

Synopsis

Aspect based Sentiment Analysis using NLP and Deep Learning

SUBMITTED

BY

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Under the Guidance of:

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**1. Introduction**

**1.1**  **General Introduction to the topic**

Sentiment analysis is increasingly viewed as a vital task both from an academic and a commercial standpoint. The majority of current approaches, however, attempt to detect the overall polarity of a sentence, paragraph, or text span, regardless of the entities mentioned (e.g., laptops, restaurants) and their aspects (e.g., battery, screen; food, service).

By contrast, this task is concerned with aspect based sentiment analysis (ABSA), where the goal is to identify the aspects of given target entities and the sentiment expressed towards each aspect.

Eg. The food was good, but the ambiance was poor.

Here, we have 2 aspects “food”, and “ambiance”. Also, polarities associated with both

aspects are “positive”, and “negative” respectively.

We will use 2 labelled datasets for this problem, and will find aspects, corresponding

polarities, and visualize them.

**1.2**  **Organization**

**Impetus**is a software solutions, products and services company headquartered in Los Gatos, USA with development centers in NOIDA, Indore, Gurgaon, and Bengaluru, India.

With more than 1600 employees globally, Impetus is focused on creating new ways of analyzing data for businesses—helping them gain key business insights across the enterprise.

 They bring together a unique mix of Data Science capabilities and technology expertise across the Big Data ecosystem including Hadoop, NoSQL, NewSQL, MPP databases, machine learning, and innovative visualization.

**1.3**  **Area of Computer Science**

Aspect Based Sentiment Analysis (ABSA) falls under the Machine Learning Branch of Computer Science Applications.

Machine learning is the science of getting computers to act without being explicitly programmed. In the past decade, machine learning has given us self-driving cars, practical speech recognition, effective web search, and a vastly improved understanding of the human genome. Machine learning is so pervasive today that you probably use it dozens of times a day without knowing it.

Many researchers also think it is the best way to make progress towards human-level AI. In this class, you will learn about the most effective machine learning techniques, and gain practice implementing them and getting them to work for yourself.

**1.4**  **Hardware and Software Requirements**

* R studio
* TensorFlow
* CoreNLP

**2. Need for the project**

The applications for sentiment analysis are endless. More and more we’re seeing it used in social media monitoring and VOC to track customer reviews, survey responses, competitors, etc. However, it is also practical for use in business analytics and situations in which text needs to be analyzed.   
   
Sentiment analysis is in demand because of its efficiency. Thousands of text documents can be processed for sentiment (and other features including named entities, topics, themes, etc.) in seconds, compared to the hours it would take a team of people to manually complete. Because it is so efficient (and accurate – Semantria  has 80% accuracy for English content) many businesses are adopting text and sentiment analysis and incorporating it into their processes.

**3. Objective(s)**

Datasets consisting of customer reviews with human-authored annotations identifying the mentioned aspects of the target entities and the sentiment polarity of each aspect are given.

The goal is to identify the aspects of given target entities and the sentiment expressed towards each aspect. Eg. The food was good, but the ambiance was poor.

Here, we have 2 aspects “food”, and “ambiance”. Also, polarities associated with both

aspects are “positive”, and “negative” respectively.

We will use 2 labelled datasets for this problem, and will find aspects, corresponding

polarities, and visualise them.

**4. Methodology**

In particular, the task consists of the following subtasks:

Subtask 1: Aspect term extraction

Given a set of sentences with pre-identified entities (e.g., restaurants), identify the aspect terms present in the sentence and return a list containing all the distinct aspect terms. An aspect term names a particular aspect of the target entity.

For example, "I liked the service and the staff, but not the food”, “The food was nothing much, but I loved the staff”. Multi-word aspect terms (e.g., “hard disk”) should be treated as single terms (e.g., in “The hard disk is very noisy” the only aspect term is “hard disk”).

Subtask 2: Aspect term polarity

For a given set of aspect terms within a sentence, determine whether the polarity of each aspect term is positive, negative, neutral or conflict (i.e., both positive and negative).

For example:

“I loved their fajitas” → {fajitas: positive}

“I hated their fajitas, but their salads were great” → {fajitas: negative, salads: positive}

“The fajitas are their first plate” → {fajitas: neutral}

“The fajitas were great to taste, but not to see” → {fajitas: conflict}

Subtask 3: Aspect category detection

Given a predefined set of aspect categories (e.g., price, food), identify the aspect categories discussed in a given sentence. Aspect categories are typically coarser than the aspect terms of Subtask 1, and they do not necessarily occur as terms in the given sentence.

For example, given the set of aspect categories {food, service, price, ambience, anecdotes/miscellaneous}:

“The restaurant was too expensive”  → {price}

“The restaurant was expensive, but the menu was great” → {price, food}

Subtask 4: Aspect category polarity

Given a set of pre-identified aspect categories (e.g., {food, price}), determine the polarity (positive, negative, neutral or conflict) of each aspect category.

For example:

“The restaurant was too expensive” → {price: negative}

“The restaurant was expensive, but the menu was great” → {price: negative, food: positive}

**5. Project Schedule**

* *January 2018*
* Study Part of speech Tagging in NLP
* *February 2018*
* Implementation of unsupervised ABSA NLP program
* *March 2018*
* Implementation of supervised ABSA NLP program
* Documentation
* *April 2018*
* Submission of report & evaluation
* Study DeepLearning Technology and begin implementation
* *May 2018*
* ABSA implementation using a DeepLearning Approach ( TensorFlow)
* *June 2018*
* Submission of report & evaluation  
    
     
    
     
    
     
    
    
    
    
    
    
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  PROJECT DETAILS

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| **Project Title** | Aspect based Sentiment Analysis using NLP (R) and Deep Learning | | |
| Project Duration | 5 Months | Date of reporting | 22 - Jan - 2018 |
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