Chapter 5
Ontology-Based Opinion Mining

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ABSTRACT

E-commerce business is very popular as a large amount of data is available on the internet in the form of unstructured data. To find new market trends and insight, it is very important for an organization to track the customers' opinions/reviews on a regular basis. Reviews available on the internet are very scattered and heterogeneous (i.e., structured as well as unstructured form of data). A good decision is always based on the quality of information within a specified period of time. Ontology is an explicit detailed study of concepts. The word ontology is borrowed from philosophy. It can also be defined as systematic maintenance of information about the things which already exist. In computer science, it could be said that it is a formal representation of knowledge with the help of a fixed set of believed concepts and the relationship between those concepts.

INTRODUCTION

Opinion Mining, also known as sentiment analysis, is a process which aims to determine the polarity of a textual corpus i.e document, paragraph or sentence etc., ending towards positive, negative or neutral sense. Economic and Financial modeling could be one of the most promising application of Opinion Mining/Sentiment Analysis.

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Machine Learning based sentiment classifiers also consist of an opinion mining tool. But the main problem with these classifiers is that they classify opinions of users into classes (+ve, -ve or neutral) which assigns a corresponding score to each of the class as a whole rather than considering that many aspects of the same notion is also there. Machine learning approach always gives a single quantitative (sentiment score) or qualitative result (+ve or –ve). So, there is a requirement of ontology based techniques which is a fine grained version of Opinion Mining/Sentiment Analysis.

Ontology is an explicit detailed study of concepts. The word 'Ontology' is borrowed from philosophy. Ontology can be defined as an "explicit, machine-readable specification of a shared conceptualization'. It is generally considered as a formal specification of conceptualization which consists of concepts and their relations. It can also be defined as systematic maintenance of information about the things which already exist.

In Computer Science, "Ontology Based Opinion Mining" is a formal representation of knowledge with the help of a fixed set of believed concepts and the relationship between those concepts. It could have the reasons about the domain's properties and with the help of that property a domain can be described easily. So, it is a formal explicit description of the basic/core concepts of domain. It also provides a shared word stock/lexicon.

It is an identification and extraction of subjective material from different types of source material or from the unstructured data with the help of natural language processing, computational linguistics and text analytics.

Ontologies are used in many areas like Artificial Intelligence, Library Science and Information Science. Mainly there are 4 categories of ontologies:

1. **Static:** This type of ontology tells us about the existing things, their attributes and relationship between them.
2. **Dynamic:** It describe transition, process and morphisms of various types of things.
3. **Intentional:** It deals with want, prove or disprove and argue about the things as per user's own perception.
4. **Social:** It relates with surrounding environment and its settings.

Ontologies can be used in many ways. Within Computer Science, it is a model for describing world which has a particular set of types, their relationships and properties. It can also be assumed that there is a very thin line of difference between real world and the model features used for ontologies. Text based online reviews by customers for a product is fair and unbiased parameter to quality measure of the product. But the problem is that all these reviews cannot be read by all users. So we have to apply some techniques of opinion mining which can construct a feature