

A Survey on Text Filtering in Online Social Networks

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Abstract— Online Social networks (OSNs) are one of the most popular interactive medium to communicate, share and dissipate a considerable amount of human life information. The main issue in online social networks is the users have less control over the filtering mechanism of unwanted messages that posted on their walls. This paper presents an overview of various methods used for text classification in online social networks.

Keywords— Online Social Networks, Text Classification, Text Filtering

I. INTRODUCTION

Text classification is one of the major techniques for processing text data. In the new era, the online information is growing rapidly. Text categorization can be defined as the classification of documents into a fixed number of predefined categories. We can classify the text categorization approaches into rule based and machine learning based approaches. For improving the privacy and security of online social networks we can use text classification methods in messages that are posted by the users. Users can communicate and share information in the form of text, image, audio, video data etc. through OSNs. Day by day a huge amount of information is exchanged through OSNs, so it is very important to ensure the filtering mechanisms in OSNs.

II. RELATED WORKS

A. Text Classification

Text classification task consists of learning models for a given set of classes and applying these models to new unseen documents for class assignment [1]. It is mainly a supervised classification task, where a training set consisting of documents with previously assigned classes is provided, and a testing set is used to evaluate the models [1]. Due to the increasing amount of digital textual data, the applications of text classification are also increasing. Different algorithms are used to organize the textual data into a set of categories. Some of the applications are:

- Document Organization
- Word Sense Disambiguation
- Text Filtering

Text filtering applications can be defined such that, a set of texts should be filtered out before reaching a user or application. One of the main known examples is anti-spam filtering for e-mails. Text categorization refers to the process of assign a category or some categories among

predefined ones to each document, automatically [4]. Approaches for text categorization:

- Rule based approach
- Machine learning based approach

Rule based approaches can be defined as where the classification rules are defined manually in the form of if-then-else and the documents are classified based on the rules. This approach has high precision but poor recall, because of its poor flexibility.

Machine learning based approaches can be defined as where classification rules or equations are defined automatically using sample labelled documents. Machine learning based approaches are replacing rule based approaches because of its poor flexibility and it requires more time for building classification rules.

Some of the machine learning approaches used are K Nearest Neighbour, Naïve Bayes, Support Vector machine, decision tree etc. Among these mentioned KNN is the simplest approach. It's a classification algorithm where objects are classified by voting several labelled training examples with their smallest distance from each object. The main disadvantage of KNN is that it costs very much time for classifying objects.

Naïve Bayes is also a traditional and popular approach used for text categorization. It learns training examples in advance before given unseen examples [4]. The assumption used in NB approach is that the attributes are independent of each other. The learning of NB is fast and simple. This approach is used for text categorization and for any other classification problems.

The most popular method which is suitable for text classification is Support Vector Machines (SVMs). The basic idea of SVM is derived from linear classifier. The idea of SVM is that if a distribution of training examples is not linearly separable; these examples are mapped into another space where their distribution is linearly separable. SVM can be applied to huge dimensionality of numerical vectors. Because of the advantages of SVM, it is used in both text categorization and any other classification problems.

B. Eliminating unwanted messages in SNS using decision tree

The usage of online social networks is increasing day by day. User security is the main issue need to handle in OSNs. V.N Mandhala. et al. proposed a new approach using the Machine Learning algorithm called decision tree, for ensuring security in user walls. [2] Mainly focuses on the

security of a user account. Decision trees are designed essentially for a hierarchical decomposition of the data space [2]. Decision trees are the popular method used in data mining due to their simplicity and transparency.

The decision tree method deals with the separation of user wanted and unwanted messages in social networking sites. The concept used by V.N Mandhala. et al. is that, they introduced an efficient user security mechanism in transmission of messages with secret message sharing. The method uses filtering wall techniques with short text classifier and also it is managed by using filtering rules and blacklists.

C. Content based filtering in Online Social Networks

M. Vanetti et al.[1] proposed a system enforcing content-based message filtering conceived as a key service for Online Social Networks (OSNs). Through a flexible rule-based system the users can customize their walls by filtering out unwanted messages. The proposed system have a direct control on the messages posted on the walls [1]. M. Vanetti et al. [1] used a Machine Learning based soft classifier that automatically producing membership labels in support of content-based filtering.

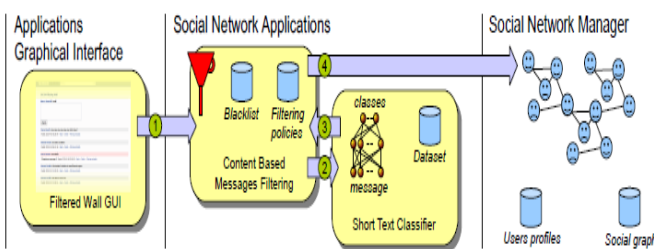


Fig.1 Filtered Wall Conceptual Architecture

The proposed architecture is a three-tier structure. The first layer provide basic OSN functionalities and the proposed system is placed in the second and third layers. The filtering rules are added in the GUI where the users interact with the system.

The core components of the proposed system are the Content-Based Messages Filtering and Short Text Classifier [1]. A blacklist mechanism is used to improve the filtering actions. Here the approach used for semantically categorizing short text is multi-class soft classification process which is composed of two main phases: text representation and ML-based classification. [1] consider two types of features for text representation: Bag of words (BoW) and Document properties (Dp). This is used to determine the exact combination for short message classification. Here [1] chooses Radial Basis Functional Network (RBFN) Machine Learning model for text classification.

The main issues stated by [1] are:

- The creators on which a filtering rule applies should be based on the conditions on user profile attributes.
- The next issue is based on defining a language for filtering rules specification based on their contents.

M. Vanetti et al. [1] developed a prototype model called DicomFW with all these specific features. The system will

filter out unwanted messages from OSN walls. The system uses a ML soft classifier to enforce customizable content-dependent filtering rules [1]. The flexibility of the system is enhanced through the management of Blacklists.

D. Content based filtering in social networking sites using web application

Each and every person in the today’s globalized world are being addicted in using Social Networking sites. Lack of Privacy is the major problem faced by all the sites. In [4], the authors proposed a system which will provide the indirect control to the users of the sites. This can be achieved through a rule based system that allows the administrator to customize the filtering criteria to be applied to their walls. The main aim of [4] proposed work is to filter the content based on the filtering rules. Admin has the control of the entire site. What are the content to be filtered and what not are decided by the admin. This proposed model only blocks the content of the users, not the message creators.

E. Filtering unwanted messages

The main issue in Online Social Networks is the controlling of messages that are posted o user walls. In [5], the authors proposed a system that allows OSN users to have a direct control on the messages posted on their walls. This is achieved through a flexible rule based system. The users are allowed to customize their walls by applying the filtering rules. A machine learning based soft classifier is used to automatically labeling messages in support of content based filtering [5]. In [5], the authors developed an automated system, called Filtered Wall (FW). The filtered wall is able to filter unwanted messages from OSN user walls.

Advantages:

- The system can automatically filter unwanted messages from OSN user walls on the basis of both message content and the message creator relationships and characteristics.
- An online setup assistant (OSA) is developed to help users in filtering rule specifications

The overall short text classification strategy is based on the Radial Basis Functional Network (RBFN). The architecture consists of a three tier structure. The first layer is Social Network Manager (SNM), the second layer is Social Network Applications (SNA). An additional layer is introduced called Graphical User Interface (GUI).

The working of the proposed model is as follows:

- The user can send a message only through the filtered wall.
- The metadata is extracted from the message by using a Machine Learning based text classifier.
- To enforce the filtering and blacklist rules, the filtered wall uses the metadata and the data extracted from the social graph and user profiles.
- The filtered wall will decide wheather to display the message or not based on the above steps.

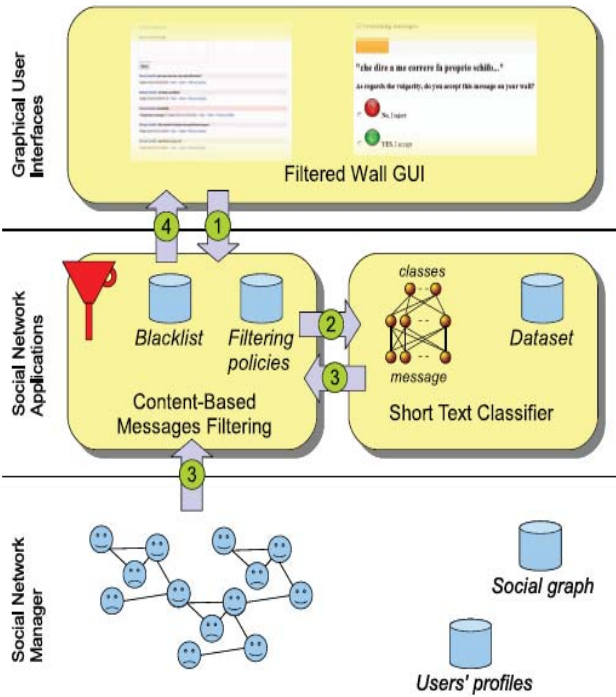


Fig. 2 Filtered Wall conceptual architecture.

III. CONCLUSION

Different methods are proposed for classifying text data. Among these entire approaches, machine learning based approach is more effective. Different learning algorithms are proposed. The Support Vector Machine algorithm is mostly used for text classification. The SVM algorithm can operate in large feature sets and it is trained using preclassified documents.

REFERENCES

- [1] M. Vanetti, E. Binaghi, B. Carminati, M. Carullo and e. Ferrari, "Content-based Filtering in On-line Social Networks," Proc. EMCL/PKDD Workshop Privacy and Security Issues in Data Mining and Machine Learning (PSDML '10), 2010.
- [2] Venkata Naresh Mandhala, Debnath Bhattacharyya, Tai-hoon Kim, "Eliminating unwanted messages in SNS using Decision Tree", International Journal of Database Theory and Application, vol.7, No.3 (2014), pp.121-130.
- [3] Hongyu Gau, Yan chen, Kathy Lee, Diana Palsetia, Alok Choudhary "POSTER: Online Spam Filtering in Social Networks." CCS'11, October 17-21, 2011, ACM 978-1-4503-0948-6/11/10
- [4] Taeho Jo, "NTC (Neural Text Categorizer): Neural Network For Text Categorization," International Journal of Information Studies, Volume-2, Issue-2, April 2010
- [5] Macro Vanetti, Elisabetta Binaghi, Elena Ferrari, Barbara carminatti and Moreno Carullo. "A system to filter unwanted messages from OSN user Walls" IEEE Transactions on knowledge and data Engineering, Vol 25, No. 2, February 2013