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SEMANTIC-ENHANCED MARGINALIZED DENOISING AUTO-ENCODER BASED ON WORD EMBEDDING TECHNIQUE

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Abstract:

As a side effect of increasingly popular social media, cyber bullying has emerged as a serious problem afflicting children, adolescents and young adults. Machine learning techniques make automatic detection of bullying messages in social media possible, and this could help to construct a healthy and safe social media environment. In this meaningful research area, one critical issue is robust and discriminative numerical representation learning of text messages. In this paper, we propose a new representation learning method to tackle this problem. Our method named Semantic-Enhanced Marginalized Denoising Auto-Encoder (smSDA) is developed via semantic extension of the popular deep learning model stacked denoisingautoencoder. The semantic extension consists of semantic dropout noise and sparsity constraints, where the semantic dropout noise is designed based on domain knowledge and the word embedding technique. Our proposed method is able to exploit the hidden feature structure of bullying information and learn a robust and discriminative representation of text. Comprehensive experiments on two public cyberbullying corpora (Twitter and MySpace) are conducted, and the results show that our proposed approaches outperform other baseline text representation learning method

I.INTRODUCTION:

What is Secure Computing?

Computer security (Also known as cyber security or IT Security) is information security as applied to computers and networks. The field covers all the processes and mechanisms by which computer-based equipment, information and services are protected from unintended or unauthorized access, change or destruction. Computer security also includes protection from unplanned events and natural disasters. Otherwise, in the computer industry, the term security -- or the phrase computer

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security -- refers to techniques for ensuring that data stored in a computercannot be read or compromised by any individuals without authorization. Most computer security measures involve data encryption and passwords. Data encryption is the translation of data into a form that is unintelligible without a deciphering mechanism. A password is a secret word or phrase that gives a user access to a particular program or system.

Diagram clearly explain the about the secure computing

Working conditions and basic needs in the secure computing:

If you don't take basic steps to protect your work computer, you put it and all the information on it at risk. You can potentially compromise the operation of other computers on your organization's network, or even the functioning of the network as a whole.

1. Physical security:

Technical measures like login passwords, anti-virus are essential. (More about those below) However, a secure physical space is the first and more important line of defense.

Is the place you keep your workplace computer secure enough to prevent theft or access to it while you are away? While the Security Department provides coverage across the Medical center, it only takes seconds to steal a computer, particularly a portable device like a laptop or a PDA. A computer should be secured like any other valuable possession when you are not present.

Human threats are not the only concern. Computers can be compromised by environmental mishaps (e.g., water, coffee) or physical trauma. Make sure the physical location of your computer takes account of those risks as well.

2. Access passwords:

The University's networks and shared information systems are protected in part by login credentials (user-IDs and passwords). Access passwords are also an essential protection for personal computers in most circumstances. Offices are usually open and shared spaces, so physical access to computers cannot be completely controlled.To protect your computer, you should consider setting passwords for particularly sensitive applications resident on the computer (e.g., data analysis software), if the software provides that capability.

3. Prying eye protection:

Because we deal with all facets of clinical, research, educational and administrative

data here on the medical campus, it is important to do everything possible to minimize exposure of data to unauthorized individuals.

4. Anti-virus software:

Up-to-date, properly configured anti-virus software is essential. While we have server-side anti-virus software on our network computers, you still need it on the client side (your computer).

5. Firewalls:

Anti-virus products inspect files on your computer and in email. Firewall software and hardware monitor communications between your computer and the outside world. That is essential for any networked computer.

6. Software updates:

It is critical to keep software up to date, especially the operating system, anti-virus and anti-spyware, email and browser software. The newest versions will contain fixes for discovered vulnerabilities.

Almost all anti-virus have automatic update features (including SAV). Keeping the "signatures" (digital patterns) of malicious software detectors up-to-date is essential for these products to be effective.

7. Keep secure backups:

Even if you take all these security steps, bad things can still happen. Be prepared for the worst by making backup copies of critical data, and keeping those backup copies in a separate, secure location. For example, use supplemental hard drives, CDs/DVDs, or flash drives to store critical, hard-to-replace data.

8. Report problems:

If you believe that your computer or any data on it has been compromised, your should make a information security incident report. That is required by University policy for all data on our systems, and legally required for health, education, financial and any other kind of record containing identifiable personal information.

Benefits of secure computing:

- **Protect yourself - Civil liability**: You may be held legally liable to compensate a third party should they experience financial damage or distress as a result of their personal data being stolen from you or leaked by you.
- **Protect your credibility - Compliance**:
  You may require compliancy with the Data Protection Act, the FSA, SOX or other regulatory standards. Each of these bodies stipulates that certain measures be taken to protect the data on your network.
- **Protect your reputation – Spam:** A common use for infected systems is to join them to a botnet (a collection of infected machines which takes orders from a command server) and use them to send out spam. This spam can be

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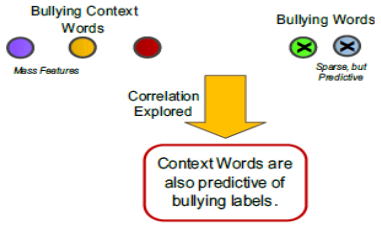
traced back to you, your server could be blacklisted and you could be unable to send email.

- **Protect your income - Competitive advantage:**
  There are a number of "hackers-for-hire" advertising their services on the internet selling their skills in breaking into company's servers to steal client databases, proprietary software, merger and acquisition information, personnel details*et al*.
- **Protect your business – Blackmail**: A seldom-reported source of income for "hackers" is to·break into your server, change all your passwords and lock you out of it. The password is then sold back to you. Note: the "hackers" may implant a backdoor program on your server so that they can repeat the exercise at will.
- **Protect your investment - Free storage:**
  Your server's harddrive space is used (or sold on) to house the hacker's video clips, music collections, pirated software or worse. Your server or computer then becomes continuously slow and your internet connection speeds deteriorate due to the number of people connecting to your server in order to download the offered wares.

II.SYSTEM ARCHITECTURE:



III.EXISTING SYSTEM:

- Previous works on computational studies of bullying have shown that natural language processing and machine learning are powerful tools to study bullying.
- Cyberbullying detection can be formulated as a supervised learning problem. A classifier is first trained on a cyberbullying corpus labeled by humans, and the learned classifier is then used to recognize a bullying message.
- Yin et.al proposed to combine BoW features, sentiment features and contextual features to train a support vector machine for online harassment detection.
- Dinakar et.al utilized label specific features to extend the general features, where the label specific features are learned by Linear Discriminative Analysis. In addition, common sense knowledge was also applied.
- Nahar et.al presented a weighted TF-IDF scheme via scaling bullying-like features by a factor of two. Besides content-based information, Maral

et.al proposed to apply users' information, such as gender and history messages, and context information as extra features

Disadvantages of Existing System:

- The first and also critical step is the numerical representation learning for text messages.
- Secondly, cyberbullying is hard to describe and judge from a third view due to its intrinsic ambiguities.
- Thirdly, due to protection of Internet users and privacy issues, only a small portion of messages are left on the Internet, and most bullying posts are deleted.

IV.PROPOSED SYSTEM:

- Three kinds of information including text, user demography, and social network features are often used in cyberbullying detection. Since the text content is the most reliable, our work here focuses on text-based cyberbullying detection.
- In this paper, we investigate one deep learning method named stacked denoisingautoencoder (SDA). SDA stacks several denoisingautoencoders and concatenates the output of each layer as the learned representation. Each denoisingautoencoder in SDA is trained to recover the input data from a corrupted version of it. The input is corrupted by randomly setting some of the input to zero, which is called dropout noise. This denoising process helps the autoencoders to learn robust representation.
- In addition, each autoencoder layer is intended to learn an increasingly abstract representation of the input.
- In this paper, we develop a new text representation model based on a variant of SDA: marginalized stacked denoisingautoencoders (mSDA), which adopts linear instead of nonlinear projection to accelerate training and marginalizes infinite noise distribution in order to learn more robust representations.
- We utilize semantic information to expand mSDA and develop Semantic-enhanced Marginalized Stacked DenoisingAutoencoders (smSDA). The semantic information consists of bullying words. An automatic extraction of bullying words based on word embeddings is proposed so that the involved human labor can be reduced. During training of smSDA, we attempt to reconstruct bullying features from other normal words by discovering the latent structure, i.e. correlation, between bullying and normal words. The intuition behind this idea is that some bullying messages do not contain bullying words. The correlation information discovered by smSDA helps to reconstruct bullying features from normal words, and this in turn facilitates detection of bullying messages without containing bullying words.

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Advantages of Proposed System:

- Our proposed Semantic-enhanced Marginalized Stacked DenoisingAutoencoder is able to learn robust features from BoW representation in an efficient and effective way. These robust features are learned by reconstructing original input from corrupted (i.e., missing) ones. The new feature space can improve the performance of cyberbullying detection even with a small labeled training corpus.
- Semantic information is incorporated into the reconstruction process via the designing of semantic dropout noises and imposing sparsity constraints on mapping matrix. In our framework, high-quality semantic information, i.e., bullying words, can be extracted automatically through word embeddings.
- Finally, these specialized modifications make the new feature space more discriminative and this in turn facilitates bullying detection.
- Comprehensive experiments on real-data sets have verified the performance of our proposed model.

V.IMPLEMENTATION

MODULES:

- OSN System Construction Module
- Construction of Bullying Feature Set
- Cyberbullying Detection.
- Semantic-Enhanced Marginalized Denoising Auto-Encoder.

MODULES DESCSRIPTION:

OSN System Construction Module

- In the first module, we develop the Online Social Networking (OSN) system module. We build up the system with the feature of Online Social Networking. Where, this module is used for new user registrations and after registrations the users can login with their authentication.
- Where after the existing users can send messages to privately and publicly, options are built. Users can also share post with others. The user can able to search the other user profiles and public posts. In this module users can also accept and send friend requests.
- With all the basic feature of Online Social Networking System modules is build up in the initial module, to prove and evaluate our system features.

Construction of Bullying Feature Set:

- The bullying features play an important role and should be chosen properly. In the following, the steps for constructing bullying feature set Zb are given, in which the first layer and the other layers are addressed separately.
- For the first layer, expert knowledge and word embeddings are used. For the other layers, discriminative feature selection is conducted.
- In this module firstly, we build a list of words with negative affective,

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including swear words and dirty words. Then, we compare the word list with the BoW features of our own corpus, and regard the intersections as bullying features.

- Finally, the constructed bullying features are used to train the first layer in our proposed smSDA. It includes two parts: one is the original insulting seeds based on domain knowledge and the other is the extended bullying words via word embeddings
- Observe Attentively Over A Period Of Time.

Cyber bullying Detection:

- In this module we propose the Semantic-enhanced Marginalized Stacked Denoising Auto-encoder (smSDA). In this module, we describe how to leverage it for cyberbullying detection. smSDA provides robust and discriminative representations The learned numerical representations can then be fed into our system.
- In the new space, due to the captured feature correlation and semantic information, even trained in a small size of training corpus, is able to achieve a good performance on testing documents.
- Based on word embeddings, bullying features can be extracted automatically. In addition, the possible limitation of expert knowledge can be alleviated by the use of word embedding
- BLOCK THE ACCOUNTS:
  - Abnormal user.
  - Cyber- Crime user.

Semantic-Enhanced Marginalized Denoising Auto-Encoder:

- An automatic extraction of bullying words based on word embeddings is proposed so that the involved human labor can be reduced. During training of smSDA, we attempt to reconstruct bullying features from other normal words by discovering the latent structure, i.e. correlation, between bullying and normal words. The intuition behind this idea is that some bullying messages do not contain bullying words.
- The correlation information discovered by smSDA helps to reconstruct bullying features from normal words, and this in turn facilitates detection of bullying messages without containing bullying words. For example, there is a strong correlation between bullying word fuck and normal word off since they often occur together.
- If bullying messages do not contain such obvious bullying features, such as fuck is often misspelled as fck, the correlation may help to reconstruct the bullying features from normal ones so that the bullying message can be detected. It should be noted that introducing dropout noise has the effects of enlarging the size of the dataset, including training data

size, which helps alleviate the data sparsity problem.

VI.CONCLUSION

- In,This paper addresses the text-based cyberbullying detection problem, where robust and discriminative representations of messages are critical for an effective detection system. By designing semantic dropout noise and enforcing sparsity,
- we have developed semantic-enhanced marginalized denoisingautoencoder as a specialized representation learning model for cyberbullying detection. In addition, word embeddings have been used to automatically expand and refine bullying word lists that is initialized by domain knowledge. The performance of our approaches has been experimentally verified through two cyberbullying corpora
- from social medias: Twitter and MySpace. As a next step we are planning to further improve the robustness of the learned representation by considering word order in messages.

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