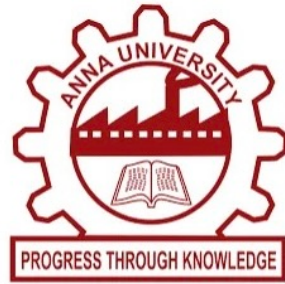# University College of Engineering Villupuram

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Personalised Content Recommendation
Project

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Personalised Content Recommendation in Python

Abstract :

This project aims to develop a personalised content recommendation system using data science.During the last few decades, with the rise of web services, recommender systems have taken more and more place in our lives. From e-commerce to online advertisement recommender systems are today unavoidable in our daily online journeys.In a very general way, recommender systems are algorithms aimed at suggesting relevant items to users (items being movies to watch, text to read, products to buy or anything else depending on industries).

Introduction :

A recommendation engine is an AI-driven system that generates personalized suggestions to users based on collected data.There are many business benefits of using recommender systems such as personalized user experienced , increased revenue, enhanced user engagement, among others. Various industries utilize recommendation systems: e commerce, media, entertainment , travel, gaming, and more.It operates by collecting and analyzing user behaviour, user preferences, and historical user item interactions.

Methodology :
Steps involved in building content recommendation system :

1. Data Acquisition and Data Cleaning :
- Recommendation systems primarily collect data through user interactions, including clicks, views, and purchase history of different users.
- The inaccurate data ,missing datas are removed and formatted into a structure suitable for analysis .
- Data cleaning. These techniques, manual and automated, remove data incorrectly added or classified.
- Data integration. Combining multiple datasets to get a large corpus can overcome incompleteness in a single dataset.
- Data normalization. The size of a dataset affects the memory and processing required for iterations during training. Normalization reduces the size by reducing the order and magnitude of data.

2.Choose a recommendation algorithm :

- Model selection is the process of choosing the best ml model for a given task.
- To build a recommendation system , a best algorithm is needed.There are several algorithms :

    1. Collaborative filtering :
        In collaborative filtering, the system analyzes information about preferences, behaviour, and activities of all users to predict what you might like. Simply put, the system recommends items that other users with similar tastes and behaviour liked. The main assumption of this method is that people who liked similar products in the past will also like similar products in the future.

    2. Content-based filtering :
        Content-based filtering methods are based on product descriptions and user preferences. In Product description analysis , a product descriptions are analyzed using a feature extraction technique to transform original descriptions into an item vector. Using item vectors, the system calculates the similarities between products.

    3. Hybrid approaches :
        Hybrid approaches combine both collaborative and content-based filtering.

- The choice depends on the type of data available and the use case.

3.Train and test a model :

- In machine learning projects, we generally divide the original dataset into training data and test data.
- We train our model over a subset of the original dataset, i.e., the training dataset, and then evaluate whether it can generalize well to the new or unseen dataset or test set.
- Therefore, train and test datasets are the two key concepts of machine learning, where the training dataset is used to fit the model, and the test dataset is used to evaluate the model.

- In machine learning, model testing is referred to as the process where the performance of a fully trained model is evaluated on a testing set.

4.Evaluation :
- Model evaluation is the process that uses some metrics which help us to analyze the performance of the model.
- In the last step, we test the model by feeding it with the test data and unseen dataset. This step ensures that the model is trained efficiently and can generalize well.

Existing Work on Personalised Content Recommendation :

There is a vast body of existing work on personalised content recommendation across various domains. Few notable examples are listed below

1. Zillow

Zillow's recommendation system suggests real estate properties depend on a user's search history and preferences. Users can receive personalized recommendations based on their budget, location, and desired features.

2. Airbnb

Airbnb's recommendation system suggests accommodations based on a user's search history, preferences, and reviews. Personal recommendations are made based on factors such as the user's travel history, location, and desired amenities.

3. Uber

Ulber's recommendation system suggests ride options created on a user's previous rides and preferred options. When recommending rides, the algorithm considers factors such as the user's preferred vehicle type, location, and other preferences.

4. Google Maps

Google maps's recommendation system system suggests places to visit, eat, and shop based on a user's search history and location. Personalized recommendations are generated based on factors such as the user's location, time of day, and preferences.

5. Goodreads

Goodreads's recommendation system suggests books centered on a user's reading history, ratings, and reviews. To provide personalized recommendations, the algorithm considers factors such as the user's reading habits, genres, and favourite authors.

From online shopping to entertainment and travel. These systems have significantly improved the user experience by suggesting relevant options based on our interests and preferences. The success of these real-world examples showcases the power and effectiveness of recommendation system in various industries. With advancements in artificial intelligence, recommender systems are expected to become even more accurate and personalized in the future.

System Requirements for Personalised content recommendation system :

This project can run on a machine with the following specification :

Software :
- Operating System : Windows 10

- Python version 3.11.7

- Python Libraries :
  1. Numpy
  2. Pandas
  3. Scikit Learn
  4. Matplotlib

Hardware :
Processor : Intel core i3
RAM : 4.00 GB

Future Works :
Extend the recommendation system to handle multimodal data, such as text, images, and audio, by incorporating techniques like deep learning architectures that can process and fuse information from different modalities.

Conclusion :

The personalised content recommendation project, developed using Python libraries, has successfully demonstrated the efficiency of data-driven methodologies in enhancing user experience and satisfaction through tailored recommendations.we have covered Data Acquisition and Preprocessing ,Training the dataset , Testing the model and Evaluation.This personalised content recommendation project contributes to creating a more engaging and valuable user experience, fostering loyalty, and driving business growth in the digital landscape.