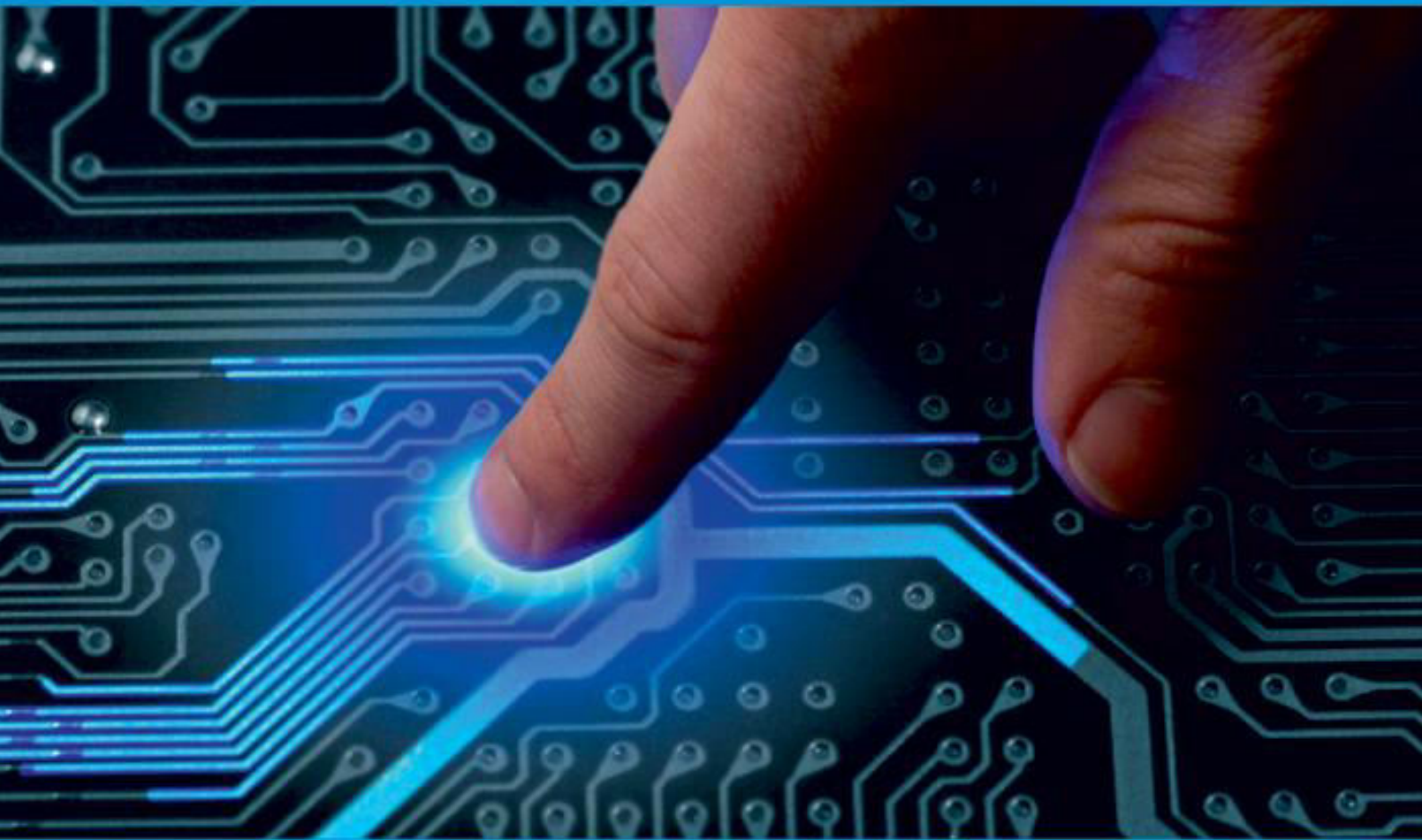




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Recommendation System Based on User's Action

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ABSTRACT: The goal of this study is to create and test a prototype of an RS that uses emotions as input. It is to increase the user involvement with the system by using the current emotional state of user that will produce more accurate movie recommendations, music suggestions or if person needs to take a break. This research intends to relate the emotional state with the type movies, music, preferred by a user and what is the emotional state of a person. To develop an Emotion based recommender System (E-RS), user will be asked to choose the colours and it will be analysed in order to predict the current emotional state. User would be suggested few genres of movies or music according to how he/she is feeling and top-rated movies or music matching with that genre would be asked to choose. Further when a user selects a movie then most similar movies to his choice would be recommended.

KEYWORDS: Recommendation System, Emotion based, Mental Health surveillance, Sentiment Analysis, Content based filtering, Collaborative based filtering, k nearest neighbor

I. INTRODUCTION

A recommender system is a form of data filtering system that anticipates how a user would rate or favour a specific item [2]. A recommender system is also a decision-making tool that provides consumers with individualized recommendations for various things [18].

The industry has embraced the Movie Recommendation Engine [5].

Emergence of video streaming platforms has been one of the greatest avenues in the content consuming sphere. It has changed the traditional modus operandi for content viewing i.e., either televisions or theatre. In the past few years such platforms have seen an exponential increase in the users because these platforms provide a huge variety of content from regional content to international movies on demand all at one place.

Catering this huge heterogeneity of content poses its own challenges. Firstly, it should be user friendly while looking for the specific content of our choice and also there must be an understanding about the user that want kind of content, he/she prefers. To elucidate this matter these platforms, use recommendation techniques that filter the content for the user. These techniques mainly consider the user's recent viewing history and suggest the movies according to his recent history. The objective is to provide adapted and personalized suggestions to users using a combination of collaborative filtering and content-based techniques[1]. If someone has seen "SherShah," a film about the brave, rugged, and patriotic Captain Vikram Batra, the algorithm will immediately recommend "Border" or "Lakshay," both of which deal with similar themes[14], based on their description but this approach is not user-centric because it is not necessary that after watching a series about crime detective he would still prefer the content of same type. So how this could be solved?

Choice of movies change as per the varying user emotions. For instance, movies chosen in a happy state and in sad state would not necessarily be the same. So, if users' current mood is considered, then it would help in more user centric filtering of content. Also, it should be considered that several users can have different preferences for same emotional state. These two aspects can greatly improve the accuracy of recommendation produced.

II. LITERATURE SURVEY

Recommender systems are systems that try to figure out what a user wants and then turn that information into useful content. They make it simple for consumers to find information and material, and they present the results in a logical order.

Overall, the recommender systems are nothing but support systems that have helped many service providers to reduce the amount of content and make it easy for the users to find content and information in a very easy manner within less time.

The support systems mainly follow two methods:

1. Content based filtering (CBF)
2. Collaborative based filtering (CF)

The current state of most recommender systems is that they are based on the user's consumption and search history. The earlier accessible content might be considered as the consumption history. Following the analysis of this content, it can be linked to other forms of content with similar features or labels; this method is known as **content-based filtering** [1]. Another popular method compares the user's history to that of other users. Users with similar interests are grouped together, and content obtained by one person is recommended to the others in that group. As a result, the user will be given a recommendation based on what another user with similar interests has already eaten; this is referred to as collaborative filtering methods [1]. Additional product recommendations on any e-commerce website are a regular example.

Individual problems led various authors to experiment hybrid RS that merged CF and CBF approaches [4]. To provide reliable recommendation, the recommender systems need to capture the customer's current emotional state and associate it with appropriate genre of movie/music and further filter out the movies/music that would fit in the user preference. Emotional status determination of the user is the main role of this research.

Sentiment Analysis is the process of assessing, processing, summarising, and deducing meaning from emotional text [5]. Sentiment analysis can be performed by using three approaches [17]. The polarity of a text is determined to determine its emotional context. Positive, negative, and neutral emotional polarity can be found in the film review text. Positive information usually features a positive effect, while negative information features a negative effect. Users are then directed to the films that include the most positive information [15].

III. RESEARCH PERSPECTIVE

The goal of the research is to gather data and analyze feelings of subjects, to make appropriate responses possible [16]. Also, the aim is to implement an emotion detection algorithm and to associate these emotions to proper movie genres. An E-RS will provide adapted and personalized suggestions to user using combination of collaborative filtering and content-based techniques. The recommendation is based on references about a user's emotion and preferences. For understanding the user emotion, we aim to implement an efficient emotion detection algorithm that will help us to understand the varying nature of the emotional state and the movies recommended.

IV. FUNCTIONS

The functions used in this project are listed below-

4.1 Filtering based on features of a movie (Content based approach)

When a user selects a movie or a song, other similar movies/music are recommended to the user. Basically, if we like an idea then we may also like similar ideas.

A content-based recommender uses information provided by the user, such as explicit movie ratings from the Movie Lens collection. A user profile is created using that information produced, which is subsequently used to create recommendations for the user. As a user, adds new information or acts on the recommendation, the engine becomes more and more precise [3][13].

4.2 Collaborative Approach

The collaborative filtering recommender is almost fully dependent on the previous behaviour and not on the context. All the more explicitly, it depends on the comparability in inclinations, tastes, and decisions of two clients [8]. It investigates how comparable the inclinations of one client are to one more and makes suggestions in view of that [9].

If we consider a situation where user A enjoys movies 1,2, and 3 and user B enjoys movies 2,3, and 4, then they have comparable preferences, and A should also enjoy movie 4 and B should also enjoy movie 1 [3][10].

4.3 Sentiment Enhanced Recommendation System

The process of analyzing, processing, summarizing, and reasoning the emotional text is known as trend analysis. The polarity of movie and other goods and services reviews can be split into three categories: positive, negative, and neutral. Negative impact is made by negative information whereas positive impact is created by positive information.

Based on this finding, some sentiment analysis was performed on the user reviews, and the polarity of the reviews was determined. After that, users were directed to movies with the highest good reviews.

Collaborative filtering and content-based techniques can compensate for each other's flaws, ensuring that the recommendation system is accurate and stable. On one hand collaborative filtering can compensate for the lack of personalization of the content-based approach and on the other hand the content-based method can overcome the disadvantage of the collaborative filtering method that is relatively low scalability [6].

The hybrid recommendation method in general generates the preliminary recommendation list based upon movie and user data [6]. The preliminary list is then optimized using sentiment analysis to produce the final recommendation list [7]. Furthermore, this article extensively evaluates the recommender system's efficiency using the hybrid recommendation framework [6]. This study focuses on user reviews on movies in the process of recommending movies. Users are influenced by the herding effect to choose goods or services that most people like. As a result, when compared to movies with a lot of bad ratings, movies with a lot of favourable reviews will be recommended to users first. The final suggestion list is prepared after optimization [7].

V. DFD DIAGRAM

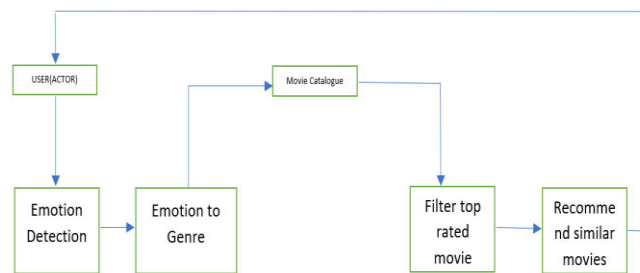


Fig -1: DFD Diagram

VI. CONSTRAINTS AND ASSUMPTIONS

The objective of the research is to design and implement a prototype of an RS that uses emotions as feedback. To implement the proposed system certain constraints were kept into consideration-

- The emotions are dependent on each individual, everyone reacts to same situation differently. A factor that may influence results when working with data.
- A colour could represent different meaning (feelings) in different culture this could lead to varied results.
- Not every user will choose similar type of movie under same emotional state.
- It is assumed that user chooses the colours only from given catalogue of colours.

VII. SYSTEM FEATURES

7.1 SYSTEM FEATURE 1

The proposed system allows the users to find the movie according to their taste easily. It happens so by considering their current emotional state [12]. Colour patterns are used to determine the emotions as the choice of colour varies with the changing emotions. A happy person may choose brighter colours unlike a sad person who would choose dull colours.

7.2 SYSTEM FEATURE 2

After analysing the colours emotions are predicted and these emotions are associated with appropriate movie genre. This kind of relationship filters the movies more precisely and will result in more user centric recommendations.

7.3 SYSTEM FEATURE 3

Concept of cosine similarity and KNN algorithm is implemented in finding the similar movies according to the user's preference. Cosine similarity analyses features like cast, director, keywords about a movie and fetches most accurate result whereas KNN finds most similar users according to the new user.

7.4 SYSTEM FEATURE 4

The proposed system also allows users to find the type of music a person wants to listen according to their moods. A pop out will be generated where you will filter according to your mood and environment.

7.5 SYSTEM FEATURE 5

Screen time of a user can be extracted using cookies. And if the screen time is considerably more, then the system can suggest the user to take a break by using extensions and can recommend any music or a reminder thereby contributing to the emotional wellbeing of the user.

VIII. NON FUNCTIONAL REQUIREMENTS

8.1 PERFORMANCE REQUIREMENTS

- Use of more colours improves the accuracy of the emotion detection algorithm. With more colours different categories of emotions can be predicted for the user [11].
- For desired results user is supposed to choose the colours from the catalogue offered.
- Movie catalogue having more and more genre specific movies would not generate generalized results.
- User should be unbiased while choosing the colours, he should choose the colours that he really feels like choosing, deliberately choosing different colours would not yield correct results.

8.2 SOFTWARE QUALITY ATTRIBUTES

- ERS reduces the efforts of user by systematically showing the results that may be preferred by user thereby reducing his task to search in the vast data jungle. For desired results user is supposed to choose the colours from the catalogue offered.
- ERS offers a set of colors to the user and input three colors, not more or not less.
- ERS correctly detects the current state of user and generate list of relevant movies.

IX. CONCLUSIONS

ERS has an extra feature over traditional RS of incorporating user emotion with user profile and recommending content based on the emotional state. Concepts of cosine similarity and collaborative filtering have been used along with taking user emotion as a parameter. The efficiency of the movie recommendation can be greatly improved by the ability of the RS to recognize emotions. Moreover, emotions are very subjective in nature. They can influence the interaction,

behaviors and thinking, also the interpretation of colors and emotion can differ between cultures, religions and beliefs of the user.

X. SCOPE FOR FUTURE WORK

Firstly, the proposed system may lead to help the people suffering from daily work anxieties, mental pressure, which may help the researchers in finding the pattern of anxiety or any other mental disorder, thereby setting a pattern tracker. Secondly, this can also help music and film industry and online platforms to showcase what viewers want and what are the different interests of their target audience by establishing a database of users based on the interests, viewing history, etc.

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