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Filtered Wall Architecture for Social Networks

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Abstract - The basic problem in today's On-line Social Networks (OSNs) is to give users the ability to control the messages posted on their own private space to avoid that unwanted content is displayed. Up to now social networks provide little support to this requirement. So in this paper, we propose a system allowing OSN users to have a direct control on the messages posted on their walls. We are using here a flexible rule-based system, that allows users to customize the filtering criteria to be applied to their walls, and a Machine Learning based soft classifier automatically labeling messages in support of content-based filtering.

Keywords - *On-line Social Networks, Filtered Wall, Machine Learning, Short Text Classifier.*

1. Introduction

On-line Social Networks (OSNs) are today one of the most popular interactive medium for users to communicate, share and disseminate a considerable amount of human life information. Daily and continuous communications imply the exchange of several types of content, including free text, images, audio and video data. Facebook have stated that statistics average user creates 90 pieces of content each month, whereas more than 30 billion pieces of content (web links, news stories, blog posts, notes, photo albums, etc.) are shared each month. Huge and dynamic character of these data creates the premise for the employment of web content mining strategies aimed to automatically discover useful information dormant within the data. They are instrumental to provide an active support in various complex and sophisticated tasks involved in OSN management [1], such as for instance access control or information filtering. So information filtering has been greatly explored for what concerns textual documents and, more recently, web content. However, the aim of the majority of these proposals is mainly to provide users a filtering classification mechanism to avoid they are overwhelmed by useless data.

In social networks, information filtering can also be used for a different, more sensitive, purpose. This is due to the fact that in OSNs there is the possibility of posting or commenting other posts on particular public/private areas, called in general walls. Message filtering can therefore be used to give users the ability to automatically control the messages written on their own walls, by filtering out unwanted messages.

2. Existing System

We believe that this is a key OSN service that has not been provided so far. Today's social networks provide very little support to prevent unwanted messages on user walls. For example, Social network Facebook allows users to state who is allowed to insert messages in their walls (i.e., friends, friends of friends, or defined groups of friends). In this no content-based preferences are supported and therefore it is not possible to prevent undesired messages, such as political or vulgar ones, no matter of the user who posts them. Providing this service is not only a matter of using previously defined web content mining techniques for a different application, rather it requires to design ad-hoc classification strategies. This is because wall messages are constituted by short text for which traditional classification Methods have serious limitations since short texts not provide sufficient word occurrences.

2.1 Drawbacks

- However, no content-based [1] options are supported and therefore it is not possible to prevent undesired messages, such as political or vulgar ones, no matter of the user who posts them.
- Providing this service is not only a matter of using previously defined web content mining techniques for a different application, rather it requires to design ad hoc classification strategies.
- This is because wall messages are constituted by short text for which traditional classification methods have serious limitations because short texts do not provide sufficient word occurrences.

3. Literature Survey

3.1 Background of The Project

In the past decade, On-line Social Networks (OSNs) have become a popular interactive medium to

communicate, share and disseminate a considerable amount of human life information. Daily and continuous communication implies the exchange of several types of contents including free text, image, audio and video data. The huge and dynamic character of these data creates the premise for the employment of web content mining strategies aimed to automatically discover useful information dormant within the data and then provide an active support in various complex and sophisticated tasks involved in social networking analysis and management. A main part of social network content is constituted by short text, a notable example are the messages permanently written by OSN users on particular public/private areas, called in general walls.

Filtered Wall (FW) architecture [1], able to filter out unwanted messages and links from social network user walls. The key idea of the proposed system is the support for content based user preferences. This is possible thank to the use of a Machine Learning (ML)[1][2] technique text categorization procedure which is able to automatically assign with each message a set of categories based on its content. We believe that the proposed strategy is a key service for social networks in that in today social networks users don't have control on the messages displayed on their walls. For example, Facebook allows users to state who is allowed to insert messages in their walls (i.e., friends, friends of friends, or defined groups of friends). However, there is no content-based preferences are supported. For instance, it is not possible to prevent political or vulgar messages. In contrast, by means of the proposed mechanism, a user can specify what contents should not be displayed on his/her wall, by specifying a set of filtering rules.

3.2 Domain of The Study

Filtering rules are very flexible in terms of the filtering requirements they can support, in that they allow to specify filtering conditions based on user profiles, user relationships as well as the output of the ML categorization process. In addition, our system provides the support for user defined blacklist management, that is, list of users that are temporarily prevented to post messages on a user wall.

3.3 Motivation of The Project

The main aim of the present work is to propose and experimentally evaluate an automated system, called Filtered Wall (FW), able to filter out unwanted messages from social network user walls. The advantages of using ML filtering strategies over ad-hoc knowledge engineering approaches are a very good effectiveness, flexibility to changes in the domain and portability in different applications. However difficulties arise in finding an appropriate set of features by which to represent short, grammatically ill formed sentences and in providing a consistent training set of manually classified text.

4. Proposed System

The aim of the present work is therefore to propose and experimentally evaluate an automated system, called Filtered Wall (FW), able to filter unwanted messages from user walls. We exploit Machine Learning (ML) text categorization techniques to automatically assign with each short text message a set of categories based on their content. The major efforts in building a robust short text classifier are concentrated in the extraction and selection of a set of characterizing and discriminate features. The original set of features, derived from endogenous properties of short texts, is enlarged here including exogenous knowledge related to the context from which the messages originate. As far as the learning model is concerned, we confirm in the current paper the use of neural learning which is today recognized as one of the most efficient solutions in text classification. In particular, we base the overall short text classification strategy on Radial Basis Function Networks (RBFN) [1] [3] for their proven capabilities in acting as soft classifiers, in managing noisy data and intrinsically vague classes.

4.1 Advantages

1. Content-Based Messages Filtering (CBMF) [3] and the Short Text Classifier are supported to filter undesired messages from social networks walls.
2. Proposed system give the control to what kind of messages post on own wall. It is secure because in this filter wall act as Administrator.
3. The core components of the proposed system are the Content-Based Messages Filtering (CBMF) [3] and the Short Text Classifier modules.
4. Rule layer adopted for filtering unwanted messages. We start by describing FRs, and then we illustrate the use of BLs. BL mechanism to avoid messages from undesired creators, independent from their contents.

4.2 Filtering Rules

In defining the language for FRs specification, we consider three main issues that, in our opinion, should affect a message filtering decision. First of all, in user walls like in everyday life, the same message may have different meanings and relevance based on who writes it. As a consequence, FRs should allow users to state constraints on message creators. Creators on which a FR applies can be selected on the basis of several different criteria; one of the most relevant is by imposing conditions on their profile's attributes. In such a way it is, for instance, possible to define rules applying only to young creators or to creators with a given religious/political view. Given the social network scenario, creators may also be identified by exploiting

information on their social graph. This implies to state conditions on type, depth and trust values of the relationship(s) creators should be involved in order to apply them the specified rules.

4.3 Blacklisting Mechanism

A further component of our system is a BL mechanism to avoid messages from undesired creators, independent from their contents. Blacklists are directly managed by the system, which should be able to determine who are the users to be inserted in the BL and decide when user's retention in the BL is finished. To enhance flexibility, such information is given to the system through a set of rules, hereafter called BL rules. Such rules are not defined by the SNM, therefore they are not meant as general high level directives to be applied to the whole community. Rather, we decide to let the users themselves, i.e., the wall's owners to specify BL rules regulating who has to be banned from their walls and for how long. Therefore, a user might be banned from a wall, by, at the same time, being able to post in other walls.

5. Flow of The System

Architecture diagram

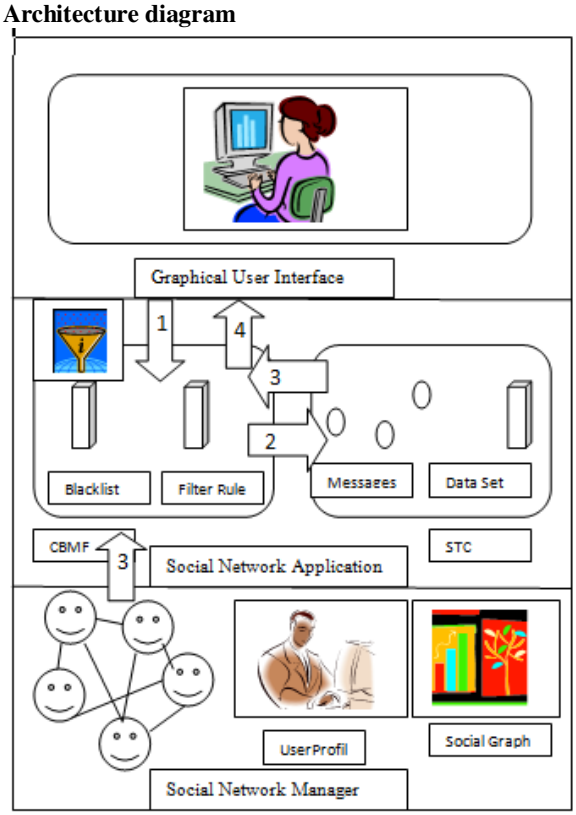

Fig. 1: Architecture diagram

The architecture in support of OSN services is a three-tier structure .The first layer, called Social Network Manager (SNM), commonly aims to provide the basic OSN functionalities (i.e., profile and relationship management), whereas the second layer provides the support for external Social Network Applications (SNAs). The supported SNAs may in turn require an additional layer for their needed Graphical User Interfaces (GUIs). According to this reference architecture, the proposed system is placed in the second and third layers. In particular, users interact with the system by means of a GUI to set up and manage their FRs/BLs. Moreover, the GUI provides users with a FW, that is, a wall where only messages that are authorized according to their FRs/BLs are published. The core components of the proposed system are the Content-Based Messages Filtering (CBMF) and the Short Text Classifier (STC) modules. The latter component aims to classify messages according to a set of categories...In contrast; the first component exploits the message categorization provided by the STC module to enforce the FRs specified by the user. BLs [4] can also be used to enhance the filtering process. As graphically depicted in Figure the path followed by a message, from its writing to the possible final publication can be summarized as follows:

1) After entering the private wall of one of his/her contacts, the user tries to post a message, which is intercepted by FW.

2) A ML-based text classifier extracts metadata from the content of the message.

3) FW uses metadata provided by the classifier, together with data extracted from the social graph and users' profiles, to enforce the filtering and BL rules.

4) Depending on the result of the previous step, the message will be published or filtered by FW.

6. System Requirement

a. Hardware requirements:-

- System: Pentium IV 2.4 GHz. Requires internet connection
- Hard Disk : 80 GB.
- Monitor : 15 VGA Color.
- Mouse : Logitech.
- Ram : 512 MB.

b. Software requirements:-

- Operating system : Windows 7 (32-Bit) :
- Coding Language : Java
- GUI creation : HTML, JavaScript
- Database : MySQL

C. JAVA

Java is a general-purpose, concurrent, class-based, object-oriented computer programming language that is specifically designed to have as few implementation dependencies as possible. It is intended to let application developers "write once, run anywhere" (WORA), meaning that code that runs on one platform does not need to be recompiled to run on another. Java applications are typically compiled to byte code (class file) that can run on any Java virtual machine (JVM) regardless of computer architecture.

Features:

- Object Oriented.
- Platform Independent.
- Portable, Robustness.
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7. Conclusions

In this paper, we have presented a system to filter undesired messages from OSN walls. The system develops a ML soft classifier to implement customizable content-dependent FRs. In particular, we aim at investigating a tool able to automatically recommend trust values for those contacts user does not individually identified. We do consider that such a tool should propose expectation assessment based on users procedures, performances, and reputation in OSN, which might involve enhancing OSN with assessment methods. Though, the propose of these assessment based tools is difficult by several concern s, like the suggestions an assessment system might have on users' confidentiality and/or the restrictions on what it is possible to audit in present OSNs. An introduction work in this direction has been prepared in the context of expectation values used for OSN access control purposes. We would like to remark that the system proposed in this paper represents just the core set of functionalities needed to provide a sophisticated tool for OSN message filtering. Still if we have balanced our system with an online associate to set FR thresholds, the improvement of an absolute system effortlessly exploitable by average OSN users is a wide topic which is out of the scope of the present paper.

In future work, we plan to address this problem by investigating the use of online learning paradigms able to include label feedbacks from users. Additionally, we plan to enhance our system with a more sophisticated approach to decide when a user should be inserted into a Black Lists or not.

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