

Survey on Detecting Psychological Stress System with FGM

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Abstract - *Psychological stress is frightening the people's fitness. It is important to notice stress suitable for active care. With the reputation of social media, people are reprocessed to sharing their day-to-day events and cooperating with friends on social media platforms, building it achievable to strength online social network data for stress detection. In this paper, we finding that users stress state are carefully associated toward that of friends in social media, and we pay a large-scale dataset from actual social stands to thoroughly study the connection of users' pressure situations and social communications. We major outline a set of stress-related documented, graphic, and social qualities from numerous features, and then suggest a novel hybrid model - a factor graph model joint with Convolution Neural Network to influence tweet content and social contact information for stress discovery. Investigational results display that the proposed model can recover the detection show by 6-9% in F1-score. By further analyzing the social interaction data, we also discover several fascinating marvels, i.e. the number of social structures of scarce influences (i.e. by no delta connections) of stressed users is around 14% progressive than that of non-stressed users, representative that the social structure of stressed users' friends incline to be less connected and less complicated than that of non-stressed users.*

Key Words: Stress detection, factor graph model, micro-blog, social media, healthcare, social interaction.

1. INTRODUCTION

With growth of the Internet, people have developed increasingly dependent on social connections. Social media data are form by multiple modalities, for instance, text, images, voice, social interactions, etc. Moreover, the modalities in data samples vary identical. Social media data has created different types of co relational structures and distinctive statistical properties. Old-style approaches focus on dealing with single modality data or combining data of multiple and same modalities. In contrast, cross-media learning focuses on similar and diverse multimedia data. This multimedia data from various sources wants to be integrated as a means to learn knowledge about the world synergistically. We mention to same problem as the essential problem for cross-media learning.

Early social media, like Facebook, YouTube and Twitter, are being accepted by a growing number of entrepreneurs who seek to deploy them for the advantage of their business. In the relatively few scholarly studies that reflect how such social media may benefit firms, the popular has focused on social media as marketing tools. Tiny is known about social media may move the entrepreneurs themselves. In our paper, we statement this cavity by reviewing how the use of one social medium, Twitter, may cause effectual entrepreneurial intellectual and action. Given that social interaction is facilitated by social media, and that social interaction is one key element in the effectuation perspective, it is logical to ask how the use of a social media channel may affect entrepreneurs' effectual cognitions. By studying how engagement with social media may be related to aspects of

effectuation, we can advance a better accepting of the conditions under which entrepreneurs' use of social media may facilitate cognitions and behaviours that ultimately result in creating opportunities and developing new firms, markets, or industries. At the same time, by reviewing the use of social media through an effectuation lens, we can achievement a theory-informed understanding of the potential impact of adoption of such channels by entrepreneurs.

Psychological stress is becoming a threat to people's health nowadays with the rapid pace of life, more and more people are feeling stressed. According to a worldwide survey reported by fresh business in 2010, over half of the population have experienced an appreciable rise in stress over the last two years. Though stress itself is non-clinical and common in our life, excessive and chronic stress can be rather injurious to people's physical and mental health. According to existing research works, long-term stress has been found to be related to many diseases, e.g., clinical depressions, insomnia etc. Moreover, according to Chinese Centre for Disease Control and Prevention, suicide has become the top cause of death among Chinese youth, and excessive stress is considered to be a chief factor of suicide. All these reveal that the rapid increase of stress has become a great challenge to human health and life quality. Thus, there is significant importance to detect stress before it turns into severe problems. Traditional psychological stress detection is mainly based on face-to face interviews, self-report surveys or wearable sensors. However, extra additional methods are actually reactive, which are usually labour-consuming, time-costing and hysteretic. Are there any timely and proactive methods for stress detection? The rise of social media is changing people's life, as well as research in healthcare and wellness. With the development of social networks like twitter and Sina Weibo more and more people are willing to share their daily events and moods, and interact with friends through the social networks. As these social media data timely reflect users' real-life states and emotions in a timely manner, it offers new opportunities for representing, measuring, modelling, and mining user's behaviour patterns through the large-scale social networks, and such social information can find its theoretical basis in psychology research. For example,[2] found that stressed users are more likely to be socially less active, and more recently, there have been research efforts on harnessing social media data for developing mental and physical healthcare tools. For example, proposed to leverage Twitter data for real-time disease surveillance; while [3] tried to bridge the vocabulary gaps between health seekers and providers using the community generated health data. There are also some research works using user tweeting contents on social media platforms to detect users' psychological stress. Existing works demonstrated that leverage social media for healthcare, and in particular stress detection, is feasible.

In the next segment we will go through some of the researches provided the different authors on Detecting Psychological stress system.

2. LITERATURE SURVEY

In paper [2] author reveal emotional states, intentions, thinking styles, individual differences, etc. LIWC (Linguistic Inquiry and Word Count) has been widely used for psychological text analysis, and its dictionary is the core. The Traditional Chinese version of LIWC dictionary has been released, which is a translation of LIWC English dictionary. However, Simplified Chinese which is the world's most widely used language has subtle differences with Traditional Chinese. Furthermore, both English LIWC dictionary and Traditional Chinese version dictionary were both developed for relatively formal text. Micro blog has become more and more popular in China nowadays. Original LIWC dictionaries take less consideration on micro blog popular words, which makes it less applicable for text analysis on micro blog. In this study, a Simplified Chinese LIWC dictionary is established according to LIWC categories. After translating Traditional Chinese dictionary into Simplified Chinese, five thousand words most frequently used in micro blog are added into the dictionary. Four graduate students of psychology rated whether each word be-longed in a category. The reliability and validity of Simplified Chinese LIWC dictionary were tested by these four judges. This new dictionary could contribute to all the text analysis on micro blog in future.

In this paper [3], Cross-media analysis exploits social data with different modalities from multiple sources simultaneously and synergistically to discover knowledge and better understand the world. There are two levels of cross-media social data. One is the element, which is made up of text, images, voice, or any combinations of modalities. Elements from the same data source can have different modalities. The other level of cross-media social data is the new notion of aggregative subject (AS)—a collection of time-series social elements sharing the same semantics (i.e. a collection of tweets, photos, blogs, and news of extra events). While traditional feature learning methods focus on dealing with single modality data or data fused across multiple modalities, in this training, we systematically analyze the problem of feature learning for cross-media social data at the previously mentioned two levels. The general purpose is to obtain a robust and uniform representation from the social data in time-series and across different modalities. We propose a novel unsupervised method for cross-modality element-level feature learning called cross auto encoder (CAE). CAE can capture the cross-modality correlations in element samples. Furthermore, we extend it to the AS using the convolutional neural network (CNN), namely convolutional cross au- to encoder (CCAIE). We use CAEs as filters in the CCAIE to lever cross-modality elements and the CNN framework to handle the time sequence and reduce the impact of outliers in AS. We finally apply the proposed method to classification tasks to evaluate the quality of the generated representations against several real-world social media datasets. In terms of accuracy, CAE gets 7.33% and 14.31% overall incremental rates on two element-level datasets. CCAIE gets 11.2% and 60.5% overall incremental rates on two AS-level datasets. Experimental results show that the proposed CAE and CCAIE work well with all tested classifiers and perform better than several other baseline feature learning methods.

In this paper [4], Long-term stress may lead to many severe physical and mental problems. Traditional psychological stress detection usually relies on the active individual participation, which makes the detection labor-consuming, time-costing and hysteretic. With the rapid development of social networks, people become more and more willing to

share moods via micro blog platforms. In this paper, we propose an automatic stress detection method from cross-media micro blog data. We construct a three-level framework to formulate the problem. We first obtain a set of low-level features from the tweets. Then we define and extract middle-level representations based on psychological and art theories: linguistic attributes from tweets' texts, visual attributes from tweets' images, and social attributes from tweets' comments, retweets and favorites. Finally, a Deep Sparse Neural Network is designed to learn the stress categories incorporating the cross-media attribute. Experiment results show that the proposed method is effective and efficient on detecting psychological stress from micro blog data.

This paper [5], under the rapid social and economic development and intensive competition pressures, adolescents are experiencing different psychological pressures coming from study, communication, affection, and self-recognition. If these psychological pressures cannot properly be resolved and released, it will turn to mental problems, which might lead to serious consequences, such as suicide or aggressive behavior. Traditional face-to-face psychological diagnosis and treatment cannot meet the demand of relieving teenagers' stress completely due to its lack of timeliness and diversity. With micro-blog becoming a popular media channel for teenagers' information acquisition, interaction, self expression, emotion release, we envision a micro-blog platform to sense psychological pressures through teenagers' tweets, and assist teenagers to release their stress through micro-blog. We investigate a number of features that may reveal teenagers' pressures from their tweets, and then test five classifiers (Naive Bayes, Support Vector Machines, Artificial Neural Network, Random Forest, and Gaussian Process Classifier) for pressure detection. We also present ways to aggregate single-tweet based detection results in time series to overview teenagers' stress fluctuation over a period of time. Experimental results show that the Gaussian Process Classifier offers the highest detection accuracy due to its robustness in the presence of a large degree of uncertainty that may be encountered with previously-unseen training data on micro-blog tweets. Among the features, tweet's emotional degree combining negative emotional words, emoticons, exclamation and question marks, plays a primary role in psychological pressure detection.

This paper [6], recent years have witnessed the explosive growth of online social media. Weibo, a Twitter-like online social network in China, has attracted more than 300 million users in less than three years, with more than 1000 tweets generated in every second. These tweets not only convey the factual information, but also reflect the emotional states of the authors, which are very important for understanding user behaviours. However, a tweet in Weibo is extremely short and the words it contains evolve extraordinarily fast. Moreover, the Chinese corpus of sentiments is still very small, which prevents the conventional keyword-based methods from being used. In light of this, we build a system called Mood Lens, which to our best knowledge is the first system for sentiment analysis of Chinese tweets in Weibo. In Mood Lens, 95 emoticons are mapped into four categories of sentiments, i.e. angry, disgusting, joyful, and sad, which serve as the class labels of tweets. We then collect over 3.5 million labelled tweets as the corpus and train a fast Naive Bayes classifier, with an empirical precision of 64.3%. Mood Lens also implements an incremental learning method to tackle the problem of the sentiment shift and the generation of new words. Using Mood Lens for real-time tweets obtained from

Weibo, several interesting temporal and spatial patterns are observed. Also, sentiment variations are well-captured by Mood Lens to effectively detect abnormal events in China. Finally, by using the highly efficient Naive Bayes classifier, Mood Lens is capable of online real-time sentiment monitoring.

This paper [7], Cross-media analysis exploits social data with different modalities from multiple sources simultaneously and synergistically to discover knowledge and better understand the world. There are two levels of cross-media social data. One is the element, which is made up of text, images, voice, or any combinations of modalities. Elements from the same data source can have different modalities. The other level of cross-media social data is the new notion of aggregative subject (AS)—a collection of time-series social elements sharing the same semantics (i.e., a collection of tweets, photos, blogs, and news of emergency events). While traditional feature learning methods focus on dealing with single modality data or data fused across multiple modalities, in this study, we systematically analyse the problem of feature learning for cross-media social data at the previously

mentioned two levels. The general purpose is to obtain a robust and uniform representation from the social data in time-series and across different modalities. We propose a novel unsupervised method for cross-modality element-level feature learning called cross auto encoder (CAE). CAE can capture the cross-modality correlations in element samples. Furthermore, we extend it to the AS using the convolutional neural network (CNN), namely convolutional cross auto encoder (CCA). We use CAEs as filters in the CCAE to handle cross-modality elements and the CNN framework to handle the time sequence and reduce the impact of outliers in AS. We finally apply the proposed method to classification tasks to evaluate the quality of the generated representations against several real-world social media datasets. In terms of accuracy, CAE gets 7.33% and 14.31% overall incremental rates on two element-level datasets. CCAE gets 11.2% and 60.5% overall incremental rates on two AS-level datasets. Experimental results show that the proposed CAE and CCAE work well with all tested classifiers and perform better than several other baseline feature learning methods.

Table -1: Survey Table

| Sr. No | Title | Paper Details | Method Used | Advantages | Disadvantages |
|--------|--|--|--|---|---|
| 1 | Detecting Stress Based on Social Interactions in Social Networks | Stress detection system for flexibility of social network | the factor graph model (FGM) and convolution neural Network (CNN). | discovered several intriguing phenomena of stress. | --- |
| 2 | Developing Simplified Chinese Psychological Linguistic Analysis Dictionary for Micro blog | Developed Simplified Chinese Psychological Linguistic Analysis Dictionary for Micro blog | Sina Microblog high frequency words selection | SCLIWC bridges the gap between LIWC software and Simplified Chinese | Can analyze only Single behaviour tweets There is no option to tweet based on user emotions |
| 3 | Learning robust uniform features for cross-media social data by using cross Auto encoders | formulate the feature learning problem for cross-media social data with respect to social elements | convolution cross auto-encoder (CCA) | handle the cross-modality correlations in cross-media social elements | There is only Feature engineering technique which fails to detect the different type of stress. There is no Support vector classification technique to categorize the different type of user emotions. |
| 4 | Psychological Stress Detection From Cross-Media Micro blog Data Using Deep Sparse Neural Network | Detected Psychological stress | Cross-media Auto-Encoder | | There is only Low level Semantics in detecting Stress. There is no Option to analyze the stress based on Stress Category. |
| 5 | Mood Lens: An Emoticon-Based Sentiment | Emoticon-Based Sentiment Analysis System | Emoticon-Based Method | real-time monitoring of sentiment fluctuations | Only used for this four sentiments angry, disgusting, joyful, and |

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|---|---|--|---------------------|--|---|
| | Analysis System for Chinese Tweets | | | | sad. The Sentiment Patterns used for the hourly pattern of the sentiment |
| 6 | User-Level Psychological Stress Detection from Social Media Using Deep Neural Network | Psychological Stress detection | Cross auto encoders | effective and efficient on detecting psychological stress from micro-blog data | <ul style="list-style-type: none"> Used only for stress detection from micro-blog data Modeling stress in user-level is more difficult than in discrete tweet-level |
| 7 | An Alternative Evaluation of Post Traumatic Stress Disorder with Machine Learning Methods | Post Traumatic stress disorder detection | Naïve Bayes | 74-79% accuracy range | Whole concept only used for Posttraumatic stress disorder (PTSD) diagnosing |

3. CONCLUSIONS

In this survey we have studied the presented a framework for detecting users' psychological stress states from users' weekly social media data, leveraging tweets' content as well as users' social interactions. Employing real-world social media data as the basis, we studied the correlation between user' psychological stress states and their social interaction behaviors. To fully leverage both content and social interaction information of users' tweets, we proposed a hybrid model which combines the factor graph model (FGM) with a convolutional neural network (CNN). In this work, we also discovered several intriguing phenomena of stress. We found that the number of social structures of sparse connection (i.e. with no delta connections) of stressed users is around 14% higher than that of non-stressed users, indicating that the social structure of stressed users' friends tend to be less connected and less complicated than that of non-stressed users. These phenomena could be useful references for future related studies

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