

Accepted Manuscript

Title: A Novel Framework for Internet of Knowledge Protection in Social Networking Services

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PII: S1877-7503(17)31072-4
DOI: <https://doi.org/10.1016/j.jocs.2017.12.010>
Reference: JOCS 815

To appear in:

Received date: 3-10-2017
Revised date: 14-12-2017
Accepted date: 27-12-2017

Please cite this article as: Shailendra Rathore, Arun Kumar Sangaiah, Jong Hyuk Park, A Novel Framework for Internet of Knowledge Protection in Social Networking Services, Journal of Computational Science <https://doi.org/10.1016/j.jocs.2017.12.010>

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A Novel Framework for Internet of Knowledge Protection in Social Networking Services

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Highlights

- Spam activities on Social Networking Services (SNSs) are studied.
- A novel feature set is introduced to the task of spammer detection on SNSs.
- We propose a new Bagging Extreme Learning Machine approach to detect SNS spammers.

Abstract: With the increasing number of users on Social Networking Service (SNS), the Internet of knowledge shared on it is also increasing. Given such enhancement of Internet of knowledge on SNS, the probability of spreading spammers on it is also increasing day by day. Several traditional machine-learning methods, such as support vector machines and naïve Bayes, have been proposed to detect spammers on SNS. Note, however, that these methods are not efficient due to some issues, such as lower generalization performance and higher training time. An Extreme Learning Machine (ELM) is an efficient classification method that can provide good generalization performance at higher training speed. Nonetheless, it suffers from overfitting and ill-posed problem that can degrade its generalization performance. In this paper, we propose a Bagging ELM-based spammer detection framework that identifies spammers in SNSs with the help of multiple ELMs that we combined using the bagging method. We constructed a labeled dataset of the two most prominent SNSs -- Twitter and Facebook -- to evaluate the performance of our framework. The evaluation results show that our framework obtained higher generalization performance rate of 99.01% for the Twitter dataset and 99.02 % for the Facebook datasets, while required a lower training time of 1.17s and 1.10s, respectively.

Keywords- Internet of knowledge; social networking services; machine learning; extreme learning machine; spammer detection; bagging method

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