

# Chapter 43

## Deep Learning for Social Media Text Analytics

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### ABSTRACT

*Text analytics is the process of extracting high quality information from the text. A set of statistical, linguistic, and machine learning techniques are used to represent the information content from various textual sources such as data analysis, research, or investigation. Text is the common way of communication in social media. The understanding of text includes a variety of tasks including text classification, slang, and other languages. Traditional Natural Language Processing (NLP) techniques require extensive pre-processing techniques to handle the text. When a word “Amazon” occurs in the social media text, there should be a meaningful approach to find out whether it is referring to forest or Kindle. Most of the time, the NLP techniques fail in handling the slang and spellings correctly. Messages in Twitter are so short such that it is difficult to build semantic connections between them. Some messages such as “Gud nite” actually do not contain any real words but are still used for communication.*

### DEEP LEARNING APPROACH IN HANDLING THE TEXT

The deep learning is a new learning method of the machine learning, it analyze the neural network through the imitation of the human brain and the interpretation of the appropriate data. In the process of text mining, the application of the deep learning would be suitable for text clustering and text classification, it is easy to find the desired text information, so the application of the deep learning plays an important role in process of handling the text.

The Deep learning architectures are helpful in understanding a number of languages faster. A number of variations such as slang and spellings exist across various languages. The language dependent knowledge can very well be reduced with the help of Deep learning architectures. The mathematical

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concept of word embeddings can be used to preserve the semantic relationship between words. This kind of representation generally helps to retrieve the deeper semantic meaning of words.

Social media sites such as Facebook, Instagram, Twitter etc. allows users to share lots of photos tagged with text information. The joint understanding of image and text is so important to perceive the user's information. The Deep learning architecture helps in the joint understanding of the text and visual content.

Deep learning allows the algorithms to understand the structure and semantics of the sentence. The model considers the representation of the entire sentence. The result is so meaningful as the entire sentence is based on the arrangement of the words and the interaction between the words.

Deep learning is better than traditional machine learning algorithms because they try to learn high-level features from data in an incremental manner. Deep learning techniques outperform other algorithms in the performance when the data size is very large. Deep Learning really shines when it comes to complex problems such as image classification, natural language processing, and speech recognition.

## **SOCIAL MEDIA ANALYSIS**

Social media is an important communication medium during crisis. The machine has to understand the text by recognizing the words. The task is so challenging in social media because it contains misspellings, abbreviations and moreover social media text does not follow any syntax and semantics. The traditional supervised learning approaches mainly depend on the correctness of the training set. A number of ways the word is misspelled is so large and the traditional supervised learning approaches fail to reach its target (Acharyya, 2009).

The traditional supervised machine learning approach has certain limitations on the predefined topics. When text on a new topic i.e some new crisis is presented to the algorithm it will misclassify it as one of the existing topics. In the sequence of semantically related words Deep learning can be used to predict the next word (LeCun, Bengio & Hinton, 2015) and thus the Deep learning approach have learnt the semantic representation of words. This approach also predicts the next character in a sequence of characters and is used to generate the text (LeCun, Bengio & Hinton, 2015). Deep learning approach can be used on the normalized text and is used to learn the features for the concepts automatically. The document is decomposed into concepts and the text is segmented into semantically meaningful atomic units (Mehdi Ben Lazreg, Morten Goodwin, & Ole-Christoffer Granmo, 2016). A deeper understanding is established by identifying the underlying concepts of a document or a sentence. This is the foundation for the understanding of social media text.

## **DEEP LEARNING MODELS**

### **Convolutional Neural Networks (CNN)**

The Convolutional Neural Network (CNN) comprises of pooling layers and sophistication as it produces a standard architecture to map the sentences of variable length into sentences of fixed size scattered vectors. This CNN framework for the visual sentiment analysis can very well predict sentiments of visual content. The Single one-dimensional convolution layer is followed by a max pooling layer combining neighboring vectors. The final linear classifier for each class selects the class with highest confidence score. The goal is to learn a region based on text embedding.

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