Reverse Recommendation: without user details

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Abstract

The recommendation is the new and probably the only method to ensure any online application effectively caters to a global audience. An application that caters to a very wide group of people from different backgrounds so people can find the data they could be looking for. We see the use of recommendations almost everywhere in our digital lives. We can look at recommended apps, posts, dishes, songs, and this list extends till infinity. Personalizing an application for any specific user helps in achieving better conversion rates. This is achieved through recommending the user based on the data collected about the user. The more data is collected, the more precise the recommendation gets, thus resulting in greater conversion rates. Various machine learning algorithms could be used for creating a recommendation system based on the type of recommendation required. The recommendation could get better with the collection of more data and then training the algorithm on the particular dataset. More precise recommendations could lead to the reverse effect of the recommendation. It could be used to model the user behavior according to what the developer wants. This could lead to negative consumer patterns as user now does what the developer wants them to do. But this does not mean we forbid the idea of recommendation asa whole. A recommendation is a great tool for achieving more conversion rates. In this paper, the authors propose recommending using groups. This not only ensures that reverse consumer behavior is prevented from being achieved, but is also computationally cheaper.

1 Introduction

The recommendation comes with a big challenge to user privacy. The recommendation is based on the user's activity, so there is a possible chance that a user's behavior is recommended to some other user. Individual user tracking can also bring issues of privacy. In this paper, the authors use sentiment analysis to group data and flag a user in a particular category. The flag can change as per the user activity throughout the application.

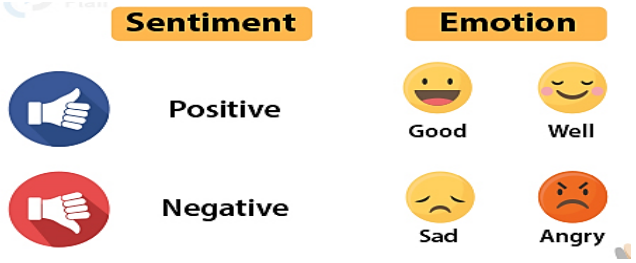

Fig 1. Users Emotions

This way, the users are not tracked individually but are flagged under few categories and are recommended data according to the flag. The recommendation could not be avoided in an application that is catering to a very wide group audience but there could be other ways to recommend that retain the user privacy as well. With this implementation, as there is no tracking, authors expect more expression from the users as they now enjoy the privacy

1.1 Motivation

The recommendation has its negative effects on the users and most of the users are not aware of these effects that could affect them. Even if the users are aware, they don't have any choice. To recommend the system needs user's data that includes their activity their browsing history. All these data will be trained whichaffect the privacy of the user, but Group recommendation will not target any user particularly, this giving space for privacy and even reducing computational costs. Here the group recommendation will be done based on the sentiment of user's posts that are posted in the application.

1.2 Problem Statement

An individual recommendation can lead to the problem of privacy. Authors believe that this privacy issue can limit the emotions that are expressed by people. Also, more recommendations can reverse the effect of recommendation. This tool can be used to psychologically change the behavior of the people to make choices that the developer wants them to. This is a negative thing as it violates the very spirit of consumerism. The main disadvantage is as we are not collecting any user's information. That makes it difficult to recommend individuals based on their identity.

1.3 Objectives

The objective is to flag a user under a specific category as per their interaction with the application and then recommend data from the particular category. The user's category could change from time to time based on the changed category. The recommended posts will be recommended based on sentimental analysis of the created data which will then be recommended to all the users in the particular category. The main objective is to make a depressed or mentally ill person come out of it and keep entertained the happier person and make them more strong than before.

2 LITERATURE REVIEW:

We can find traces of notable work done in recommending using grouping. Though the application of the existence of such a system is different from the method proposed by the authors:

In [1] James et al. discuss YouTube's video recommendation system that recommends videos based on user's activities over the site these include users liked, watched, and favorite videos. They recommend populated videos for the user who just wants entertainment by the content.

The recommendation is updated regularly bases on the user's recent activity. Following that, the videos are evaluated for relevance and diversity using a variety of signals. This system aims to provide privacy. The main metric that is considered is click-through rate (CTR) This is evaluated based on time until first recommendation coverage, session length, and long watch. These parameters are used to assess system overall performance as well as to evaluate system changes in real-time traffic. They consider top viewed, the most added as a favorite by most users, and rates videos receiving the most rating this observed for 21 days.

In [2] Joonseok et al. explain the implementation of a recommendation system in an academic paper that reduces the load on researchers in searching the papers based on keyword-based or browsing papers based on top journals or conferences. They use computational evaluation and user study demonstrate techniques to build recommendation systems that recommend users interesting papers.

This is done by applying the bag-of-words model to the corpus and learning is done using a lazy method similar to kNN. The preference of the user is determined and relatively paper is recommended. Here neighbor-based and clustering recommendation algorithm is applied. The results are transferred by the visualizer to users.

In [3] Tetsuya et al. illustrate the sentimental analysis of a particular subject from a document instead of analyzing the whole document is positively polarised or negatively polarised. The main target is to identify whether a statement is positive (favorable) or negative (unfavorable) to achieve this they have used these steps that are Expressions of emotion, their polarity and power, and their connection to the subject.

It is said that all these are correlated. In this entire process, Natural Language Processing is used to understand the sentimental part of speech (POS). the achieved 95% precision and round 20% recall during the initial stage, it is said based on the observation that the precision may go down till 75 %. In a feature, they are working on the automated generation of the sentiment lexicons to reduce human effort and also a new way to improve

In [4] Amer et al. talk about the importance of grouping to recommend data to a group of people together. For example, recommending a movie to a group of friends watching it together.

In [5] Kim et al. talk about the working of a recommendation system that works in two stages to recommend data to a community of people.

In [6] HaiYan et al. talk about dynamically recommending by adjusting weights of the data points dynamically.

3. Methodology

3.1 Sentimental Analysis

The process of detecting positive or negative sentiment in the text is known as sentiment analysis. Sentiment analysis is the systematic identification, extraction, quantification, and study of affective states and subjective information using natural language processing, text

analysis, computational linguistics, and biometrics. Businesses frequently utilize it to detect sentiment in social data, assess brand reputation, and gain a better understanding of their customers. Sentimental analysis is required in every area where users feedback is applicable. The sentimental analysis system analysis the feedback given by the user based on its business leaders can understand how much the users are satisfied with their products. Based on the number of negative feedback provided by the users the company can improve the product.

Fig 2. Sentimental Analysis

Sentiment analysis is becoming a crucial tool for monitoring and understanding client sentiment as they share their opinions and feelings more openly than ever before. Brands can learn what makes customers happy or frustrated by automatically evaluating customer feedback, such as comments in survey replies and social media dialogues. This allows them to customize products and services to match their customers' demands.

3.2 Recommendation System

Recommender systems are computer programs that make recommendations to users based on a variety of parameters. These systems predict which products users are most likely to and are most interested in. Netflix, Amazon, and other similar companies are examples of this.

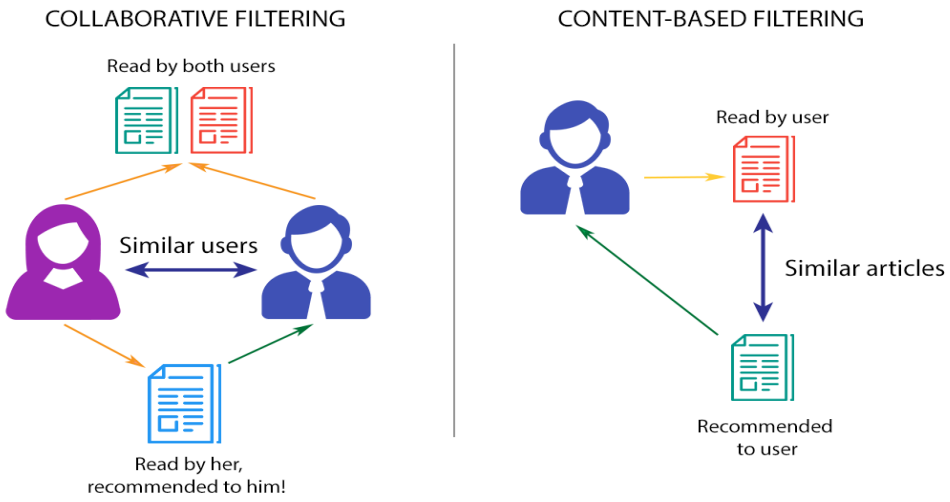

Fig 3. Recommendation Systems Methods

Here, the recommendation is based on user activity and most likely the recommendation will be of user interest and similar one. For example, if a user watches a video of the genre "horror" the system will recommend "horror" videos.

4. Proposed Model

Our application "Vmitis" focus is mainly on mental health, where people can share their taught and share their views irrespective of the subject without any identity that is our application has complete anonymity.

When a user is posting a "happy" article usually recommendation system will recommend the same "tag" article that is "happy" articles. This is completely acceptable. But when a person is in depression and he/she is posting more "depressed" or "sad" articles the system would recommend the same "tag" article that is "sad" articles. In this case, it is not acceptable. We mainly focus on people's mental health and we don't want to recommend "sad" articles and make people more depressed. Here usual recommendation system fails.

Our proposed model solves this issue. In our application, we have up to 3 tags for all the articles. When a user posts an article, we analyze the post using sentiment analysis. If we found the article to be "sad" we take the tag of the post and we recommend "happy" or any other tag articles. This model breaks the usual recommendation chain and comes out of the loop and recommends something out of the box. By this, we can improve the user personal feed, and also people can come out from "sad" or similar articles recommendations.

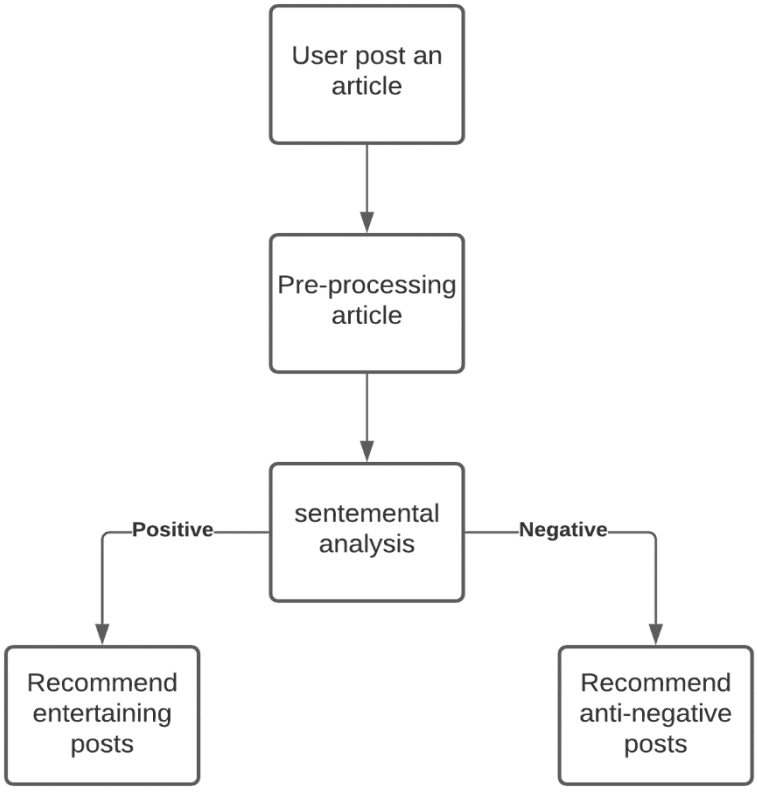

Fig 4. Proposed Method

In our application, we group users based on certain criteria and analyze the articles. Based on the certain polarity of the article and other patterns, we recommend the articles to the users.

Results

The model was trained with huge data which consists of both positively polarised and negatively polarized data. As a result of the trained model, the model made an accurate prediction in analyzing the sentiment of the article passed to it. Based on the sentimental the recommendation system starts to recommend the articles and post to the user. If the user is posting negative(depressed) data then the recommendation system will be recommending anti-negative articles to them to get them back out of negativity. Similarly is the user is posting a positive article then the user will be recommended a positive or entertainment post to engage them to be more stronger and helps him to be more active than before.

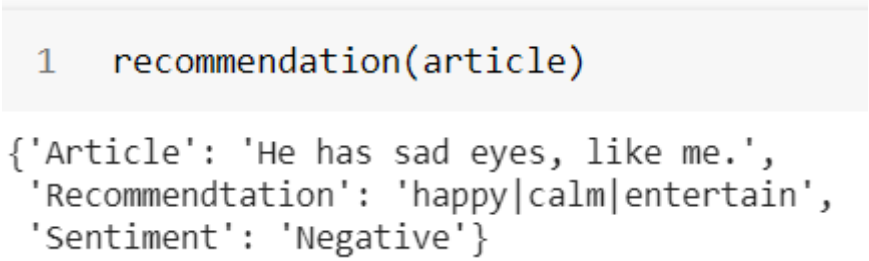

Fig 5. Negative article post detected: The customized function is written which detects that the article is positively polarised or negatively polarized. Based on it the recommendation will be recommended as seen in the above image

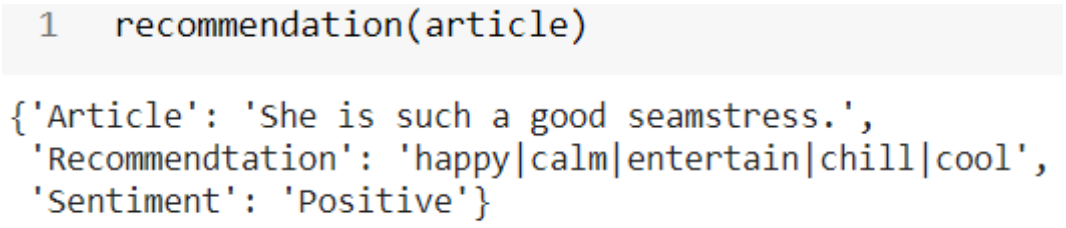

Fig 6. Positive article post detected: The customized function is written which detects that the article is positively polarised or negatively polarized. Based on it the recommendation will be recommended as seen in the above image

Conclusion

In this paper, we talked about flagging users under a category based on their interaction with the system. This flag will change as the user interacts with the system. This system will ensure that the users are not aggressively targeted for recommending. The authors talked about how the recommendation is a need for any application that is targeting a global audience for achieving more conversions. The data is categorized based on sentimental analysis. This categorization can later be extended to languages as well. Both these factors can later be mixed with different weights to create a more diverse recommendation system.

We should be aware that there should be control on the recommendation so there aren't any negative effects to it.

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