International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 08 Issue: 04 | April - 2024 SJIF Rating: 8.448 ISSN: 2582-3930

# Sentiment Analysis on Placement Aspect

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## ABSTRACT

Sentiment analysis has emerged as a pivotal tool within the realm of natural language processing, finding widespread application across diverse domains such as marketing, social media analysis, and customer feedback assessment. This research delves into the specialized domain of sentiment analysis focused on the placement aspect, which revolves around the intricate process of aligning individuals with suitable job opportunities. The primary objective of this study is to dissect sentiments embedded within textual data associated with placements, including resumes, job listings, and interview appraisals, with the aim of extracting nuanced insights to inform strategic decision-making within recruitment and talent acquisition processes.

Leveraging cutting-edge techniques in machine learning and natural language processing, our research employs a multifaceted approach encompassing text preprocessing, feature extraction, and sentiment classification methodologies. A spectrum of sentiment analysis algorithms is explored, ranging from lexicon-based methods to sophisticated machine learning models (such as Support Vector Machines and Naive Bayes) and deep learning architectures (including Recurrent Neural Networks and Transformers). Additionally, our investigation extends to assessing the influence of various factors—such as dataset dimensions, domain specificity, and feature selection techniques—on the accuracy and robustness of sentiment analysis outcomes.

Empirical validation is conducted using authentic datasets procured from prominent job portals, recruitment agencies, and social media platforms, thereby encapsulating a diverse array of industries, job roles, and candidate demographics. Through rigorous experimentation and comparative analysis of disparate methodologies, this research identifies and elucidates best practices for conducting sentiment analysis tailored to the recruitment domain. Moreover, key insights and challenges encountered throughout the research process are delineated, shedding light on the intricacies of sentiment trends prevalent within placement-related textual data.

In summation, this research paper makes a significant contribution to advancing the state of sentiment analysis methodologies within the recruitment sphere, offering actionable insights for HR professionals, recruiters, and job seekers alike. By harnessing the power of sentiment analysis, organizations can refine their recruitment strategies, elevate candidate experiences, and make informed decisions to optimize the placement process.

**Keywords**

Text Analysis, Machine Learning, Link sentimental, placement review, aspects, Student Satisfaction, etc.

## I. INTRODUCTION

In today's competitive job market, understanding the sentiment of placement aspects is crucial for both job seekers and employers. Job placement datasets contain valuable information about such as salary, job location, company reputation, and work-life balance. Analyzing the sentiment associated with these aspects can provide actionable insights to both job seekers and companies. In this project, we aim to develop a machine learning model that accurately identifies and analyzes the sentiment for placement aspects within a given placement data.

In sentiment analysis, the initial step is to label text with emotional tags like positive, negative, or neutral which denotes students emotional opinions on the services provided sentiment analysis is the most widely adopted approach for sentiment extraction in education. This approach provides a fine-grained analysis of educational data at phrase or sentence levels and extracts opinions or emotions at key aspects or entities. The actual reviews were segmented into sentences and then the aspects and their sentiment polarity were estimated .Sentiment analysis can draw student opinions on different levels of feedback and provide insights to educational institutions for making informed decisions .

However, the sentiment analysis can be performed only after labelling or annotating the text data with its sentiment orientation such as positive, negative, or neutral. There are supervised and unsupervised approaches to labelling or annotating student feedback. In the next section, sentiment annotation techniques that are adopted in education are discussed.

Campus recruitment is a strategy for sourcing, engaging and hiring young talent for internship and entry-level positions. It is typically a tactic for medium- to large-sized companies with high-volume recruiting needs but can range from small efforts (like working with university career center's to source visiting a wide array of colleges and attending recruiting events throughout the spring and fall semester). Campus recruitment often involves working with university career services center's and attending career fairs to meet in person with college attending career fairs to meet in person with college students and recent graduates.

The evolution of recruitment processes in the digital era has ushered in new opportunities and challenges, prompting a reevaluation of traditional methodologies. In this context, sentiment analysis emerges as a transformative tool, offering insights into the emotional undercurrents embedded within the textual data generated throughout the placement journey. This research paper delves into the niche domain of sentiment analysis tailored specifically to the placement aspect of recruitment.

The placement process, pivotal for both job seekers and recruiters, entails the precise alignment of individuals with suitable job opportunities. By harnessing sentiment analysis techniques, we aim to dissect and interpret the sentiments, opinions, and emotions expressed in various textual sources, including resumes, job listings, and interview feedback forms. Our objective is to uncover the underlying sentiments prevalent among stakeholders and discern patterns that influence decision-making in the recruitment ecosystem.

Through a comprehensive review of existing literature, we contextualize our research within the broader landscape of sentiment analysis and recruitment practices. This review not only identifies gaps and challenges but also sets the stage for our research contributions, outlining the need for a nuanced understanding of sentiment dynamics in the placement context.

Methodologically, our research encompasses rigorous data collection, preprocessing, feature extraction, and sentiment classification techniques. By employing state-of-the-art machine learning and natural language processing algorithms, we aim to extract meaningful insights from diverse textual sources, thereby enriching our understanding of sentiment trends in placement-related data.

Primary goals of this analysis are:

• To do an exploratory analysis of the Recruitment data.

• To find whether a student got placed or not using classification models.

## II. LITERATURE SURVEY

The literature review explores the convergence of critical objectives such as: The study begins with the exploratory analysis of campus recruitment data, a critical step in understanding the patterns and characteristics of placement dataset. According to [1] such analyses are essential for improving the efficiency and accuracy of multilingual entity extraction in NLP tasks. The patterns and characteristics found in the data can be considered analogous to the entities identified in NLP, enabling the project to extract valuable insights.

The project further aims to align educational programs and support services with the job market's demands. This strategy resonates with the work of [2] who studied sentiment analysis. Just as their research focused on categorizing and classifying the text, this project seeks to categorize aspects of campus recruitment data, such as student qualifications, industry preferences, and hiring outcomes. Aligning educational offerings with the job market's needs is analogous to understanding sentiment categories in text.

The optimization of recruitment strategies by understanding factors influencing student placements is to sentiment classification in Akhtar et al.'s study[3]. When educational institutions tailor their offerings to meet job market demands, they aim to improve placement rates, which can be perceived as classifying the sentiment of placements as positive or negative. Moreover, this action increases student and alumni satisfaction, echoing the effect of positive sentiment classification.

Ahmed S, et al. "Execution Based Placement Prediction System." IJARIIE-ISSN (O) - 4(3), 2018.

This paper centers around the utilization of DM techniques in the field of coaching. A TPO the board structure was organized which could truly see qualified understudies for grounds drive. Choice tree C4.5 calculation was applied for affiliation's previous year information and current need, which would by idea be vital to understudies since the model would send an advice to qualified newcomers in this manner assisting them with knowing whether they are prepared for it. This would assist them with getting ready of time for the grounds drive. The characteristics utilized for the review were scholastic history like rate marks, extent of limits, programming ability, correspondence dominance, rational fitness and interest.

Goyal, J., et al. "Position Prediction Decision Support System using Data Mining." International Journal of Engineering and Techniques, 4(2) 2017.

In this paper, the researcher conducted an impressive study with the help of data mining analysis. The model developed assisted in finding position probability as well as supported predicting the level of classes the student could clear. Simple Bayes and Enhanced Naïve Bayes were considered for the study. WEKA and NetBeans tools were used for data evaluation. Results showed that Enhanced Naïve Bayes provided an accuracy of 84.7% when compared to Naïve Bayes (80.96%) when a dataset of 560 samples was used for the study.

## III. PROBLEM STATEMENT

This research aims to analyze the sentiment surrounding placement experiences among graduates from Shivaji University, India. By examining sentiments expressed by students, the study seeks to identify patterns, concerns, and satisfaction levels related to placements, providing insights for enhancing the university's placement programs.

## IV. OBJECTIVES

Here are the specific objectives for a placement-based sentiment analysis system as provided:

1. Sentiment Classification: Implement sentiment analysis techniques that can classify sentiments (positive, negative, neutral) for each identified aspect within the text.

2. Real-Time Analysis: Implement real-time or near-real-time sentiment analysis capabilities to provide timely insights into students' feedback.

3. Sentimental Visualization: To develop visualizations or dashboards that display sentiments in an intuitive and user-friendly manner, allowing businesses to quickly grasp placement-based insights.

These objectives are tailored to the specialized requirements of placement-based sentiment analysis, allowing businesses to gain insights into their products or services and make informed decisions based on these insights.

## V. PROPOSED WORK

### 1.1 Dataset

For the placement based sentiment Analysis. The dataset is collected from D Y Patil College Kolhapur and Kaggle's Website. The dataset includes several aspects such soft-skill training, problem-solving skills and interpersonal skills, confidence on coding skills , creativity in technical solutions, quality of education and teaching, internships relevant to field of study, etc. where the dataset has the above characteristics in 15 columns and 10,000 rows.

### 1.2 System Requirement

**TABLE 1 : System Requirement**

| Hardware And Software | Specification |
|---|---|
| processor | Minimum 64-bit (i5 or above generation) |
| GPU (optional) | to speed up the training process. |
| Machine learning library | TensorFlow, Scikit-learn |

### 1.3 System Architecture

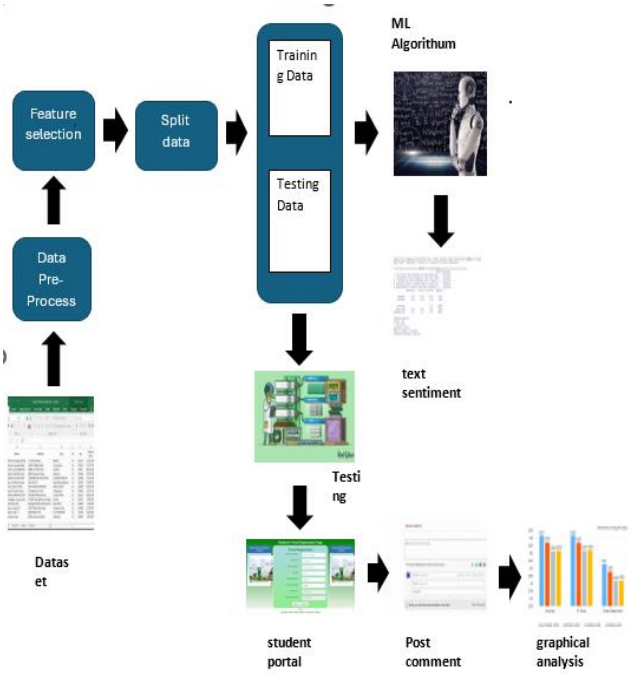


Fig.1.System Architecture

The machine learning workflow encompasses several key stages:

Data Collection: This is the initial step where data is gathered from various sources. In the image, this is represented by the box labeled "Dataset". Real-world data collection can involve methods like surveys, scraping data from the web, or using sensors.

Data Pre-processing: Once you have your data, you typically need to clean and organize it before feeding it into a machine learning model. This can involve handling missing values, removing outliers, and scaling the data. In the image, this step is labelled as "Data Pre-processing".

Feature Selection: This step involves identifying the most important features from the data. These features will be used by the machine learning model to make predictions. The image includes a separate box for "Feature selection".

Splitting the Data: Here, the dataset is divided into two parts: a training set and a testing set. The training data is used to train the machine learning model, while the testing data is used to evaluate the model's performance. The splitting process is depicted by the box labelled "Split data" in the image.

Training the Model: The machine learning model is trained on the training data. During this process, the model learns to identify patterns in the data. The training stage is shown in the box labelled "Training Data" in the image.

Testing the Model: After the model has been trained, it is evaluated on the testing data. This helps to assess how well the model generalizes to unseen data. The testing phase is represented by the box labelled "Testing Data" in the image.

Evaluation: This step involves using metrics to assess the performance of the machine learning model on the testing data. Common metrics include accuracy, precision, and recall.

Deployment: If the model performs well on the testing data, it can be deployed to a real-world application.

While this is a simplified view of the machine learning workflow, it provides a general idea of the steps involved in building and deploying a machine learning model.

### 1.4 Web Application

The user interface for the Web application gives placement sale immediate access to information and analysis about Placement review. It gives users access to information on the current Feedback. The application retrieves and displays the analyzed results using the Charts.

### 1.5 System Flowchart

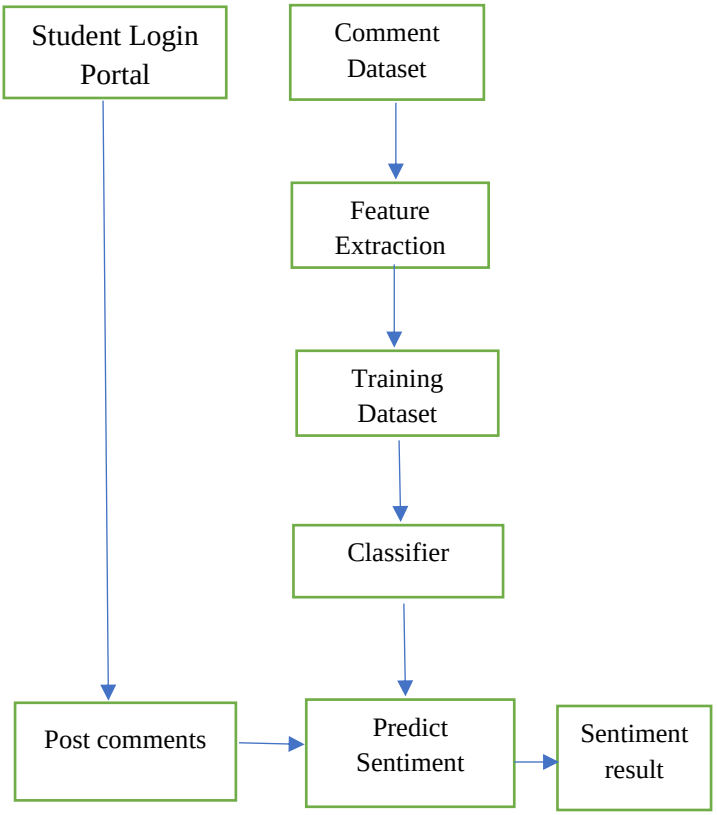


**Fig. 2. System Flowchart**

#### 1.5.1. Flow Control

Student Registration: During the registration process, students provide personal information like name, email, phone number, and skills. They also select their preferences regarding company profiles from available options.

• Feature Extractor: Extracts relevant features from student registration data to predict their suitability for placement. Features may include academic background, skills, and relevant experience.

• Training Set: Consists of data with student features and their performance at placements. Used to train the classifier for predicting student suitability.

• Classifier: Machine learning model trained on the training set. Takes student features as input and predicts their placement suitability.

• Post Comments: Students share feedback on their placement experience, including aspects like company culture, work environment, and assigned tasks.

• Predict Sentiment: Determines sentiment (positive, negative, or neutral) of student comments using a sentiment classifier.

• Sentiment Result: Utilizes sentiment analysis to refine the feature extractor and classifier. For instance, negative sentiment may prompt adjustments to feature weightage.

Overall, the process involves using machine learning to predict student placement suitability based on registration data. Feedback from students improves the model.

### 1.5.2.EXPREMENTAL ANALYSIS

**1.Naive Bayes:**

Naive Bayes classifiers are simple probabilistic algorithms based on Bayes' theorem with strong independence assumptions between features. They work well with text data, requiring minimal training and implementation effort. By assuming feature independence, they predict the probability of a label given a set of features. Typically applied with small training data, Naive Bayes (NB) classifiers show improved accuracy when used with techniques like Bag of Words (BoW) for feature extraction. Recent studies have enhanced NB classifiers, such as an improved version tested on restaurant review data. Tripathy et al. combined NB with SVM, achieving superior performance on movie review classification using techniques like Count Vectorizer and TF-IDF preprocessing.

### 1.5.3.Technology Used:

Python was chosen as the primary programming language due to its simplicity and readability, making it accessible for researchers. Its extensive array of libraries and tools are indispensable for various tasks, including data preprocessing, analysis, visualization, and machine learning. For data manipulation, Pandas is utilized, while sklearn.model_selection is employed for model evaluation and parameter tuning. Text feature extraction is facilitated by sklearn.feature_extraction.text, and sklearn.naive_bayes is used for implementing Naive Bayes classifiers. These libraries and tools streamline the research process, enhancing efficiency and productivity.

### 1.5.4 RESULT:

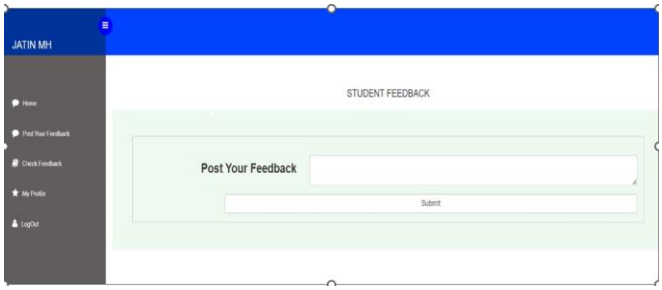


Fig.3. Live Comment

The image is a screenshot from the "Post Feedback of Placement for Placement-Based Sentiment Analysis" project website. Students are required to post their comments in the Post Your Footsteps section of this student feedback section.

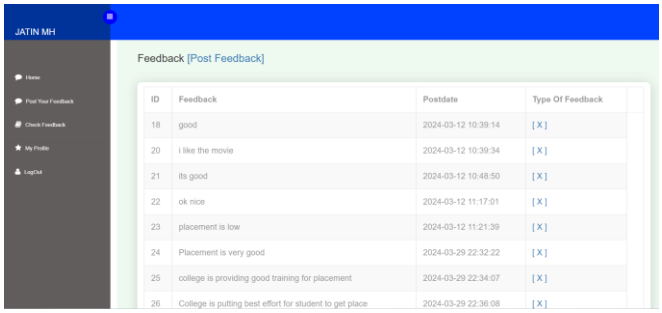


Fig.4. Feedback Report

The image is a screenshot of a feedback report that includes all of the placement-related comments. Sentiment analysis will be performed on this report.

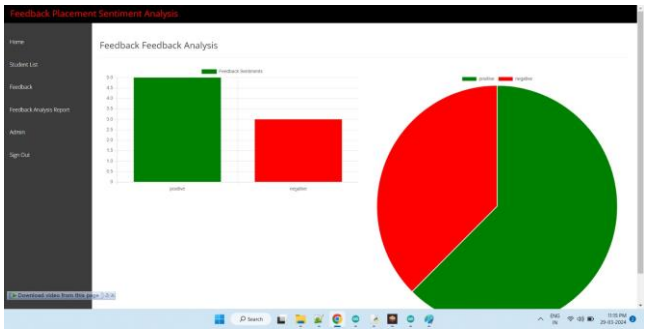


Fig.5. Live Comment

This picture is a screenshot from the "Feedback Analysis of Placement," where user feedback is displayed as a bar graph and a pia graph. Green represents positive feedback and red represents negative feedback.

## VI.CONCLUSION

This project aims to develop a robust sentiment analysis system for placement reviews, providing valuable insights for both job seekers and employers. By leveraging machine learning models, the system classifies sentiments, enabling real-time analysis and enhancing contextual understanding. The exploration of campus recruitment data not only serves the immediate goals of classification accuracy but also contributes to the broader objectives of improving student success and optimizing recruitment strategies. The architecture diagram outlines a systematic process, with the Naive Bayes algorithm playing a key role in sentiment prediction. The implementation involves Python and essential libraries, ensuring flexibility and efficiency. The project's potential impact includes informing educational institutions for better curriculum alignment and aiding businesses in making informed decisions for enhanced customer satisfaction and competitiveness. Overall, this sentiment analysis system stands to be a valuable tool in the dynamic landscape of job placement, addressing specific objectives and requirements outlined in the project scope.

## VII. ACKNOWLEDGEMENTS

We are very thankful to Department of CSE, DYPCET to give us opportunity to work on training and placement cell system we sincerely express our gratitude to Prof. R.J. Dhanal Department , of CSE, DYPCET for giving constant inspiration to complete this work.

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