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IJIEMR Transactions, online available on 4th Aug 2021. Link
:http://www.ijiemr.org/downloads.php?vol=Volume-10&issue=ISSUE-08

DOI: 10.48047/IJIEMR/V10/I08/05

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Volume 10, Issue 08, Pages: 29-34

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Weakly-Supervised Deep Embedding for Product Review Sentiment Analysis

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ABSTRACT

Now a days the Product reviews are more important for upcoming buyers in helping them make decisions. Different opinion mining techniques have been submitted, where determining a review sentence's orientation is one of their key challenges. The deep learning has appeared as an effective means for solving sentiment classification problems. A neural network congenitally learns a useful representation automatically without human efforts. The success of deep learning(DL) most depends on the availability of large-scale training data. We set a novel deep learning framework for product review sentiment classification which employs widespread available ratings as weak supervision signals. The framework be made up two steps: One is learning a high-level representation which catch the general sentiment give out sentences through rating information.

Second one is adding a classification layer on top of the embedding layer and use labeled sentences for supervised set. We inspect two kinds of low level network structure for modeling review sentences, namely, convolutional feature extractors and long short-term memory. To estimate the proposed framework, we build a dataset containing 1M weakly tag review sentences and 11,758 tag review sentences from Amazon. Experimental results show the success of the proposed framework and its lead over baselines.

Key words: Deep learning, opinion mining, sentiment classification, weak-supervision.

I. INTRODUCTION

The prospering of e-commerce, people are getting used to devouring online and writing comments about their purchase experiences on merchant/review Websites. These assertive contents are important resources both to future customers for decision-making and to merchants for improving their products and/or service. As the capacity of reviews grows rapidly, people have to face a critical information overload problem. To reduce this problem, many belief mining techniques have been proposed. The key challenge is how to accurately forecast the sentiment orientation of review sentences.

The Popular sentiment classification methods generally following two categories: 1st one is lexicon-based methods and 2nd one is machine learning methods. The Lexicon-based methods classically take the first building a sentiment lexicon of opinion

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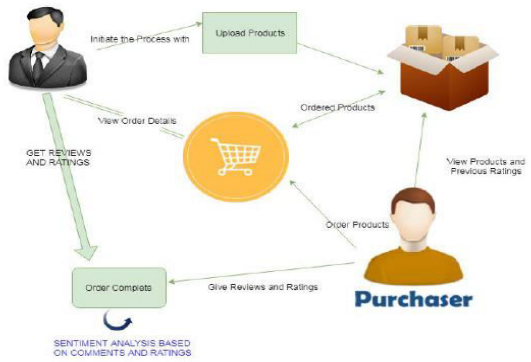
and design classification rules based on seemed opinion words and previous acceptable idea. Despite effectiveness, this kind of methods need substantial efforts in lexicon construction and rule design. Moreover, lexicon-based methods may not well handle implicit opinions, that is objective statements such as "I bought the pallet a week ago, and a valley seemed today". As identify in this is also an important form of opinions. The correct information is usually more helpful than subjective feelings. The Lexicon-based methods can only share with implicit opinions in an ad-lib way.

The first machine learning based on sentiment classification work applied popular machine learning algorithms such as Naive Bayes to the problem. After that, most research in this direction turn around feature engineering for better classification performance. Different kinds of features have been explored, Feature engineering also fetch a lot of human efforts. The deep learning has emerged as an effective means for solving sentiment classification problems. A deep neural network inherently learns a high-level representation of the data, thus eschewing laborious work such as feature engineering. A 2nd advantage is that deep models have dramatically stronger expressive power than shallow models. The success of deep learning slowly depend on the availability of large-scale training data. Tagging a large number of sentences is very laborious.

ARCHITECTURE DIAGRAM:-



II. SYSTEM ANALASIS

1. EXISTING SYSTEM

Lexicon-based methods typically take the tack of first constructing a sentiment lexicon of opinion words (e.g. "Wonderful", "disgusting "), and then design classification rules based on appeared opinion words and prior syntactic knowledge. Despite effectiveness, this kind of methods needs substantial efforts in lexicon construction and rule design. Moreover, lexicon-based methods cannot well handle implicit opinions, that is objective statements such "I bought the pallet a week ago, and a valley seemed today". As identify in this is also an important form of opinions. The correct information is generally more helpful than subjective feelings. The Lexicon-based methods can only transfer with implicit opinions in an ad-lib way.

DISADVANTAGES:

Feature engineering also fetch a lot of human efforts, and a feature fix suitable for one domain may not generate good performance for other domains. This kind of algorithm require complex lexicon

construction and rule design. The existing systems may not well handle objective statements; it only handles single word-based sentiment analysis.

2. PROPOSED SYSTEM:

In this work, we recommend a novel deep learning framework for review sentence sentiment classification. The framework serves review ratings as weak tags to train deep neural networks. For example, with 5-stars plate we can judge ratings above/below 3-stars as positive/ negative weak labels respectively. The framework generally consists of two steps. In the 1st step, rather than forecasting sentiment labels directly, we try to learn an embedding space which consists the general sentiment distribution of sentences, from a large number of weakly tagged sentences. That is, we force sentences with the same weak labels to be near each other, while sentences with different weak labels are kept away from one another. To less the impact of sentences with rating-inconsistent orientation. In the second step, a classification layer is added on top of the embedding layer, and we use labeled sentences to fine-tune the deep network. The framework is label Weakly-supervised Deep Embedding (WDE). Regarding network structure, two popular schemes are adopted to learn to extract fixed-length attribute vectors from review sentences, namely, convolutional feature extractors and Long Short-Term Memory (LSTM).

ADVANTAGES:

The Suggested work leverages the huge amount of weakly labeled review sentences for sentiment analysis. It is much more sequel than the previously developed works. The prefer work finds the sentiment not only based on the rating that user gives but also taking into consideration of reviews that they are post, in fact mainly takes an account of review, even though user gave ratings.

III. IMPLEMENTATION

There are five modules divided in this project in order develop the concept of sentiment analysis with tagging. They are listed below

1. Products Initiation
2. Products acquisition
3. Sentiment classification
4. Weak Supervision
5. Graphical Analysis

MODULES DESCRIPTON: -

1. Products Initiation

The First phase of the implementation of this project is Products Initiation. The module admin is uploading the products which user wants to see and purchase. Once admin can uploads the product then it stored in the database. The products are uploaded are listed in website to admin in order to modify or delete the particular product. Admin is the only authorized person to upload the products in this project.

2. Products acquisition

The 2nd module of this product conveys that user can view the products which are uploaded by admin. Then, they can see the products ratings and reviews of the same products which are given by other users who already purchased the product. According to the help of ratings and reviews user can

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purchase the product. The ordered list is also shown in the project for the convenience of users. The cart and checkout facility is also available to users from this module.

3. Sentiment classification

The users who are all bring the products can rate product as per their heed on one scale of five and they are free to comment for the same. following on the ratings and reviews given by user sentiment can be analyzed. There are 2 sentiments keep in this project they are positive and negative. The balance of rating and the particular comments are noted. In this module of project, we implement the algorithm named Sentiment-Analysis-using-Naive-Bayes-Classifier to find the demand sentiment based on the dataset.

4. Weak Supervision

This module provides the convenience to admin for supervision of the ratings and reviews. It oversees the given rating is high for positive comment or low ratings for negative comments. It shows the admin that how user rated for the products. It shows the comments and rating on the products.

5. Graphical Analysis

In this phase of the application user can get the clear picture analysis of the products ratings and reviews. The Various factors take into reflection for the graph analysis. In this phase intrigue the charts like pie graph, bar chart and so others.

IV. SYSTEM STUDY

FEASIBILITY STUDY

The feasibility of the project is analyzed in this phase and business proposal is put 4th with a very common idea for the project and some cost evaluated. Throughout system analysis the feasibility study of the proposed system is to be carried out. This is to secure that the prefer system is not a burden to the company.

Three key considerations involved in the feasibility analysis are,

- ECONOMICAL FEASIBILITY
- TECHNICAL FEASIBILITY
- SOCIAL FEASIBILITY

1. ECONOMICAL FEASIBILITY

This study is conveying to check the economic impact that the system will have on organization. The amount of fund that the company can stream into the research and development of the system is limited. The spending must be justified. Thus, the grower system as well within the budget and this was achieved because most of the technologies used are freely available. Only the bespoke products had to be purchased.

2. TECHNICAL FEASIBILITY

The technical feasibility study is take out to check the technical feasibility, that is, the technical requirements of the system. Any system evolved must not have a high demand on the available technical resources. This will guide to high demands on the available technical resources. This will guide to high demands being placed on the client. The evolved system must have a modest requirement, as only minimal or null changes are required for implementing this system.

3. SOCIAL FEASIBILITY

The feature of study is to check the level of acceptance of the system by the user. This cover the process of training the user to use

the system efficiently. The user can not feel intimidate by the system, instead must accept it as a necessity. The level of receiving by the users simply depends on the methods that are employed to educate the user about the system
and to make him familiar with it. The level of confidence must be lifted so that he is also able to make some constructive criticism, which is welcomed, as he is the final user of the system.

V. CONCLUSION

In this work we suggest a novel deep learning framework named Weakly-supervised Deep Embedding for review sentence sentiment classification. WDE instructs deep neural networks by utilizing rating information of reviews which is prevalently available on many merchant/review Websites. The training is a 2-step procedure: first we learn an embedding space which tries to catch the sentiment issuance of sentences by penalizing relative distances among sentences according to weak tags inferred from ratings; then a SoftMax classifier is added on top of the embedding layer and we fine-tune the network. The Experiments on reviews gathered from Amazon.com show that WDE is effective and outperforms baseline methods. Two specific instantiations of the framework, WDE-CNN and WDE-LSTM, are proposed. Compared to WDE-LSTM, WDECNN has fewer model parameters, and its computation is more easily parallelized on GPUs. Nevertheless, WDE-CNN cannot well handle long-term dependencies in sentences. WDE-LSTM is more capable of modeling the long-term dependencies in sentences, but it is less efficient than WDE-CNN and needs more training data. For future work, we plan to investigate how to combine different methods to generate better prediction performance. We will also try to apply WDE on other problems involving weak labels.

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