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T-CREO: A TWITTER CREDIBILITY ANALYSIS FRAMEWORK

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ABSTRACT: Social media and other platforms on Internet are commonly used to communicate and generate information. In many cases, this information is not validated, which makes it difficult to use and analyze. Although there exist studies focused on information validation, most of them are limited to specific scenarios. Thus, a more general and flexible architecture is needed, that can be adapted to user/developer requirements and be independent of the social media platform. We propose a framework to automatically and in real-time perform credibility analysis of posts on social media, based on three levels of credibility: Text, User, and Social. The general architecture of our framework is composed of a front-end, a light client proposed as a web plug-in for any browser; a back-end that implements the logic of the credibility model; and a third-party services module. We develop a first version of the proposed system, called T-CREo (Twitter CREdibility analysis framework) and evaluate its performance and scalability. In summary, the main contributions of this work are: the general framework design; a credibility model adaptable to various social networks, integrated into the framework; and T-CREo as a proof of concept that demonstrates the framework applicability and allows evaluating its performance for unstructured information sources; results show that T-CREo qualifies as a highly scalable real-time service. The future work includes the improvement of T-CREo implementation, to provide a robust architecture for the development of third-party applications, as well as the extension of the credibility model for considering bots detection, semantic analysis and multimedia analysis.

Index Terms— Information validation, Credibility analysis, Social media, Text credibility, Social credibility, Real-time analysis, API, credibilty, fake news, information sources, twitter,

I. INTRODUCTION Nowadays, social media generates an immense amount of information, since they are what people mostly use to share and read about a wide variety of topics. In this way, information is shared in free environments that can be used in several contexts, ranging from everyday life, global and local news, to the development of new technologies [1]–[3]. Social media and other platforms on the Internet, which allow users to communicate, share, and generate information without formal references to sources, became popular in the early 1990s, producing such a vast amount of information that fits into the Big Data category. However, in many cases, this information is not documented or validated, which makes it tough to use and analyze. Hence, the concept of credibility,as the level of belief that is perceived about (how credible it is) a person, object, or process [4], has become essential in various disciplines and from different perspectives, such as information engineering, business administration, communications management, journalism, information retrieval, human-computer interaction [5], [6]. However, existing works are limited to be applicable to analysis of credibility on specific scenarios (e.g., for a specific social platform, for a particular application). These works differ in the characteristics taken into account to calculate credibility (e.g., attributes of the posts or of users who posted them, the text of the posts, user social impact) and in the extraction techniques used to gather the information to feed the credibility models (i.e., web

scraping1 or API). Thus, a more general and flexible architecture is needed, that can be adapted to user/developer's requirements and be independent of the social media platform. To overcome these limitations, we propose a framework to automatically and in real-time perform credibility analysis of posts on social media. The framework instantiates a credibility model proposed in our previous work [4], which consists of the credibility analysis of publications on information sources, adaptable to various social networks. The credibility model is based on three aspects: Text Credibility (based on text analysis), User Credibility (based on attributes about the user's account, such as creation date, verified account), and Social Credibility (based on attributes that reflect social impact, such as followers and following). In this work, we describe the general architecture of the framework and demonstrate its applicability for unstructured information sources, taking as reference Twitter, which is one of the most used among social media networks. We develop a first version of the proposed system, called T-CREo (Twitter CREdibility analysis framework) as a proof-of-concept. As a Google Chrome Extension, T-CREo performs the credibility analysis of tweets, in real-time. According to the study presented in [7], Twitter statistics indicate that around 500 millions of tweets are published every day. Thus, credibility analysis in such as platform has become a trending topic in the last decades [8]–[11]. There exist many studies proposing Twitter credibility models [4], [8], [11], [12] and more complete studies, which also propose frameworks to perform the credibility analysis automatically and in real-time [13]–[18]. We qualitatively compare our proposal with the state-of-the-art and we show the performance evaluation of T-CREo in various scenarios, with different variables, such as number of requests and number of concurrent clients/connections. Results show that the performance of T-CREo qualifies it as a real-time and highly scalable service.

II. LITERATURE SURVEY

A) Knowledge-based Reliability Metrics for Social Media Accounts N. Guimarães, Á. Figueira, Luís Torgo Published (2020)-The growth of social media as an information medium without restrictive measures on the creation of new accounts led to the rise of malicious agents with the intend to diffuse unreliable information in the network, ultimately affecting the perception of users in important topics such as political and health issues. Although the problem is being tackled within the domain of bot detection, the impact of studies in this area is still limited due to 1) not all accounts that spread unreliable content are bots, 2) human-operated accounts are also responsible for the diffusion of unreliable information and 3) bot accounts are not always malicious (e.g. news aggregators). Also, most of these methods are based on supervised models that required annotated data and updates to maintain their performance through time. In this work, we build a framework and develop knowledge-based metrics to complement the current research in bot detection and characterize the impact and behavior of a Twitter account, independently of the way it is operated (human or bot). We proceed to analyze a sample of the accounts using the metrics proposed and evaluate the necessity of these metrics by comparing them with the scores from a bot detection system. The results show that the metrics can characterize different degrees of unreliable accounts, from unreliable bot accounts with a high number of followers to human-operated accounts that also spread unreliable content (but with less impact on the network). Furthermore, evaluating a sample of the accounts with a bot detection system shown that bots compose around 11% of the sample of unreliable accounts extracted and that the bot score is not correlated with the proposed metrics. In addition, the accounts that achieve the highest values

in our metrics present different characteristics than the ones that achieve the highest bot score. This provides evidence on the usefulness of our metrics in the evaluation of unreliable accounts in social networks.

B) A Real-Time System for Credibility on Twitter Adrian Iftene, Daniela Gîfu, Mihai-Stefan Dudu Published (2020)- Nowadays, social media credibility is a pressing issue for each of us who are living in an altered online landscape. The speed of news diffusion is striking. Given the popularity of social networks, more and more users began posting pictures, information, and news about personal life. At the same time, they started to use all this information to get informed about what their friends do or what is happening in the world, many of them arousing much suspicion. The problem we are currently experiencing is that we do not currently have an automatic method of figuring out in real-time which news or which users are credible and which are not, what is false or what is true on the Internet. The goal of this is to analyze Twitter in real-time using neural networks in order to provide us key elements about both the credibility of tweets and users who posted them. Thus, we make a real-time heatmap using information gathered from users to create overall images of the areas from which this fake news comes.

C) A qualitative and quantitative comparison between Web scraping and API methods for Twitter credibility analysis Irvin Dongo, Yudith Cardinale, +4 authors David Cabeza Published (2021)- This paper aims to perform an exhaustive revision of relevant and recent related studies, which reveals that both extraction methods are currently used to analyze credibility on Twitter. Thus, there is clear evidence of the need of having different options to extract different data for this purpose. Nevertheless, none of these studies perform a comparative evaluation of both extraction techniques. Moreover, the authors extend a previous comparison, which uses a recent developed framework that offers both alternates of data extraction and implements a previously proposed credibility model, by adding a qualitative evaluation and a Twitter-Application Programming Interface (API) performance analysis from different locations. Design/methodology/approach As one of the most popular social platforms, Twitter has been the focus of recent research aimed at analyzing the credibility of the shared information. To do so, several proposals use either Twitter API or Web scraping to extract the data to perform the analysis. Qualitative and quantitative evaluations are performed to discover the advantages and disadvantages of both extraction methods. Findings The study demonstrates the differences in terms of accuracy and efficiency of both extraction methods and gives relevance to much more problems related to this area to pursue true transparency and legitimacy of information on the Web. Originality/value Results report that some Twitter attributes cannot be retrieved by Web scraping. Both methods produce identical credibility values when a robust normalization process is applied to the text (i.e. tweet). Moreover, concerning the time performance, Web scraping is faster than Twitter API and it is more flexible in terms of obtaining data; however, Web scraping is very sensitive to website changes. Additionally, the response time of the Twitter API is proportional to the distance from the central server at San Francisco.

III. PROPOSED SYSTEM

Modules

Service Provider

In this module, the Service Provider has to login by using valid user name and password. After login successful he can do some operations such as Login, Browse Data Sets and Train & Test, View Trained and Tested Accuracy in Bar Chart, View Trained and Tested Accuracy Results, View All Antifraud Model for Internet Loan Prediction, Find Internet Loan Prediction Type Ratio, View Primary Stage Diabetic Prediction Ratio Results, Download Predicted Data Sets, View All Remote Users.

View and Authorize Users

In this module, the admin can view the list of users who all registered. In this, the admin can view the user's details such as, user name, email, address and admin authorizes the users.

Remote User

In this module, there are n numbers of users are present. User should register before doing any operations. Once user registers, their details will be stored to the database. After registration successful, he has to login by using authorized user name and password. Once Login is successful user will do some operations like REGISTER AND LOGIN, PREDICT PRIMARY STAGE DIABETIC STATUS, VIEW YOUR PROFILE.

CONCLUSION

In this work, we propose a general architecture of a framework for credibility analysis in social media based on a general credibility model. The framework is capable of calculating credibility on any social media in real-time, combining web-scraping and social media APIs to gather the parameters needed to instantiate the credibility model. A proof of concept, for a specific use case of Twitter and to show the feasibility of the proposed architecture, named T-CREo (Twitter CREdibility analysis framework), is developed and tested to evaluate its performance. Results show that our proposed framework can be implemented as a real-time service and the scalability is ensured by increasing the level of concurrency. This experience allows outlining some suggestions to improve overall performance for high-capacity servers. The modularity and simplicity of T-CREo, and the use of the credibility model, enable the creation of a real-time service; however, the connection time (latency) can be a determining factor, that might be considered in the deployment of the system.

REFERENCES

[1] D. Westerman, P. R. Spence, and B. Van Der Heide, "Social media as information source: Recency of updates and credibility of information," J. Comput.-Med. Commun., vol. 19, no. 2, pp. 171–183, Jan. 2014.

[2] Y. Kammerer, E. Kalbfell, and P. Gerjets, "Is this information source commercially biased? How contradictions between Web pages stimulate the consideration of source information," Discourse Process., vol. 53, nos. 5–6, pp. 430–456, Jul. 2016.

[3] J. Slomian, O. Bruyère, J. Y. Reginster, and P. Emonts, "The Internet as a source of information used by women after childbirth to meet their need for information: A Web-based survey," Midwifery, vol. 48, pp. 46–52, May 2017.

[4] I. Dongo, Y. Cardinale, and A. Aguilera, "Credibility analysis for available information sources on the Web: A review and a contribution," in Proc. 4th Int. Conf. Syst. Rel. Saf. (ICSRS), Nov. 2019, pp. 116–125.

[5] S. Y. Rieh and D. R. Danielson, "Credibility: A multidisciplinary framework," Annu. Rev. Inf. Sci. Technol., vol. 41, no. 1, pp. 307–364, 2007.

[6] T. J. Johnson and B. K. Kaye, "Reasons to believe: Influence of credibility on motivations for using social networks," Comput. Hum. Behav., vol. 50, pp. 544–555, Sep. 2015.

[7] Omnicore. (2020). Twitter by the Numbers: Stats, Demographics & Fun Facts. [Online]. Available: https://www.omnicoreagency.com/twitterstatistics

[8] C. Castillo, M. Mendoza, and B. Poblete, "Information credibility on Twitter," in Proc. 20th Int. Conf. World Wide Web, 2011, pp. 675–684.

[9] B. Kang, T. Höllerer, and J. O'Donovan, "Believe it or not? Analyzing information credibility in microblogs," in Proc. IEEE/ACM Int. Conf. Adv. Social Netw. Anal. Mining, Aug. 2015, pp. 611–616.

[10] S. M. Shariff, X. Zhang, and M. Sanderson, "On the credibility perception of news on Twitter: Readers, topics and features," Comput. Hum. Behav., vol. 75, pp. 785–796, Oct. 2017.

[11] M. Alrubaian, M. Al-Qurishi, A. Alamri, M. Al-Rakhami, M. M. Hassan, and G. Fortino, "Credibility in online social networks: A survey," IEEE Access, vol. 7, pp. 2828–2855, 2019.

[12] M. Viviani and G. Pasi, "Credibility in social media: Opinions, news, and health information—A survey," Wiley Interdiscipl. Rev., Data Mining Knowl. Discovery, vol. 7, no. 5, p. e1209, Sep. 2017. [

13] H. S. Al-Khalifa and R. M. Al-Eidan, "An experimental system for measuring the credibility of news content in Twitter," Int. J. Web Inf. Syst., vol. 7, no. 2, pp. 130–151, Jun. 2011.

[14] A. Gupta, P. Kumaraguru, C. Castillo, and P. Meier, "Tweetcred: Realtime credibility assessment of content on Twitter," in Proc. Internat. Conf. Social Informat., 2014, pp. 228–243.

[15] M. AlRubaian, M. Al-Qurishi, M. Al-Rakhami, M. M. Hassan, and A. Alamri, "CredFinder: A real-time tweets credibility assessing system," in Proc. IEEE/ACM Int. Conf. Adv. Social Netw. Anal. Mining (ASONAM), Aug. 2016, pp. 1406–1409.

[16] T. Stephanie, "Spot the lie: Detecting untruthful online opinion on twitter," Ph.D. dissertation, Dept. Comput., Imperial College London, London, U.K., 2017. [Online]. Available: https://www.doc.ic.ac.uk/~oc511/reportStephanie.pdf

[17] J. Yang, M. Yu, H. Qin, M. Lu, and C. Yang, "A twitter data credibility framework—Hurricane Harvey as a use case," ISPRS Int. J. Geo-Inf., vol. 8, no. 3, p. 111, Feb. 2019.

[18] A. Iftene, D. Gîfu, A.-R. Miron, and M.-S. Dudu, "A real-time system for credibility on Twitter," in Proc. The 12th Lang. Resour. Eval. Conf., 2020, pp. 6166–6173.