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# A Novel Approach to enhance the performance of Recommendation Algorithm using Sentiment Analysis

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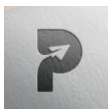
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## **Abstract –**

Many individuals are interested in making purchases online thanks to the explosive rise of Internet technology and e-commerce platforms. In this case, recommender systems are an excellent means of attracting new clients and increasing the number of people using the pertinent goods and services and thus grow the company. Nonetheless, depending on the things a consumer has bought or is interested in, it is important to be able to anticipate what he might enjoy and require. To do this, the model developed using machine learning would need to do a number of tasks, including stop-words, word segmentation, feature extraction, and identifying comparable goods that other customers have bought, among other things. This project uses a movie recommendation system as an example. We attempted to use sentiment analysis to classify reviews of films as positive or negative. We then developed a recommender system using improved item-based collective filtering based on user sentiment, which can suggest movies based on the user's list of previously watched movies.

**Index Terms — sentiment analysis; recommender system; deep learning; collaborative filtering; ensemble learning**

## **I. PROBLEM STATEMENT**



Because information technology is developing so quickly, data has been rising exponentially over the years. We are now in the big data era when the vast amounts of data that exist cannot be processed by the current technologies. It is challenging to look for facts in such a circumstance that a certain user would find interesting. A recommendation system is a technique for obtaining customized outcomes for numerous consumers from a large pool of information. In times of information or data overload, recommendation systems come in very handy as a real-time solution for individualized suggestions.

A recommendation system's primary goal is to comprehend the preferences, likes, and dislikes of the user in order to offer or suggest related information while also asking about his preferences. Recommendation systems are used in a lot of real-time applications, such as advertising and e-commerce, to increase revenue and attract new clients. The recommendation algorithm serves as the foundation for the recommendation system. The many kinds of algorithms that make recommendations are:

Collaborative filtering based on items

Collaborative filtering based on content

Collaborative filtering based on knowledge

Because conventional recommendation systems have produced erroneous, non-personalized, or semi-personalized suggestions, the recommendation process as a whole is no longer effective and is now useless for both businesses and end users. Using the emotional polarity of the movie reviews, we have attempted to improve the item-based collaborative filtering algorithm in this project by developing a recommendation system that suggests related films that the user would find interesting based on the list of movies they have previously seen.

## II. SYSTEM ANALYSIS

### Existing system:

Within it are three Traditional recommendation algorithms: knowledge-based, content-based, and collaborative filtering recommendation algorithms. The most used technique in recommendation systems these days is collaborative filtering. The conventional suggestion algorithm has been used in many different industries, with the fastest-growing ones being e-commerce and information retrieval. It has been continually updated and improved. Traditional recommendation systems tend to include more generic and semi-personalized recommendation systems. The old systems for recommendations are increasingly losing their ability to provide reliable advice due to the significant increase in the number of available data. In addition, consumers must receive precise suggestions.

### Disadvantages:

- Inaccurate recommendation systems
- Inability to manage large volumes of data

### Proposed System:

Our plan is to create and implement a web application that has the ability to suggest movies to users based on their reviews and interests. To do this, we suggest applying the CNN algorithm for sentiment analysis, which is a machine learning subfield known as natural language processing. In an



effort to provide more precise and tailored suggestions, we also attempt to suggest movies using item-based collaborative filtering.

**Advantages:**

- Automatic recommender system
- Increases revenue and profitability

### III. PROPOSED MODULAR IMPLEMENTATION

The project's suggested modular implementation is shown below. There are two modules in it:

1. Administrator
2. Customer

**Admin Module:**

The system administrator is in charge of the following tasks:

1. Uploading the dataset
2. User review analysis for sentiment analysis.
3. Create a recommender system and sentiment analysis model.
4. Examine how well the algorithms performed using the provided dataset.
5. Examine user ratings and suggested films

**Consumer Module:**

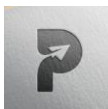
The system's user can make use of the following machine-learning services:

1. Entering the system
2. Watching film reviews
3. Get suggestions for related motion pictures

### IV. PROJECT EXECUTION

**Home page:**

This is the application's launch page when it runs on Pycharm. It resides on a web server, and a URL is produced to access it; when the consumer clicks on the URL, the browser opens the page below.

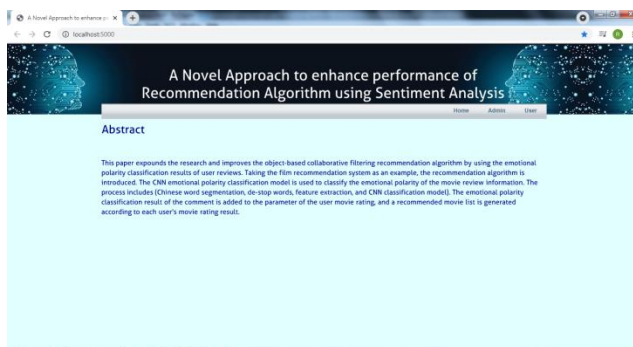


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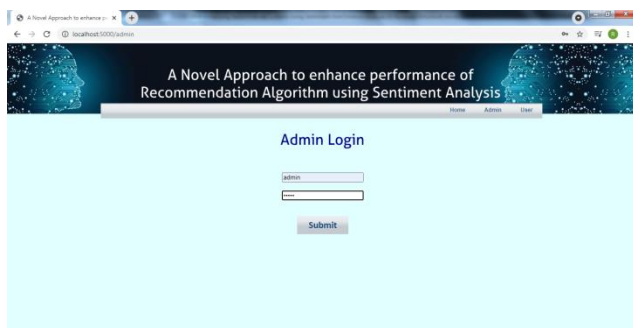
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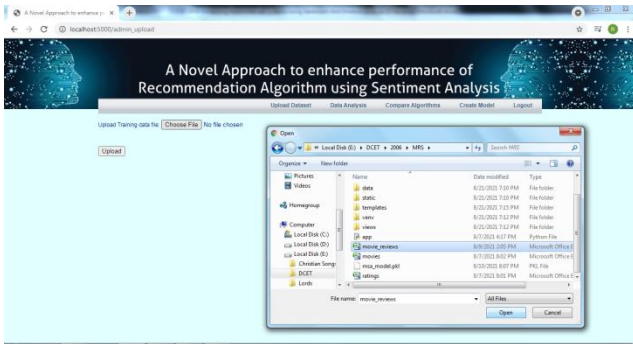
### Admin Login:

This is the admin module login page. For tasks like uploading the dataset, the administrator must connect to the system using his credentials. preparing the dataset, analyzing the dataset's exploratory data, putting the dataset through many machine learning algorithms to determine which one can get the highest level of accuracy, and Making a model that users may utilize by hosting it on the Flask application.



### Upload Dataset:

The system administrator can upload the datasets needed to train the machine learning algorithms on this page. To send the data to the server, the administrator must first choose the document by clicking the Select file button and then click the Upload button. The file has been successfully uploaded, according to the success message that appears once the upload is finished. We are utilizing the movie reviews, movies, and rating information for our research.

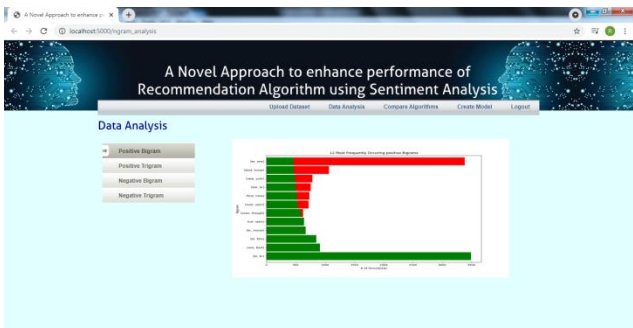


### Data Analysis:

Using graphs, statistics, and other visual aids, exploratory analysis of data is used to the dataset to remove any missing data, spot trends, and determine the connections between different output characteristics.

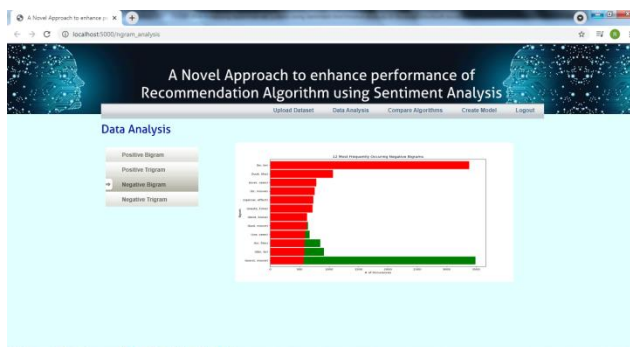
### Positive Bigram:

The Positive Bigram that occurs most frequently is seen in the graph below.



### Negative Bigram:

The Negative Bigram that occurs most frequently is seen in the graph below.



### Compare Algorithms:

The administrator can train different algorithms and determine the test accuracy for each method by feeding the dataset to them on this page.

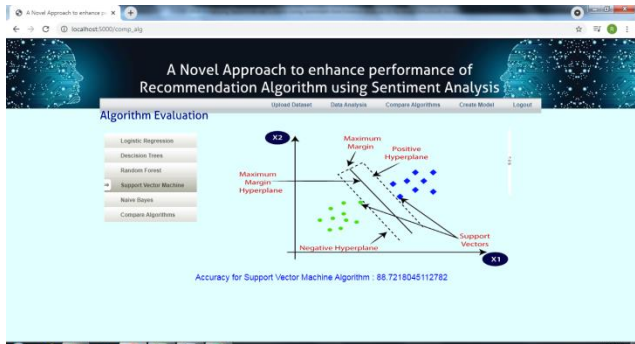
### Logistic Regression:

Logistic regression analysis of the dataset yields an observation that the test accuracy is 88.44125238469309%.



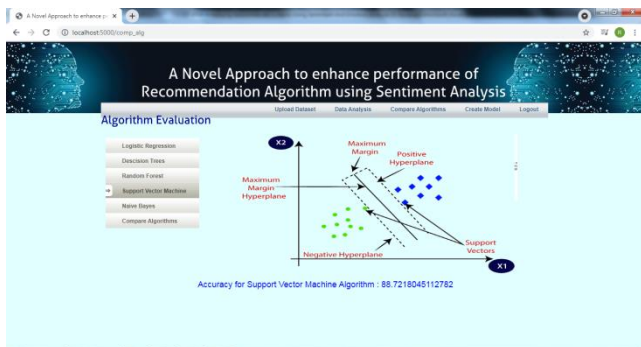
### Support Vector Machine:

The test accuracy, as observed when the dataset is fed into the Support Vector Machine method, is 88.7218045112782%.



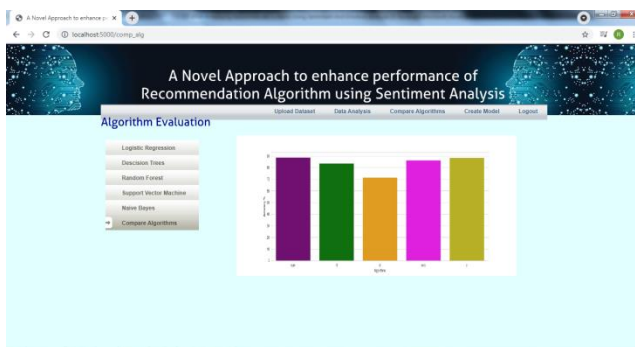
### Naive Bayes:

The test accuracy, as determined by feeding the dataset into the Naive Bayes method, is 86.38761081809%.



### Compare Algorithms:

The comparison of the algorithms' various test accuracies is displayed on this screen.





## V. CONCLUSION

In this project, we have attempted to develop a recommender system that draws on the emotional polarity of movies to provide users with suggestions. Natural language processing techniques, such as feature extraction, vectorization, and stopword use, have been utilized to undertake emotional analysis. Item-based collaborative filtering was employed by the recommendation system. to forecast which movies the viewers would enjoy. We have evaluated the effectiveness of several algorithms for sentiment analysis, including random forest, logistic regression, KNN, SVM, and Naïve Bayes. We have developed a web-based prototype application that showcases all the aforementioned capabilities. In the future, the system can be enhanced to provide recommendations in real-time.

**Future Scope:** One potential approach to developing a recommender system for users would be to incorporate not just the emotional polarity of movie reviews, but also periodic analysis and age group-based analysis to refine the system's prediction process based on reviews.

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