

# Alpha-Beta UNet based Classification Technique for Sentiment Analysis in Natural Language Processing (NLP)

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**Abstract** – Sentiment analysis in any document or applications deals with classification of user’s opinions into negative, positive, or neutral statements. This process is widely applied in many recommendation engines, text analysis, market research, business intelligence, computational linguistics, and counselling. There are many methods of sentiment classification like regression methods. The proposed method utilizes a novel CNN based approach for classification of data called the alpha-beta pruned UNet towards classifying the various emotions into its categories. The proposed method has given better classification accuracy.

**Index Terms** – UNet, NLP, sentiment analysis, classification, machine learning.

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## I. INTRODUCTION

In recent times, a large volumes of data are made available in clouds, many social media sites, and online databases. With this condition, sentiment analysis is really a much-required phenomenon to know the status of how the opinions hold good [1]. This is required to have a comparison between various organizations towards active research [2]. In earlier days, companies used to get survey on customers how the product sounds [3]. The well-defined surveys help to organize the documents and quality also can be achieved to 100[4].

There has been extensive research carried out to classify sentiments in the document or

the text data [5,6,7,8] where automatic extraction of emotions are carried out. This involves conduction of opinion extraction [9], effect analysis [10] or a recommender system [11]. In general, some of these methods generally extracts opinions from the existing data such as positive, negative, or neutral emotions.

In a research paper , they have expressed about the opinions of the persons or authors towards writing the document. In another paper, a probabilistic regression models are used to check the probability of occurrences of the words from the corpus. Many researchers have used LDA and JST statistical methods to classify sentiments.

In phrase level sentimental analysis is carried out to achieve sub text level of accuracy. Many researchers in the literature have aimed to increase the classification accuracy of sentiment classification for microblogged level and tweeting levels.

## II. PROPOSED WORK

The idea of the proposed technique has the following stages which is summarized in below fig. 1.

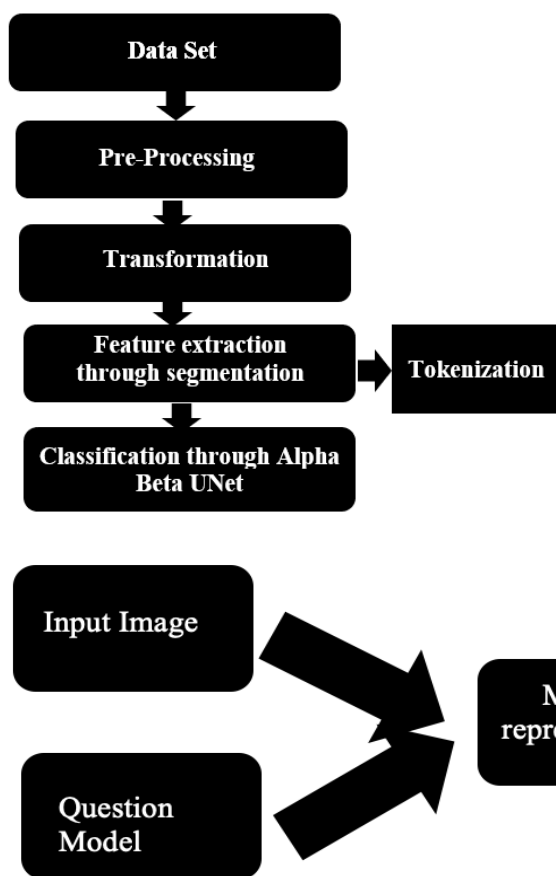


Fig 2: Question answer-based classification system

During classification and analyses, the proposed architecture also introduces a module to map sentences into its logical forms. The one is explained in the architecture in Fig 2. The next form of our proposed method involves a search technique to find

Fig 1: Proposed Sentiment classification framework

The first phase in sentiment classification involves data collection and pre-processing is carried out by removal of unwanted data from the database. Later data transformation is done to extract important descriptors from the dataset. Features are the important descriptors in the data. That must be extracted by segmentation method. Text segmentation method is somewhat a better tool which tokenizes and parses the sentence and segmentation is finally achieved

Further the last step in sentimental analysis is classification. A well-known CNN based classifier called the alpha beta UNet classifier is used to classify the data into negative, positive, and neutral sentiments. It takes the data which is divided into segments called the layers and fed into series of convolution layer. The dimensionality optimization is carried out through alpha beta UNet technique.

obtaining features are fed into dimensionality optimization and proposed UNet classifier.

### III. FACTS AND RESULTS

The document analysis is carried out in this work and the sentences are derived out of parts of speech tagging by performing parsing tree and finally fed into classifier module. The result of classification of emotions like positive, negative, neutral, and unknown are represented as a graph as shown in result table in the Fig 3.

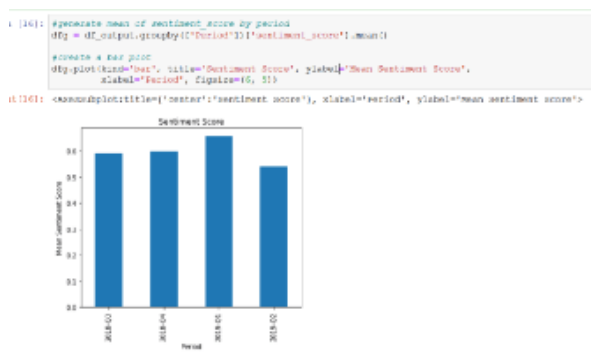


Fig 3: Result of emotion analysis classification

The exhaustive data analysis is carried out over a titanic dataset. The comparative analysis is carried out on the proposed alpha beta UNet classifier over the classical classifier techniques. The blue bar represents the work carried out over proposed technique against orange bar with classical approach. The proposed method is showing the better accuracy levels. The result is shown in the graph in Fig 4.

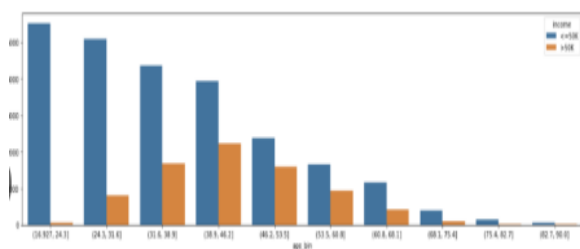


Fig 4: Performance evaluation of proposed method

### IV. CONCLUSION

Certain classical NLP techniques are applied for sentimental analysis where the methods majorly dependent on segmentation and tokenization methods. The proposed Artificial Intelligence based algorithm called the alpha beta pruning is the classical optimization algorithms for better classification of text data into various emotions.

The method is in combination with CNN based UNet classifier which has given promising results compared to existing methods. Also according the experiments carried out, more advanced sentiment patterns currently require a fair amount of manual validation. Although some amount of human expert involvement may be inevitable in the validation to handle the semantics accurately, we plan on more research on increasing the level of automation.

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