Chapter 16
Mining Sentiment Using Conversation Ontology

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ABSTRACT

The research in the field of opinion mining has been ongoing for several years, and many models and techniques have been proposed. One of the techniques that can address the need for automated information monitoring to help to identify the trends and patterns that matter is sentiment mining. Existing approaches enable the analysis of a large number of text documents, mainly based on their statistical properties and possibly combined with numeric data. Most approaches are limited to simple word counts and largely ignore semantic and structural aspects of content. Conversation plays a vital role in expressing and promoting an opinion. In this chapter, the authors discuss the concept of ontology and propose a framework that allows the incorporation of information on conversation structure in the models for sentiment discovery in text.

INTRODUCTION

The vision of the Semantic Web is to enable machines to interpret and process information in the World Wide Web to provide quality support to the mankind in carrying out their various tasks with the information and communication technology. The challenge of the Semantic Web is to provide necessary information with well-defined meaning, understandable for different parties as well as machines in such a way that applications are able to provide customized access to information by taking the individual needs and requirements of the users into account. Several technologies have

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been developed for shaping, constructing, and developing the Semantic Web. Ontology plays an important role for the Semantic Web as a source of formally defined terms for communication. The prime objective of ontology is to facilitate knowledge sharing and reuse on the distributed platform. Typically, ontology includes taxonomy of terms and details about representation scheme. Ontology creation consists of defining all ontology components through an ontology definition language. Such a creation of ontology is initially done informally using either natural language or diagram technique, and further the ontology is encoded in a formal knowledge representation language such as RDF Schema or Web Ontology Language.

In today's world, there is a demand for mechanized information monitoring tools that make easier to discover the issues and patterns that matter and that can follow and predict emerging events in day-to-day processes. One of the techniques that can address this need is sentiment mining. In the literature, existing approaches enable the analysis of a large number of text documents, mainly based on their statistical properties and possibly combined with numeric data. Moreover, such approaches are limited to simple word counts. There is a need for understanding semantic and structural features of content. Human conversation plays a significant role in expressing and promoting an opinion.

The chapter begins with ontology fundamentals. The aim is to discuss ontology concepts at a certain level of details. The chapter is organized as follows: Besides providing definition and necessary introduction, the chapter presents terminology for taxonomy, thesauri, and ontology. Further, various issues related to ontology such as type of ontology, and parameters construction of ontology are discussed. Next section presents general introduction of sentiment mining and, the interrelated notions of text mining and sentiment mining. Further, we focus on discovery of conversation structures. Finally, a framework that allows the incorporation of information on conversation structure in the models for sentiment discovery in text is presented.

ONTOLOGY FUNDAMENTALS

In the broader context of the Semantic Web, applications need to understand by machine, which is being done with the help of the meaning associated with each component stored on the Web. Such capability of understanding is not covered by the traditional tools like mark up languages and protocols utilized on World Wide Web platform. There is a requirement of a component representation scheme called Ontology. Ontology interweaves human and computer understanding of symbols. These symbols, also known as terms, can be interpreted by both humans and machines. Ontology are means for conceptualizing and structuring knowledge. They are used for semantic annotation of resources in order to support information retrieval, automated inference, and interoperability among services and applications across the Web.

What is Ontology

Ontologies provides in depth properties and classes such as inverses, unambiguous properties, unique properties, lists, restrictions, cardinalities, pair wise disjoint lists, data types, and so on. Ontologies are often able to provide an objective specification of domain information by representing a consensual agreement on the concepts and relations that characterize the manner knowledge in that domain is expressed. This specification can be the first step in building semantically aware information systems to support diverse enterprise, government, and personal activities.

The original definition of ontology comes from the field of philosophy. It is included in the Webster's revised unabridged dictionary.