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Content Based Message Filtering For OSNS Using Machine Learning Classifier

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Abstract: *Online social networking(OSNs) sites like Twitter, Orkut, YouTube, and Face book are among the most popular sites on the Internet. Users of these web sites forms a social network, which provides a powerful means of sharing, organizing, and finding useful information .Unlike web information , the Online social networks (OSN) are organized around more number of users joins the network, shares their information and create the links to communicate with other online users. The resulting social network sites provides a basis for maintaining social relationships, for finding users with similar interests, and for locating content and knowledge that has been contributed or endorsed by other users. In OSNs information filtering can be used for avoiding the unwanted messages sharing or commenting on the user Walls. In this paper, we have proposed a system to filter undesired messages from OSN walls. The system exploits a machine learning soft classifier to enforce customizable content-dependent FRs. Moreover, the flexibility of the proposed system in terms of filtering options is enhanced through the management of BLs.*

Keywords*: Black list, Classifier, Content filtering, GUI, OSN.*

I. Introduction

Information and communication technology plays a significant role in today's online networked society. It has affected the online interaction between various users, who are aware of security applications and their implications on personal privacy. Online Social networks(OSNs) provide platform to meet different users and share information with them. Communication on these web sites involves exchange of various content including text as well as multimedia content. A social network include private messaging, blogs, chat facility and file, photo sharing functions and other ways to share text and multimedia content. Users of these online networking web sites can express their feelings and can convey their idea in terms of wall messages too. A wall is a section in online site user profile where others can post messages or can attach an image to leave a gift to its wall owner. This OSN wall is a public writing space so others can view what has been written on wall. Therefore in online sites there is possibility of posting illegal or undesirable messages on wall which is visible to others too.There is a need to develop more security techniques for different communication technologies, particularly online social networks. Networking sites provide very little support to prevent unwanted messages on user walls. With the lack of classification or filtering tools, the user receives all messages posted by the users he or she follows. In most cases, the user receives a noisy stream of updates from other users. In this paper, a content based information filtering system is introduced. The system focuses on one kind of feeds-Lists which are a manually selected group of users on networking sites. List feeds tend to be focused on specific topics, however it is still noisy due to undesired messages. Therefore, we present an online filtering system, which extracts the such topics in a list, filtering out irrelevant messages[1].

In networking sites, information filtering can also be used for a different, more sensitive, purpose. This is due to the fact that in networking sites there is the possibility of posting or commenting other posts on particular public or private areas, called in general walls. In the proposed system Information filtering can therefore be used to give various users the ability to automatically control the messages written on their own walls, by filtering out undesired messages. The aim of the proposed work is therefore to propose and experimentally evaluate an automated system, called Filtered Wall (FW), able to filter undesired messages from OSN user walls. We exploit Machine Learning (ML) text categorization techniques [2] to automatically assign with each short text message a set of categories based on its information. The major efforts in developing a robust short text classifier are concentrated in the extraction and selection of a set of characterizing and discriminant features.

II. Related Work

In this section we are going to discuss the recent methods over the content-based filtering in Online Social Networking (OSN). In [3], the authors provide the user to have a straight rule over their own private wall to avoid the unwanted messages.

The main aim of this work is users have a straight control over various messages posted on their own private space. So we are using the automated system called Filtered wall (FW), which have the capacity to filter unwanted messages .This system will blocks only the undesired messages send by the user. Drawback of this paper is user will not be blocked; This means only the content posted by the user will block .content based message filtering and short text classification support by this system.

In [4], the authors use mutual filtering method, but in our proposed system content based filtering is used. It explains the content based proposal system that develops the information pulling out and machine learning technique for text categorization. In [5], the authors provide the system can generally take decision about the message which is blocked due to the acceptance depends up on statistical information. In [6], the authors provides classification of text put in complex and specific terminology; need the application of the learning process. Fractional Matching method is applied which shrink the text message for confining the text characteristic. Fractional matching develops a language model. The output of the fractional matching compression provides consistent care of text classification

In [7], the authors introduce a social network is the common concentration group in network. Two level approaches are stated to combine trust, gloss and origin. The authors state an algorithm for concluding trust relationship with origin content and trust gloss in web social network. Film trust application is introduced which uses trust to video ranking and ordering the review. We consider film trust give the good crop model. In [8], the authors provide the clustering of document is helpful in many field. Two categories of clustering general purpose and text tilting, these both will be used for clustering process of information. Novel heuristic online document clustering is predictable, which is the proficient in clustering of text tilting parallel measures. Presentation measure is done in F-measure, and then it will be counterpart up with the other methods.

III. Proposed Work

1. Filtered Wall Architecture

The architecture of networking site services is a three-tier structure of three layers (Figure 1). These three layers are:

- Social Network Manager (SNM)
- Social Network Application (SNA)
- Graphical User Interface (GUI)

The starting stage is the Social Network Manager Layer provides the essential OSN functionalities (i.e., profile and relationship administration).This layer also maintains all the data regarding to the user profile. After maintaining and administrating all users information will provide for second stage for applying Filtering Rules (FR) and Black lists (BL). In second stage, the Content Based Message Filtering (CMBF) and Short Text Classifier is composed. This is very important stage for the message categorization according to its CBMF filters. Also a Black list(BL) is maintained for the user who sends frequently bad words in message.

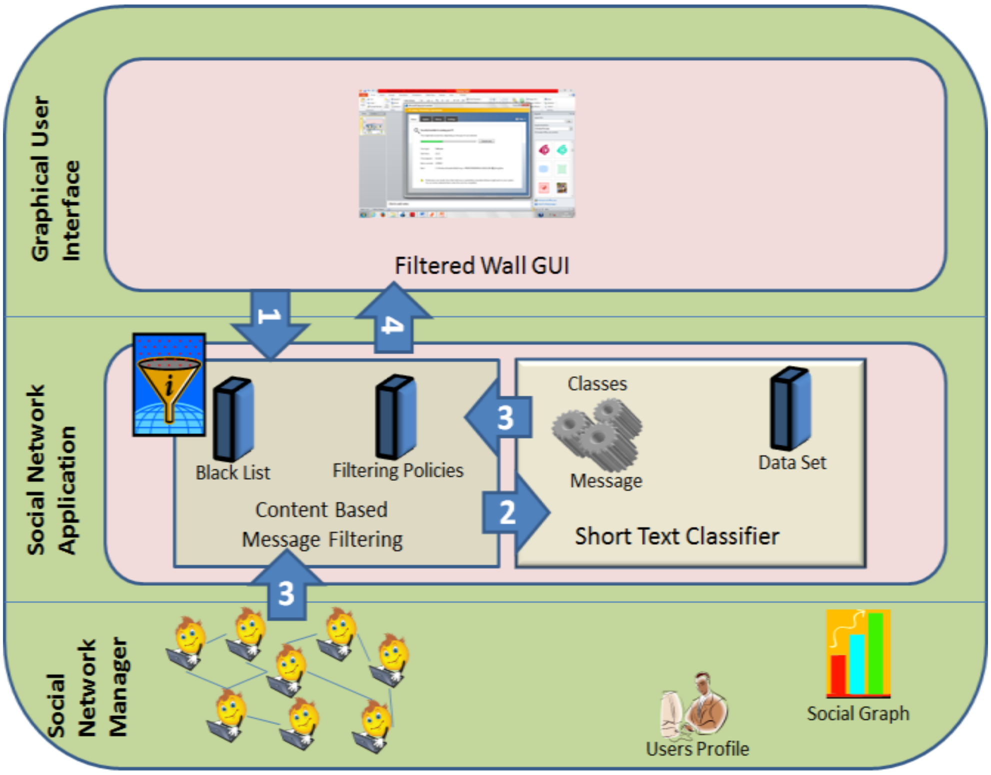

Fig. 1: Architecture of Filtered Wall

The third stage provides Graphical User Interface(GUI) to the user who wants to post his or her messages as a input. In this stage the Filtering Rules (FR) are used to filter the unwanted messages and provide Black list (BL) for the user who are temporally prevented to publish messages on user's wall. In general, the architecture in support of networking site services is a three-tier configuration. According to this orientation layered structural plan, the proposed system has to be positioned in the second and third layers (Figure 1), as it can be considered as a SNA. Particularly, the users cooperate with the system by means of a GUI setting up their filtering laws, along with which messages have to be filtered out. In addition, the GUI offers users with a FW that is a wall where only legal messages that are authorized according to their filtering rules are published. The core components of the proposed system are the short Text Classifier elements and Content-Based Messages Filtering (CBMF). The latter element aims to categorize the messages according to a set of categories. In compare, the first element exploits the message categorization offered by the STC module to implement the FRs specified by the wall user. As graphically illustrated in Figure 1, the path pursued by a message, it can be summarized as follows:

- After entering the private wall of one of his/her neighbors, the user attempts to post a message, which is captured by FW.
- A ML-based text classifier extracts the metadata from the content of the posted message.
- FW uses metadata provided by the classifier, mutually with data extorted from the social graph and the users' profiles, to implement the filtering and black list rules.
- Depending on the result of the previous step, the message posted will be available or filtered by FW.

2. Short Text Classifier

In short text classifier, it consider three types of features, Document properties (Dp), Bag of words(BoW), and Contextual Features (CF).The first two types of features; they are entirely derived from the data contained within the text of the message. We introduce contextual features modeling information that characterizes the environment where the user is posting. These features play an important role in the semantics of the messages. Text representation is the Vector Space Model (VSM) according to which a text document dj is represented as the vector of binary or real weights:

$$d_j = w_{1j}, \ldots\ldots\ldots, w_{|T|j}$$

where T is the set of features that occur at least once in at least one text document of the collection Tr and *wkj* [0, 1] represents how much term tk contributes to the semantics of the document dj. In the bag of words representation, terms are identified with words. In the case of the non binary weighting, the weight wkj of term tk in document dj is computed according to the standard term frequency—inverse document frequency (tf-idf) weighting function is defined as follows:

$$f - idf(t_k, d_j) = \#(t_k, d_j).\log\frac{|T_r|}{\#T_r(t_k)}$$

where #(*tk*, *dj*) denotes the number of times tk occurs in documeny dj and #*Tr*(*tk*) denotes the document frequency of the term tk, i.e., the number of documents in T r in which tk occurs. Contextual features is not very dissimilar from BoW features describing the nature of data. Therefore, all the formal definitions introduced for the bag of words features also apply to Cfs.

3. Filtering Rules

To define the language for filtering rule specification, many issues are considered. First issue may be the text message with different meaning and significance based on who writes it. As a result, filtering rules should allow the user to restrict the message creators. Here the type, depth, and the trust value are recognized by creator Specification.

Definition 1: Creator specification

A Creator Specification CreaSpec, which denotes a set of networking site users. Possible combinations are one. Set of attributes in the An OP Av form, where An is the user profile attribute name, Av is the profile attribute value and OP is a comparison. Set of relationship of the form (n, Rt, minDepth, maxTrust) indicate site users participating with user n in a relationship of type Rt, depth greater than or equal to minDepth, trust value greater than or equal to maxTrust.

Definition 2: Filtering rule

A filtering rule is a tuple (auth,CreaSpec,ConSpec,action) Auth is the user who states the filtering rule. CreaSpec is the Creator specification(see definition 1). ConSpec is the Boolean expression. Action is the action performed by the system.

Filtering rules will be applied, when the site user profile does not hold value for attributes submitted by a FR. This type of situation will dealt with asking the owner to choose whether to notify or block the messages initiating from the profile which does not match with the wall owners filtering rules, due to missing of attributes.

4. Blacklist Management

The main implementation of this paper is to execute the Blacklist Mechanism, which will keep away messages from unwanted creators. Black list are handled undeviating by the system. This will able to decide the users to be inserted in the BL. And it also decides the user preservation in the list will get over. Set of rules are applied to improve the stiffness, such rules are called black list rules. By applying the list rule, the owner can identify which user should be blocked based on the relationship in OSN and the user's profile. The user may have bad opinion about the other users can be banned for an uncertain time period. We have the information based on bad attitude of the user. Two principles are stated as follows First one is within a given time period user will be inserted in black list for numerous times, he /she must be worthy for staying in black list for another sometime. This principle will be applied to user who inserted in black list at least once. Relative Frequency is used to find out that the system, who messages continue to fail the filtering rules. Two measures can be calculated globally and locally, which will consider only the message in local and in global it will consider all the networking site users walls.

A BL rule is a tuple (auth,CreaSpec,CreaB,t),where Auth is a user who state the black list rule. CreaSpec is the creator specification. CreaB have two components ,RF Blocked and minBanned-RFBlocked(RF,mode,window) such that RF=*bMessages/*tMessages Where *tMessage is the total number of messages that site User recognized using CreaSpec, whereas *bMessage is the number of message in *tMessage that have been blocked. A window represents the time interval of the message creation. minBanned= (min,mode,window) min is the minimum number of times in the time interval enumerate in window that site user recognized using CreaSpec .mode indicates all site user. T signify the time period the user recognized by CreaSpec and CreaB which will be banned from authentication wall.

IV. Conclusion

In this paper, we present a system to filter unwanted message in online networking sites wall. The first step of the proposed system is to classify the content using several rules. Next step is to filter the unwanted rules. Finally a Blacklist rule is also implemented. So that owner of the user can insert the user who posts unwanted messages. Better privacy is given to the networking site wall using our proposed system. In future Work, we plan to implement the filtering rules with the aim of bypassing the whole filtering system, so that it can be used only for the purpose of overcome the filtering system.

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