

# Sentiment Analysis of Product Reviews using Deep Neural Networks

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## ABSTRACT

Numerous consumer opinions of goods are now available on the Internet. The review is often confused, most important to difficulty in information direction-finding and knowledge gaining. This idea problem review sentiment analysis using deep learning, aiming to improve the accuracy of reviews and working for large datasets and topic-wise extraction that is featured classification regarding the product specification like display, camera quality, and performance measures of product. We further apply the review ranking results to the application of sentiment classification, and improve the performance significantly.

**Keywords:** Neural network, feature extraction, naive bayes classifier algorithm, pos tagging

## I. INTRODUCTION

Review is big boom in product purchasing time and a person tends to buy based on previous customer experiences and make decision over them. However they face lot of problem or difficulty in identify the right ones among various features in that it tends either positive or negative about the product from user point of view. To alleviate such problem we use sentimental analysis over the user review or comments and check the accurate review neither its positive or negative review nor comments by user. It analyses through various machine learning algorithms and how much accurate the result reports both in manually and computation report. Deep learning use to solving sentiment classification problems. Data mining tools is used to analyses review as data sets using machine learning algorithms.

## II. RELATED WORK

The project idea carried out in neural network based pattern. It has three layers that are Input layer, Output layer, Hidden Layer. The first layer that is input layer gets the input as reviews text, positive and

negative words text file. The review text pre-collected from website which was given by user and it given as input to pre-processing phase in hidden layer. Positive and negative words text for Polarity Identification in classification phase in hidden layer. The hidden layer inputs from input layer and pre-processing carried out. It filters the URL content and consider only comments section as input review text of products it take as input to this phase. The Output of this phase goes to POS ( Parts-of-Speech ) tagging phase to identifies the subject word which leads the whole sentence which is adjective in POS Tagger operation. It label by Sentence Labeling phase and it carried out remains process by polarity identification and compare by pre- collected positive and negative word text as input and classifies the review as **Positive** and **Negative** as Labeling each and every reviews in topic-wise manner in Clustering phase. The Output phase represent the number of positive and negative review by analysis in Data mining tools (WEKA) using machine learning algorithms which is added has library jar file in Netbeans.

## Module Description

- Data Collection
- Pre-processing
- Part of Speech Tagging
- sentence Labeling
- Polarity Identification
- Classification

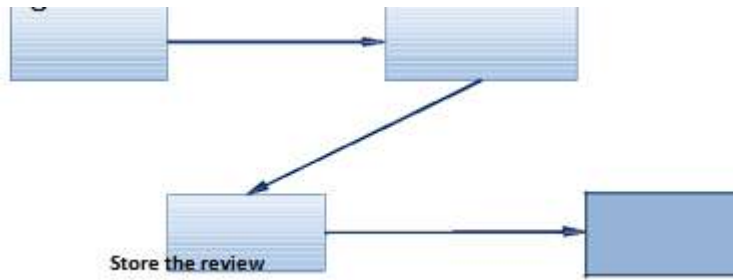
## III. PROPOSED SYSTEM

### I. INPUT SET

In Input layer the review dataset file taken as input to data pre-processing phase in hidden layer Positive and negative words text file take as input to polarity Identification phase for comparison the classification based their algorithm.

Various Website  
Specific  
Product

Collect the  
Consumer Reviews



**Loading**

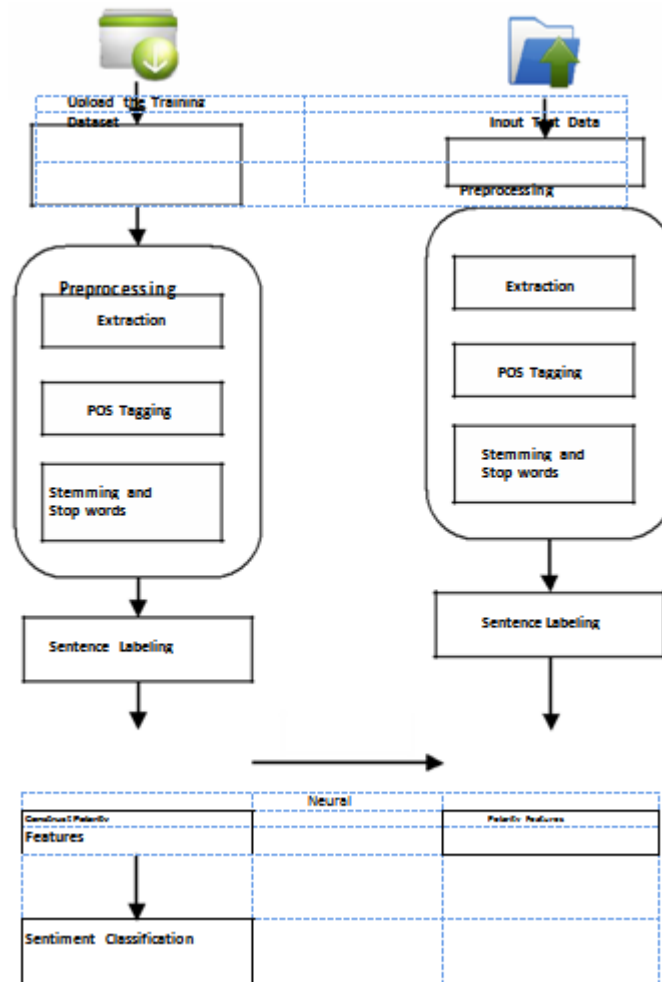
From website given user to take the inputs. Unrefined information is highly subject to noise, omitted standards, and irregularity. The qualities of information affect the data mining outcome. In order to help recover the quality of the information and accordingly, of the mining outcomes rare data is preprocessed so as to advance the efficiency and ease of the mining process. Data preprocessing is one of the most important steps in a data mining process which

**Dataset in CSV File**

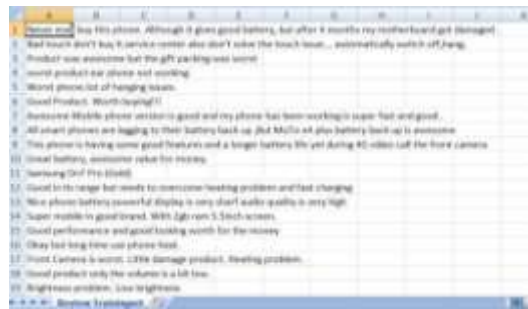
deals with the training and transformation of the initial dataset. Data preprocessing methods are divided into following categories:

- Data Cleaning
- Data Integration
- Data Transformation
- Data Reduction

**Training Phase Testing phase**



**Architecture of Entire proposed System**



## II. DATA PRE-PROCESSING

Data pre-processing is a main step in the data mining process. Data preprocessing phase includes cleaning, instance selection, normalization, transformation, feature extraction and selection, etc. The result of data preprocessing phase is the finishing training set. Kotsiantis is a famous algorithm for each step of data preprocessing. In pre-processing phase splits line by line the whole review context and filtering

## III. POS TAGGING

Part-of-speech tagging has a bunch of words and their parts of speech, because various words can be more than one part of speech at singular times, and because some parts of speech are composite or unsaid. This is not unusual in normal languages, a large percentage of word-forms are confusing. We take an nlp Stanford POS tagger package for tagging process by build the package with project file to tag the sentence to part of Speech sentence. Eg : The/DT grand/JJ jury/NN commented/VBD on/IN a/DT

number/NN of/IN other/JJ topics/NNS

## IV. SENTENCE LABELING

It labels the sentence using taggers/wsj-0-18-left3words-distsim.tagger package in nlp Stanford jar file to build path in project workspace.

## V. POLARITY IDENTIFICATION

The process of identifying and categorize opinions expressed in a part of text, especially in order to decide whether the writer's approach towards a particular topic, product, etc. is positive, negative, or neutral. Using positive and negative words text comparison with review sentence classification made. It determining the polarity of a text consists of a combination of several processing techniques that obtains an efficient set of appropriate information for the underlying text. Using positive and negative words text comparison with review sentence classification made.



## VI. CLASSIFICATION

Classification is called a supervised learning method. In classification process that assigns items in a collection to target classes. The goal of classification is to exactly predict the target class for each case in the data. For example, a classification process could be used to find the loan applicants as low, medium, or high credit risks. This classification technique based on Bayes Theorem with an assumption of independence

among predictors. In Naive Bayes classifier assumes that the presence of a particular feature in a class is unrelated to the presence of any other feature. Using Classification algorithm like Decision tree, k-NN, Linear discriminant analysis, Naive bayes, Logistic regression, SVM. We analyses through Native Bayes classifier algorithm.

$$P(c|x) = \frac{P(x|c)P(c)}{P(x)}$$

Likelihood
Class Prior Probability  
Posterior Probability
Predictor Prior Probability

$$P(c|X) = P(x_1|c) \times P(x_2|c) \times \dots \times P(x_n|c) \times P(c)$$

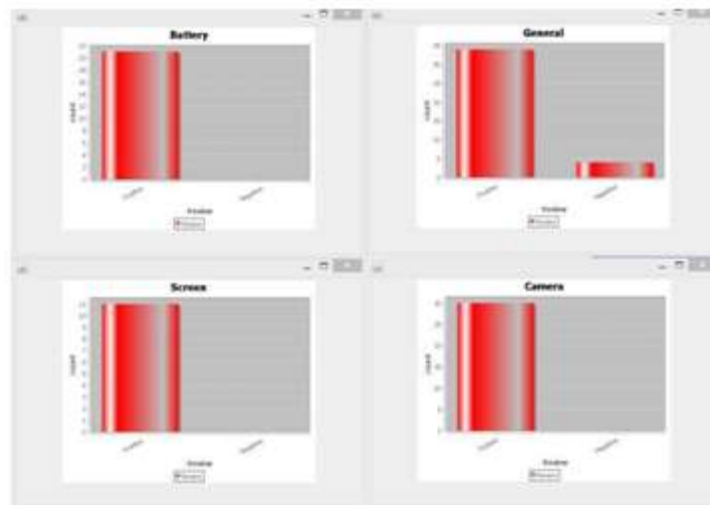
### VII. OUTPUT DATA

It analyze the classification data and represent number of positive and negative review in general dataset record and feature classification also made .

number of positive and negative review based sentimental analysis through review context and display how many positive and negative in computation record using Native Bayes classifier algorithm. By this System we analyze a review in efficient manner significantly.

### IV. RESULTS

Using machine learning algorithm it count



### V. CONCLUSION

In previous work it proposed system follows a novel deep learning framework for review sentence sentiment classification. WDE trains deep neural networks by exploiting ranking the information of reviews which is commonly available on many merchant/review Websites. Then implement Neural Network classification to find the opinion words by simultaneously considering the reviews collection and the influence of consumers' opinions given to each aspect on their overall opinions. The investigational results on popular mobile product reviews demonstrate the effectiveness of our approach in accuracy.

### VI. FUTURE ENHANCEMENT

Experiments on reviews collected from Amazon.com website show that WDE is effective and outperforms baseline methods. In further submit an application the review ranking results to the application of sentiment classification, and classifier the training set in Naive Bayes classifier algorithm and future it improve the performance accuracy significantly in a alterative algorithm.

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