

Chapter 83

Impact of Deep Learning on Semantic Sentiment Analysis

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ABSTRACT

Online social media (forums, blogs, and social networks) are increasing explosively, and utilization of these new sources of information has become important. Semantics plays a significant role in accurate analysis of an emotion speech context. Adding to this area, the already advanced semantic technologies have proven to increase the precision of the tests. Deep learning has emerged as a prominent machine learning technique that learns multiple layers or data characteristics and delivers state-of-the-art output. Throughout recent years, deep learning has been widely used in the study of sentiments, along with the growth of deep learning in many other fields of use. This chapter will offer a description of deep learning and its application in the analysis of sentiments. This chapter will focus on the semantic orientation-based approaches for sentiment analysis. In this work, a semantically enhanced methodology for the annotation of sentiment polarity in Twitter/ Facebook data will be presented.

1. INTRODUCTION

1.1 Introduction to Deep Learning

G.E Hinton in 2006 proposed the concept of deep learning & was also the founder of the Deep Neural Network machine learning (Day & Lee, 2016). The human brain is influenced by the neural network and contains many neurons which make up an impressive network. Deep learning (DL) simulate the structure of the human brain hierarchically, processes data from the lower to the upper level and gradu-

DOI: 10.4018/978-1-6684-6303-1.ch083

ally produces more and more semantic concepts. In developing the technology of big data and artificial intelligence, deep learning has been increasingly explored as a machine learning paradigm. Deep learning networks can provide both supervised and unsupervised training (Vateekul & Koomsubha, 2016). The architecture of deep learning demonstrates maximum potential when dealing with different functions and involves large numbers of labeled samples to collect data across deep architectures. Deep learning networks and techniques are widely implemented in various fields such as visual recognition, pedestrian tracking, off-road robot navigation, category artifacts, acoustic signaling & in the prediction of time series (Arnold et.al, 2011). In natural language processing the dynamic multi-tasking, including syntactic and semantic labeling, can be highly performed using deep architectures.

1.2 Introduction to Sentiment Analysis

Opinions or ideals have become an essential component in making judgement or alternatives for people or businesses. The rapid boom of Web 2.0 over the last decade has improved online organizations and enabled humans to put up their reviews or evaluation on a variety of topics in public domains. This user-generated content (UGC) is an essential statistics supply to help clients make shopping decision, however also provided treasured insights for shops or manufacturers to enhance their marketing strategies and products (Pang & Lee, 2008) . Sentiment evaluation deals with the computational treatment of critiques expressed in written texts (Kalra & Agrawal, 2017) .In the era of Information explosion, there may be a huge quantity of opinionated statistics generated each day. These generated statistics leads to unstructured records and the analysis of these records to extract useful information is a hard to achieve task. The need to address these unstructured opinionated statistics naturally causes the upward push of sentiment analysis. The addition of already mature semantic technologies to this subject has increased the consequences accuracy. Evaluation of semantic of sentiments is precisely essential method in the internet now days. Discovering the exact sense and understanding in which a specific sentence was written on the net is very important as there might not be any physical interaction to discover the significance of the sentence. There are a number of techniques to classify the specified sentiment as bad or terrible. This categorization helps us honestly discover the context of a sentence remotely (Gupta & Verma, 2019). The crucial troubles in sentiment evaluation is to express the sentiments in texts and to check whether or not the expressions indicate superb (favorable) or negative (unfavorable) opinions toward the challenge and to evaluate the correctness of the sentences that are classified.

1.3 Sentiment Analysis and Deep Learning

Deep learning plays a major role in both unsupervised and supervised learning, and many researchers use deep learning to perform sentiment analysis. Deep learning model is comprised of numerous efficient and common models, which are used to effectively solve the various problems (Ouyang, 2015). The most prominent example of deep learning is used by Socher where he has used Recursive Neural Network (RNN) to analyze the sentiments in film reviews (Socher et.al, 2011). Following the efforts of (Mikolov, 2013), many researchers have carried out a sentiment classification using neural networks, for instance, Kalchbrenner (Kalchbrenner et.al, 2014) anticipated a complex DyCNN(Dynamic Convolution Neural network) that uses an activity of pooling, i.e., dynamic k-max pooling on linear sequences. Similarly, Kim (Kim, 2014) uses CNN to learn sentence vectors of sentiments.

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