Assignment 3: Pitch and Plan for Solving a Domain Problem

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Content

PROJECT TITLE：Music recommendation system

Aims：

The recommendation system has been widely used in the field of e-commerce. Currently, the mainstream recommendation algorithms include collaborative filtering algorithms, content-based recommendation algorithms, and knowledge-based recommendation algorithms. Our aim is to design a music recommendation algorithm that not only uses collaborative filtering algorithms and content-based recommendation algorithms, but also has a music similarity analysis system to make the recommended music more in line with user preferences.

Objects：

(i)   Collect song class data sets, including the author of the song, release year, song type, etc. as a training set.
(ii)   Use data analysis tools such as tableau to integrate data and eliminate invalid data. And use python to build the programming environment and build the recommendation system.
(iii)   Use RMSE, MAE and other algorithms for accuracy analysis, test recommendation speed, reasonable content of recommended content, comprehensive evaluation of use prospects.

Background：

The music recommendation system is the main push function and core competitiveness of all current music software, and is highly praised by users. The recommendation algorithm is simply to divide the user in a large amount of user data (behavior records, etc.), and recommend music that other users like to the same group of users. Among them, it is necessary to classify music and establish scoring rules, establish user models, find similar users, and classify songs based on user behavior data to achieve "blind listening.". Current

mainstream recommendation methods include user-based recommendation methods, item-based recommendation methods, and content-based recommendation methods. Among them, user-based and item-based recommendation methods belong to the recommendation method of memory-based collaborative filtering. The user-based recommendation method can analyze the similarity of users, recommend songs of interest to users with the same music preferences, item-based can analyze the similarity of music, and content-based recommendation method can label music. For example, if the user likes lyric music, then we can recommend the high score music of the lyrics to the user. But there are flaws in all of these methods. For example, when using a content-based recommendation algorithm, if we like a song from a certain singer, the system may recommend other songs that the singer likes, but the style between the songs is different. If recommended by the item-based recommendation algorithm, the two songs may be too similar, causing the user's aesthetic fatigue. When using the user-based recommendation algorithm, the taste of songs between similar users may be different. Therefore, the recommendation system we developed not only combines the advantages of several recommended algorithms, but also analyzes the melody, wavelength, and author's tone of the music through the music similarity analysis system. Ensuring that the recommended songs not only interest the user, but also ensure the difference between the songs and the quality of the song.

Research Project：

Significance

The music recommendation system is an important part of music software. When the user's song list is limited, recommending the appropriate music to the user not only allows the user to enjoy the happiness brought by the good music, but also improves the user's evaluation of the music software, and at the same time, can promote the user to purchase more paid music and improve the economic benefit. However, at present, the music recommended by many music recommendation systems is not very relevant, and the quality of songs is generally low, and is not loved by users. It's hard to be truly intelligent and can't effectively dig out the potential interest of users. Therefore, we need a recommendation system that uses a hybrid algorithm to recommend songs that make users more satisfied.

Innovation

The recommendation system we designed uses a hybrid recommendation algorithm. For new users, we recommend songs with higher scores. When we get enough implicit feedback, we recommend users based on the user's favorite songs, preferences, and the number of times each song is enjoyed. The type of song, and then recommend the appropriate song through collaborative filtering. Finally, the music analysis software compares the similarity between the newly recommended songs and the user's current favorite songs, eliminates the songs that are too different, and constantly changes the recommended song style to prevent the user from being fatigued.

Briefly outline

First, we need to build a training set, mainly to choose a huge music library as a training set. Secondly, we build a classifier through python. If the matrix is too sparse, in order to solve the cold start problem, we use the knowledge-based recommendation algorithm. Then use content-based and collaborative filtering algorithms to ensure the completeness of the recommendation system, then we build music analysis software to ensure that the songs are accepted by users. Finally, we will evaluate the system's recommended speed, recommendation accuracy, customer feedback and economic benefits.

Modeling and evaluation

Modeling is the core stage of the project. Its accuracy directly affects the construction process of the entire recommendation system. First, we need to process and mine the data to ensure the accuracy, integrity and consistency of the data, eliminate meaningless data, and reduce operating costs. Next we need the IT team to design a hybrid recommendation algorithm that can solve the cold start problem, matrix sparse problem and recommendation efficiency problem. This kind of algorithm needs to combine the advantages of collaborative filtering, content-based algorithms, not only to make the recommended songs have complete labels, but also to give reasons for recommendation, and also to ensure that the recommended songs are of a type that is satisfactory to users. The construction of music analysis software is also essential. After generating a large number of recommended songs, we need to use music analysis software to filter out the songs that users are most likely to be interested in. At the same time, real-time online calculations can ensure that

users' preferences change and other factors can be It was recorded at a time. Finally, we need to test the accuracy through RMSE, MAE and other methods, and optimize the recommended time and recommended efficiency, and maintain the data in the future use.

Timelines

As shown in Figure 1, we prepared training data, sales data, etc. in the first two months. From the second month, we started to build the mode. First process the data and use Python to build the platform necessary to run the data. Finally, we carry out the evaluation and deployment plan, and analyze the benefits and economic benefits of the system.
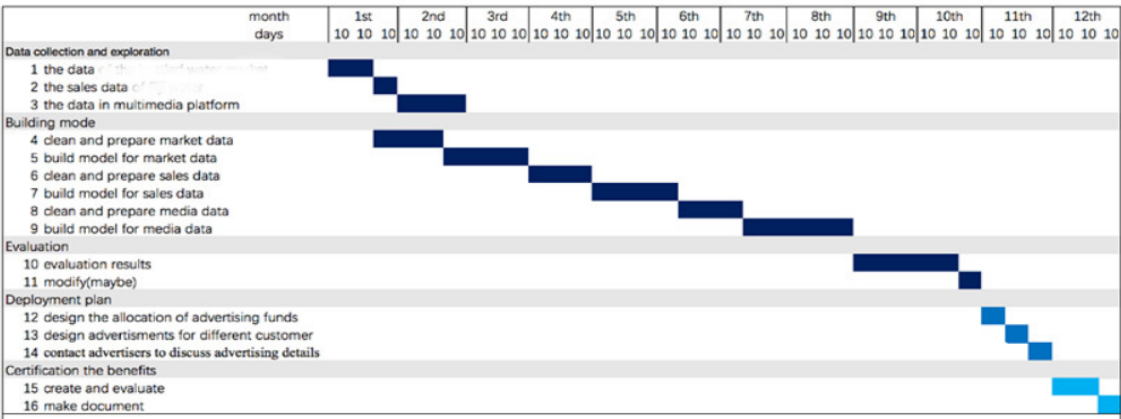

	month	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
	days	10 10 10	10 10 10	10 10 10	10 10 10	10 10 10	10 10 10	10 10 10	10 10 10	10 10 10	10 10 10	10 10 10	10 10 10
Data collection and exploration													
1 the data													
2 the sales data													
3 the data in multimedia platform													
Building mode													
4 clean and prepare market data													
5 build model for market data													
6 clean and prepare sales data													
7 build model for sales data													
8 clean and prepare media data													
9 build model for media data													
Evaluation													
10 evaluation results													
11 modify(maybe)													
Deployment plan													
12 design the allocation of advertising funds													
13 design advertisments for different customer													
14 contact advertisers to discuss advertising details													
Certification the benefits													
15 create and evaluate													
16 make document													

Figure 1

Expect the outcome

Our desired result is the ability to develop a recommendation system with a hybrid recommendation algorithm and music analysis software that can be accepted by investors and marketed, recommending the music they are most interested in and getting good feedback, increasing users. The frequency of use increases market share and motivates users to purchase more paid music and increase the economic benefits of our products. Investors can gain greater market share and higher profit returns.

BUDGET

As shown in Figure 2, because our development environment is python, there is no need for additional infrastructure costs, and on the hardware side, we need some high-performance computers to analyze huge amounts of data. In order to ensure the comprehensiveness of the song, we need to invest more money in the song database. Because we need to develop a hybrid recommendation algorithm and powerful music analysis software, the IT team is very demanding and invested the most.

Suggest Component	$A(Thousand)
Basic devices	
Hardware (purchase and implementation)	50
Network infrastructure (purchase and implementation)	10
Software development	5
Database (purchase and implementation)	100
Salaries	
Project Manager	20
IT team	500
Certification Experts	10

Figure 2

PERSONNE

In order to develop a complete recommendation system, we first need an experienced product manager to ensure that the entire product development plan is reasonable and reliable. Second, we need a complete IT development team to ensure that we can design the ideal recommendation system and evaluate the accuracy, completeness and efficiency of the system. When the system is developed, we need an advertising team and a sales team to promote

and sell the product. Finally，we need some certification experts to certificates

benefit.

VIDEO PITCH Link：

https://www.youtube.com/watch?v=Auz4xLz5H5Q

Reference

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