistics 7th Int. Joint Conf. Natural Lang. Process. (Long Papers), vol. 1, 2015, pp. 687–696. [Online]. Available: https://www. aclweb.org/anthology/P15-1067.pdf [14] N. Jindal and B. Liu, ''Opinion spam and analysis,'' in Proc. Int. Conf. Web Search Web Data Mining WSDM, 2008, pp. 219–230.

[15] J. Li, M. Ott, C. Cardie, and E. Hovy, ''Towards a general rule for identifying deceptive opinion spam,'' in Proc. 52nd Annu. Meeting Assoc. Comput. Linguistics (Long Papers), vol. 1, 2014, pp. 1566–1576. [Online]. Available: https://www.aclweb.org/anthology/P14-1147.pdf.

[16] X. Wang, K. Liu, S. He, and J. Zhao, ''Learning to represent review with tensor decomposition for spam detection,'' in Proc. Conf. Empirical Methods Natural Lang. Process., 2016, pp. 866–875.

[17] A. Melleng, A. Jurek-Loughrey, and P. Deepak, ''Sentiment and emotion based text representation for fake reviews detection,'' in Proc. Int. Conf. Recent Adv. Natural Lang. Process. (RANLP), Oct. 2019, pp. 750–757.

[18] M. Z. Asghar, A. Ullah, S. Ahmad, and A. Khan, ''Opinion spam detection framework using hybrid classification scheme,'' Soft Comput., vol. 24, no. 5, pp. 3475–3498, Mar. 2020.

[19] P. Hajek, A. Barushka, and M. Munk, ''Fake consumer review detection using deep neural networks integrating word embeddings and emotion mining,'' Neural Comput. Appl., vol. 32, no. 23, pp. 17259–17274, Dec. 2020.

[20] Y. Zhang, G. Lai, M. Zhang, Y. Zhang, Y. Liu, and S. Ma, ''Explicit factor models for explainable recommendation based on phrase-level sentiment analysis,'' in Proc. 37th Int. ACM SIGIR Conf. Res. Develop. Inf. Retr., Jul. 2014, pp. 83–92. [21] Y. Jo and A. H. Oh, ''Aspect and sentiment unification model for online review analysis,'' in Proc. 4th ACM Int. Conf. Web Search Data Mining - WSDM, 2011, pp. 815–824.

[22] Y. Zhang, H. Zhang, M. Zhang, Y. Liu, and S. Ma, ''Do users rate or review?: Boost phrase-level sentiment labeling with review-level sentiment classification,'' in Proc. 37th Int. ACM SIGIR Conf. Res. Develop. Inf. Retr., Jul. 2014, pp. 1027–1030.

[23] S. Poria, E. Cambria, and A. Gelbukh, ''Aspect extraction for opinion mining with a deep convolutional neural network,'' Knowl.-Based Syst., vol. 108, pp. 42–49, Sep. 2016.

[24] C. M. Yilmaz and A. O. Durahim, ''SPR2EP: A semi-supervised spam review detection framework,'' in Proc. IEEE/ACM Int. Conf. Adv. Social Netw. Anal. Mining (ASONAM), Aug. 2018, pp. 306–313.

[25] X. Wang, K. Liu, and J. Zhao, ''Detecting deceptive review spam via attention-based neural networks,'' in Proc. Nat. CCF Conf. Natural Lang. Process. Chin. Comput., 2017, pp. 866–876.

[26] D. P. Kingma and J. Ba, ''Adam: A method for stochastic optimization,'' in Proc. Int. Conf. Learn. Represent. (ICLR), 2015, pp. 1–15. [Online]. Available: https://arxiv.org/pdf/1412.6980.pdf