A Minor Project Synopsis on

**Recommendation engine using movielens dataset**

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SYNOPSIS

1. INTRODUCTION

* We are transitioning from the era of facts to that of recommendations. A recommender system makes a forecast, just like many other device mastering techniques do. depending on the historical behaviour of consumers. It specifically expects the user to select a fixed set of products only on the basis of prior experience.
* A recommendation system filters information and predicts a user's rating or preference for an item. Recommender systems in simple algorithms suggest relevant products to consumers. The recommendation system has two types: content-based filtering and collaborative filtering. Content-based filtering uses item features to recommend similar items based on user preferences and feedback. The system relies on user input, such as ratings or link clicks, to function.
* It operates on data that is obtained from the user, either implicitly (clicking on a link) or explicitly (ratings). There are two types of collaborative filtering: item-based collaborative filtering and user-based collaborative filtering. By employing user-based filtering, comparable users are located. Those that have similar interests and preferences in books, films, and other media are referred to as comparable users. Conversely, item-based filtering locates related products.

1. MOTIVATION

* The importance of recommendation systems is growing in the incredibly hectic world of today. Individuals constantly lack time due to the numerous tasks they have to complete in the limited 24-hour period. Consequently, the recommendation structures are essential since they enable them to make wise decisions without depleting their mental energy. A recommendation system's main purpose is to find stuff that will excite a specific person. Additionally, it has several features that allow for the creation of personalised lists of interesting and helpful stuff for each user or individual.

1. PROJECT OBJECTIVES

Objective 1: Increase User Contentment and Engagement

Create and put into action a personalised movie recommendation system for consumers by utilising content-based algorithms and collaborative filtering. By observing how users interact with suggested films and provide feedback, the goal is to raise user happiness and engagement and improve the quality of recommended movies simultaneously.

Objective 2: Enhance Genre Diversity and implement a rating system

To increase the precision and variety of suggestions, create and incorporate cutting-edge machine learning algorithms into the movie recommendation system. The objective is to guarantee that consumers are exposed to a wider variety of movie genres and styles while also achieving a boost in recommendation accuracy. We will also implement a review rating system which shows ratings of a particular movie both good and bad so that users can decide movies to watch based on how other viewers perceived that particular movie.

1. PROBLEM STATEMENT

* Due to the recent exponential expansion in movie material availability, viewers now have an excessive amount of options, which makes it necessary to create an efficient Movie Recommendation System (MRS) that can intelligently direct people towards personalised content. The difficulty of developing a reliable MRS by analysing user preferences and behaviour using machine learning techniques is addressed in this problem statement. In order to improve the accuracy of user preference prediction, the system intends to include collaborative filtering algorithms, such as matrix factorization or deep learning models. Furthermore, it aims to address the issue of cold start by utilising hybrid recommendation strategies that combine content-based and collaborative filtering. In order to provide equitable and varied recommendations, the MRS must contend with algorithmic biases while also taking scalability and real-time user dynamics adaption into account.
* System must create a user-friendly interface that accommodates a wide range of interests and preferences while striking a balance between customisation and serendipity. The ultimate objective is to create an intelligent MRS that maximises user delight while offering insights into the difficulties of recommending algorithms in a quickly changing digital environment.

**Pros and cons in tabular format are shown below**

|  |  |
| --- | --- |
| Pros of existing method | Cons of existing method |
| Scalability: Easily scalable to accommodate a growing user base. | Resource-intensive: Ongoing data processing and algorithm modifications could call for a large amount of computer power. |
| Enhanced User Experience: By making the process of finding content easier to navigate, this enhances the user experience in general. | Absence of Context: The system can have trouble comprehending the background of a user's attitude or particular viewing situation. |
| Real-time Updates: Based on user behaviour and current trends, it is possible to offer recommendations in real-time. | Bandwagon Effect: Even if a user's preferred material doesn't match the trending content, they may still be persuaded to view it. |
| Content that is tailored to the user's tastes makes movie recommendations that improve the watching experience. | Insufficient serendipity: If the system concentrates too much on the user's choices, the user may not discover a variety of content. |
| User Retention: Raises customer happiness, which raises loyalty and retention. | Limited Interpretation: If a user has subtle preferences outside of the preset categories, the system might not be able to handle them well. |

1. METHODOLOGY:
2. Project Planning:

Project planning for a movie recommendation system involves outlining the goals, tasks, and timelines, ensuring a structured approach to the development process and effective resource allocation.

Data Collection:

1. Data collection: in the context of a movie recommendation system refers to gathering diverse information on movies, user preferences, and ratings, forming the foundation for algorithm training and personalized recommendations.
2. Data Filtering and Cleaning:

Data filtering and cleaning involve refining the collected movie data, removing inconsistencies and irrelevant information to enhance the accuracy and reliability of the recommendation system.

4)Algorithm implementation in a movie recommendation system is the process of translating chosen recommendation algorithms (e.g., collaborative filtering or content-based filtering) into functioning code to generate personalized movie suggestions for users.

5)Deployment and testing entail the rollout of the recommendation system to the production environment and rigorous testing to ensure functionality, performance, and user experience meet the specified criteria.

6)Optimization and integration involve refining the recommendation algorithms and seamlessly incorporating them into the overall system architecture to improve accuracy, efficiency, and user satisfaction.

7)User testing evaluates the movie recommendation system's effectiveness by gathering feedback from real users, assessing usability, and refining features based on user preferences and interactions.

Documentation and Project Review:

8) Documentation and project review encompass creating comprehensive project documentation for future reference and conducting a thorough assessment of the completed project to ensure it aligns with initial objectives and quality standards.

A screenshot of a computer

Description automatically generated



1. Facilities required for proposed work:

Software requirements:

1. Programming Language: Python used for machine learning and data processing.
2. Frameworks: data processing: 1)numpy 2)pandas

Data visualization: 1)matplotlib 2) seaborn

Machine learning library: ScikitLearn

Frontend: streamlit

1. Database: Relational Database Management System (MySQL)
2. Recommendation Algorithms: KNN based recommendation, K-means clustering based recommendation, matrix factorization, content based filtering and collaborative filtering.

Naïve bayes algorithm for sentimental analysis

1. Development IDEs: 1) Google collab 2) jupyter notebook

Hardware requirements: 1) RAM: 8 GB

2) Storage: 10GB

3) CPU: i5 10th gen

4) GPU: Geforce GTX 1650

5) Network bandwidth: >10MbPS

1. Bibliography and references

* Book referenced: Introduction to Machine Learning with Python: A Guide for Data Scientists – Andreas C muller, Sarah Guido
* Research papers referenced: a) Machine Learning Model for Movie Recommendation System- http://www.ijert.org ISSN: 2278-0181

b) Comprehensive Movie Recommendation System -https://www.researchgate.net/publication/357301907