

Chapter 53

Emotion Mining Using Semantic Similarity

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ABSTRACT

Social networks are considered as the most abundant sources of affective information for sentiment and emotion classification. Emotion classification is the challenging task of classifying emotions into different types. Emotions being universal, the automatic exploration of emotion is considered as a difficult task to perform. A lot of the research is being conducted in the field of automatic emotion detection in textual data streams. However, very little attention is paid towards capturing semantic features of the text. In this article, the authors present the technique of semantic relatedness for automatic classification of emotion in the text using distributional semantic models. This approach uses semantic similarity for measuring the coherence between the two emotionally related entities. Before classification, data is pre-processed to remove the irrelevant fields and inconsistencies and to improve the performance. The proposed approach achieved the accuracy of 71.795%, which is competitive considering as no training or annotation of data is done.

INTRODUCTION

Social networks have become a popular interaction platform. Social Networking Sites like Facebook, Twitter has changed the standard of social interaction among the online users. Social Networking Sites enables online users to share their ideas, experiences, feelings, and emotions related to their daily routines. Social Networks are considered the most abundant sources of affective information for emotion analysis, affective computing and sentiment analysis. Sentiment analysis deals with determining the appraisals, feelings, opinions about different entities. Emotion analysis deals in determination and identification of feelings or emotions like Anger, Disgust, Fear, Happiness, Sadness, and Surprise. The goal of this

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research is to create an automated system able to detect emotions in text using Semantic similarity between two textual elements. Our system creates a knowledge base for classification and then uses that knowledge base to infer classes of unseen data.

Emotion is defined as the mental state observed by behavioral or developmental changes. Emotions are universal despite the vast differences between different individuals and their cultures. The social conditions also induce emotions. Emotions are not bounded by the person's inner conscience but also afflicted by the person's experiences, goals and most importantly by the society. Emotions are a fundamental part of human nature possessed by every human. Emotions can be broadly classified into two types: Basic emotions and Complex Emotions. Basic emotions include Anger, Disgust, Fear, Happiness, Sadness, and Surprise. Complex emotion encompasses two or more emotions felt by a person in a particular situation. An accurate emotion detection system can be thus very beneficial for social orientation. Therefore, the need of the hour is a reliable and scalable emotion detection system capable of mapping human wrote social media posts into a different set of emotions for tracking the well-being of the society and provide benefits to the business establishments and political systems. The creation of automatic emotion detection system would thus allow us to evaluate and identify the people's emotion by automatically analyze the social media content like twitter posts and Facebook comments. The automation emotion detection system would thus be having one module for analyzing the social web for the social content and tracking the well-being of the individual. Social media posts also contain the geographical and temporal information; the system will hence be able to track the well-being state of a social group at some particular place, in some specific temporal area.

The relevance of this paper is found as the vast number of applications that are being used to detect the emotional states of people and the benefit they are providing to the business establishments, political parties, individuals and society at large. Its relevance can also be seen in the e-learning environment (Rodriguez, Ortigosa, & Carro, 2012), suicide prevention (Suero Montero, & Suhonen, 2014), depression detection (Desmet, & Hoste, 2013), detection of cyber-bullying (Vaassen, 2014) or tracking the well-being of user community (Dadvar, Trieschnigg, Ordelman, & de Jong, 2013).

The primary challenge for the automatic emotion detection systems is that they do not capture the semantic meaning of the textual systems; instead, they focus on the statistical features present in the text. Traditionally, these systems employ either lexical resources or use statistical measures to build the automatic emotion detection systems. However, none of these systems would employ the measures to focus on the semantics of the text. Moreover, with the employment of these resources the emotion detection systems would have bias and thus classification of emotions is not accurate and thus the emotion detection systems are not scalable, robust and are thus error-prone.

For this reason, we propose an Automatic emotion detection system which is capable of exploiting the semantic similarity between textual elements and thus classify text based on semantic relatedness measure. The proposed system consists of three main steps: 1) creation of seed documents using NRC Emotion Lexicon (Mohammad, & Turney, 2013) which is used to evaluate semantic association of the textual element to be classified and emotion class; 2) Generation of Big-Vectors of text using Word2Vec (Mikolov, Chen, Corrado, & Dean, 2013); 3) Using semantic relatedness measure to calculate the semantic association between seed documents and textual element to compute emotion class of the textual element.

We measured the effectiveness of the proposed automatic emotion classifier using pre-labeled standard datasets and found comparable results. Thus, proposed automatic emotion classifier be built keeping the semantics of text in consideration which was lacking in the previous start of art research conducted in the area of automatic emotion classification. Moreover, the results of our proposed technique confirm the efficacy of the proposed technique of emotion detection.

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