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A Rule Based System to Refine OSN User Walls

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*Abstract- **The core problem in today's Online Social Networks (OSNs) is to allocate users the authority to manage the messages posted on their private space to avert that unwanted content. The unwanted data may contains political, vulgar, non neural etc. message filtering systems are designed for unstructured or semi-structured data, as opposed to database applications, which use very structured data. In this paper we proposed a System with the flexible rules to filter the unwanted messages posted on user wall. After crossing threshold value the notification message is send to that user. This allows users to customize the refining criteria to be applied to their walls, and a Machine Learning-based classifier automatically classify the messages and labelling messages in support of content-based filtering.***

Keywords—Flexible rules, message filtering, online social networks, short text classification.

I. INTRODUCTION

Online Social Networks (OSNs) square measure nowadays one amongst the most popular interactive medium to speak, share, and disperse a substantial quantity of human life information. Daily and continuous communications imply the exchange of many sorts of content, as well as free text, image, audio, and video information. Consistent with face book statistics1 average user creates ninety items of content every month, whereas over thirty billion items of content (web links, news stories, blog posts, notes, icon albums, etc.) are shared monthly. The massive and dynamic character of this information creates the premise for the utilization of internet content mining ways aimed to mechanically discover useful info dormant inside the info. They are instrumental to produce a lively support in advanced and sophisticated tasks concerned in OSN management, such as for instance access management or info filtering. Information filtering has been greatly explored for what considerations textual documents and, additional recently, website (e.g., [1], [2], [3]). However, the aim of the bulk of those proposals is especially to supply users a classification mechanism to avoid they're powerless information.

In OSNs, data filtering may be used for a different, additional sensitive, purpose. This can be thanks to the very fact that in OSNs there's the likelihood of posting or commenting alternative posts on specific public/private areas, called normally walls. Data filtering will so be used to provide users the flexibility to mechanically management the messages written on their own walls, by filtering out unwanted messages.

We have a tendency to believe that this can be a key OSN service that has not been provided thus far. Indeed, today OSNs offer little support to forestall unwanted messages on user walls. For instance, Face book permits users to state United Nations agency is allowed to insert messages in their walls (i.e., friends, friends of friends, or outlined teams of friends). However, no content-based preferences area unit supported and therefore it's insufferable to forestall unsought messages, like political or vulgar ones, regardless of the user United Nations agency posts them. Providing this service isn't solely a matter of victimization antecedently outlined website mining techniques for a special application, rather it needs to design impromptu classification ways. This can be as a result of wall messages area unit official by short text that ancient classification strategies have serious limitations since short texts don't offer sufficient word occurrences. The aim of this work is so to propose and experimentally value an automatic system, referred to as Filtered Wall (FW), able to filter unwanted messages from OSN user walls. we have a tendency to exploit Machine Learning (ML) text categorization techniques [4] to mechanically assign with every short text message a group of classes supported its content. The major efforts in building a strong short text classifier (STC) area unit targeted within the extraction and choice of a set of characterizing and discriminate options.

In existing system today OSNs provide very little support to prevent unwanted messages on user walls. For example, Face book 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, 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.

The solutions investigated during this paper area unit AN extension of these adopted in an exceedingly previous work by US [5] from that we have a tendency to inherit the learning model and therefore the stimulant procedure for generating pre-classified information. The first set of options, derived from endogenous properties of short texts, is enlarged here as well as exogenous information associated with the context from that the messages originate. As so much because the learning model worries, we have a tendency to ensure within the current paper the employment of neural learning that is these days recognized as one of the foremost economical solutions in text classification [4].

In specific, we have a tendency to base the short text classification strategy on Radial Basis perform Networks (RBFN) for his or her proven capabilities in acting as soft classifiers, in managing noisy information and as such obscure categories. Moreover, the speed in performing arts the educational part creates the premise for AN adequate use in OSN domains, similarly as facilitates the experimental analysis tasks.

In next section II we are presenting the literature survey over the various methods presented for ONS. In section III, the proposed approach and its system block diagram is depicted. In section IV we are presenting the current state of implementation and results achieved. Finally conclusion and future work is predicted in section V.

II. LITERATURE SURVEY

In this section we are presenting the different methods those are presented to text filtering problems of ONS.

A. Adomavicius and G. Tuzhilin, [2] discussed in Toward the Next Generation of Recommender Systems: A Survey of the State-of-the-Art and Possible Extensions that, This paper presents an overview of the field of recommender systems and describes the current generation of recommendation methods that are usually classified into the following three main categories: content-based, collaborative, and hybrid recommendation approaches. This paper also describes various limitations of current recommendation methods and discusses possible extensions that can improve recommendation capabilities and make recommender the system applicable to an even broader range of applications. These extensions include, among others, an improvement of understanding of users and items, incorporation of the contextual information into the recommendation process, support for multi-criteria ratings, and a provision of more flexible and less intrusive types of recommendations. The feature extraction procedures map text into a compact representation of its content and is uniformly applied to training and generalization phases.

In Machine Learning Approach to Web Page Filtering using Content and Structure Analysis, M. Chau and H. Chen [3], addressed, As the Web continues to grow; it has become increasingly difficult to search for relevant information using traditional search engines. Topic-specific search engines provide an alternative way to support the efficient information retrieval on the Web by providing more precise and customized searching in various domains. However, developers of topic-specific search engines need to address two issues: how to locate relevant documents (URLs) on a Web and how to filter out irrelevant documents from a set of documents collected from the Web. This papers report our research in addressing the second issue. We propose a machine-learning-based approach that combine the Web content analysis and Web structure analysis. We represent each Web page by a set of link-based and content-based features, which can be used as the input for various machine learning algorithms. The proposed approach was implemented using both a feed forward or back-propagation neural network and a support vector machine. Two experiments were designed and conducted to compare the proposed Web-feature approach with two already existing Web page filtering methods a keyword-based approach and a lexicon-based approach. The experimental results showed that the proposed approach on general performed better than the benchmark approaches, especially when the number of training documents was small. The proposed approaches can be applied in topic-specific search the engine development and the other Web applications such as Web content management.

R.J. Mooney and L. Roy, In Content-Based Book Recommending Using Learning for Text Categorization [4], presented Recommender systems improve access to relevant products and the information by making personalized suggestions based on previous examples of a user's likes and dislikes. Most existing recommender systems use social filtering methods that base recommendations on other users' preferences. By contrast content-based methods use the information about an item itself to make suggestions. This approach has the benefit of being able to recommend previously unrated items to users with unique interests and to provide explanations for its recommendations. We describe a content-based book recommending system that the utilize information extraction and a machine-learning algorithm for text categorization. Initial experimental results demonstrate that this approach can produce correct recommendations. These experiments are based on ratings from random samplings of item and we discuss problems with previous experiments that employ skewed samples of user-selected examples to evaluate performance.

F. Sebastiani [5] represent the automated categorization (or classification) of texts into predefined categories has witnessed a booming interest in last 10 years, due to the increased availability of documents in digital form and the ensuing need to organize them. In the research community the dominant approach to this problem is based on machine learning techniques: a general inductive a process automatically builds a classifier by learning, from a set of pre classified documents, the characteristics of the categories. The advantages of this approach over the knowledge engineering approach (consisting in the manual definition of a classifier by domain experts) are a good effectiveness, considerable savings in terms of expert labor power, and straightforward portability to different domains. This survey discusses a main approach to text categorization that fall within the machine learning paradigm. We will discuss in detail issues pertaining to three different problems, namely, classifier construction, document representation, and classifier evaluation.

III. PROPOSED SYSTEM

A. Problem Definition

The application of content-based filtering on messages posted on OSN user walls poses further challenges given the short length of those messages apart from the wide range of topics that may be mentioned. Short text classification has received up to currently little attention within the scientific community. Recent work highlights difficulties in shaping robust options, basically as a result of the very fact that the description of the short text is crisp, with several misspellings, nonstandard terms, and noise. Our work is additionally galvanized by the various access management models and connected policy languages and social control mechanisms that are projected to date for OSNs since filtering shares many similarities with access management.

B. Proposed Architecture

In our proposed system we first apply flexible rules on text document. The blacklist of each user is maintained. And the message is classified according to message type (eg. Neutral, Non-neutral, vulgar, etc). Here we check that the user who sends such type of messages continuously then the notification is send to its email as warning to not send these types of messages.

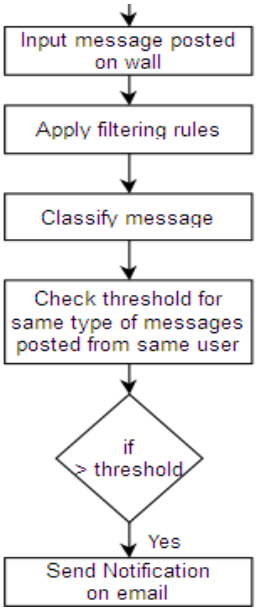

Fig 1: Proposed system Architecture

C. Mathematical Model

The set of classes considered in our experiments is

$\Omega = \{\text{Neutral, Violence, vulgar, Offensive, Hate, Set}\}$

Where $\Omega = \{\text{Neutr}$ are the second-level classes

Definition 1 (Creator specification):

A creator specification (CS) implicitly denotes a set of OSN users. It can have one of the following forms of possibly combined:

1. A set of attribute.
2. A set of relationship constraints.

Definition 2 (Filtering rule):

A filtering rule FR is a tuple $(\text{author}, \text{creatorSpec}, \text{contentSpec}, \text{action})$, where

- author is the user who specifies the rule
- creatorSpec is a creator specification, specified according to Definition 1
- contentSpec is a Boolean expression defined on content constraints of the form (C, ml), where C is a class of the first or second level and ml is the minimum membership level threshold required for class C to make the constraint satisfied
- $\text{action} = \{\text{block}, \text{notify}\}$ Denotes the action to be performed by the systems on a message matching contentSpec and created by users identified by creatorSpec.

The filtering can be computed as membership function elicitation procedure within the fuzzy set framework. For each non-neutral class C, the fuzzy set is computed as

$$F_C = \sum_{M_c} \phi(m_a, m_b)$$

where $\phi(m_a, m_b) = \frac{1}{2} + \begin{cases} m_b/10 & if\ m_a = filter \\ -m_b/10 & if\ m_a = Pass \end{cases}$

The membership value for the non-neutral class C is determined by applying the defuzzyfication procedure described to FC, this value is then chosen as a threshold in defining the filtering policy.

Definition 3 (BL rule):

A BL rule is a tuple $(\text{author}, \text{creatorSpec}, \text{creatorBehavior}, T)$, where

- author is the OSN user who specifies the rule, i.e., the wall owner.
- creatorSpec is a creator specification, specified according to Definition 1
- creatorBehavior Consists of two components RFBlocked and minBanned. $\text{RFBlocked} = (\text{RF}, \text{mode}, \text{window})$ is defined such that

- $RF = \frac{\#bMessages}{\#tMessages}$, where $\#tMessages$ is the total number of messages that each OSN user identified by $creatorSpec$ has tried to publish in the author wall $(mode = myWall)$ or in all the OSN walls $(mode = SN)$; whereas $\#bMessages$ is the number of messages among those in $\#tMessages$ that have been blocked
- $window$ is the time interval of creation of those messages that have to be considered for RF computation.

$minBanned = (min, mode, window)$, where min is the minimum number of times in the time interval specified in window that OSN users identified by $creatorSpec$ have to be inserted into the BL due to BL rules specified by author wall $(mode = myWall)$ or all OSN users $(mode = SN)$ in order to satisfy the constraint.

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A BL rule is a tuple $(author, creatorSpec, creatorBehavior, T)$, where

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  $minBanned = (min, mode, window)$, where min is the minimum number of times in the time interval specified in window that OSN users identified by $creatorSpec$ have to be inserted into the BL due to BL rules specified by author wall $(mode = myWall)$ or all OSN users $(mode = SN)$ in order to satisfy the constraint.
- T denotes the time period the users identified by $creatorSpec$ and $creatorBehavior$ have to be banned from author wall.

IV. WORK DONE

In this section we are discussing the practical environment, scenarios, performance metrics used etc.

A. Input

Input for our implementation is the text content typed by user as message on his friend's wall.

B. Hardware and Software Configuration

Hardware Configuration

Processor - Pentium –IV
Speed - 1.1 GHz
RAM - 256 Mb (min)
Hard Disk - 20 GB
Key Board - Standard Windows Keyboard
Monitor - SVGA

Software Configuration

Operating System - Windows XP/7/8
Programming Language - Java
Tool - NetBeans.

C. Matrix Computation

Information Retrieval and Document Analysis field, that is, Precision (P), that permits to evaluate the number of false positives, Recall (R), that permits to evaluate the number of false negatives, and the overall metric F-Measure (F), defined as the harmonic mean between the above two indexes in [1].

D. Results of work done

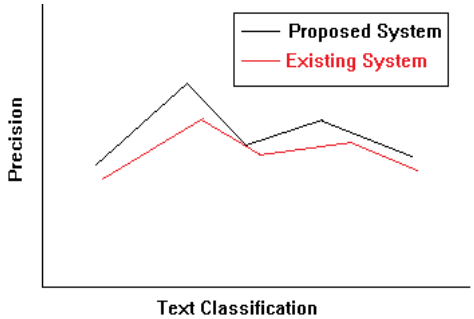

Fig 2: Performance comparison using precision

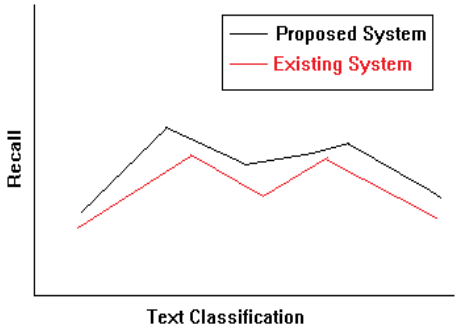

Fig 3: Performance comparison using recall

V. CONCLUSION AND FUTURE WORK

In this paper, we have presented a system to filter out undesired messages from OSN walls. The system exploits a ML soft classifier to enforce customizable content-depended filtering rules. Moreover, the flexibility of the system in terms of filtering options is enhanced trough the management of BLs.

This work is the first step of a wider project. The early encouraging results we have obtained on the classification procedure prompt us to continue with other work that will aim to improve the quality of classification. Additionally, we plan to enhance our filtering rule system, with a more sophisticated approach to manage those messages caught just for the tolerance and to decide when a user should be inserted into a BL**.** In this paper we proposed a System with the flexible rules to filter the unwanted messages posted on user wall. After crossing threshold value the notification message is send to that user. This allows users to customize the refining criteria to be applied to their walls, and a Machine Learning-based classifier automatically classifies the messages and labelling messages in support of content-based filtering.

In feature work two sets of algorithms for calculating these trust inferences: one for networks with binary trust ratings, and one for continuous ratings. For each rating scheme, the algorithms are built upon the defined notions of trust. Each is then analyzed theoretically and with respect to simulated and actual trust networks to determine how accurately they calculate the opinions of people in the system.

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