

A Games Recommender & Its Future

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Abstract— This paper reviews the various aspects required for an ideal web application that would recommend games. The initial section will focus on the need of a recommender system. Although many researchers have used video games as a method or experiment to contribute to their respective fields, this paper will solely focus on the factors of games recommendations and purpose of such a recommender system application. We mention why there is a need for recommending games and claim that this ideal games recommender shouldn't be about only recommendation; it should be about interaction and community. We would also like to share our findings and the concepts used in the making of this model, and its future scope.

Key words: Games Recommender

I. INTRODUCTION

A recommendation system is a program which is used to provide suggestions to users based on their choices. Since the past decade recommendation systems or engines have become widely popular and are being used in different fields; entertainment, jokes, articles, items in market, food etc. Recommendation system use two different types of mechanisms to provide recommendations:

A. Collaborative Filtering

Collaborative filtering is a type of technique where users are suggested items on the basis of the preferences of the people that have already used or rated that item. It is a better technique and can be used on larger sets of data. The algorithms that use collaborative filtering are efficient and accurate.

B. Content-Based Filtering

Content based filtering is a type of technique where users are suggested items on the basis of their own past preferences. Thus, user profiles are required to be created. Although this is a simple technique, it is not that effective when larger datasets are used.

II. NEED FOR GAMES RECOMMENDER

We require or desperately need a games recommender for the following reasons:

A. Rare Recommender

Although there have been significant development in the movie recommendations area, like the Netflix, a games recommender system has rarely been found, and even that is not up to the expectations of the people. Also, with this exponential growth in the games industry, it is highly essential that more research should be done in recommending video games, as they have a stronger impact on our daily lives than the movies or other things.

B. Violent Behaviour & Other Impacts

It has been highly observed that playing certain kinds of games affect the human behaviour differently; some face high levels of anxiety, paranoia, increased aggression, which leads eventually to violence. Apart from these negative aspects, positive signs have also been observed; increased in dopamine release, increase in creativity, concentration, focus, relaxation; both mentally and physically etc. With such a wide range of behaviours that are experienced by the people, it has been difficult to find or develop a suitable algorithm that would help in recommending games based on these changes.

C. Our Own Analysis

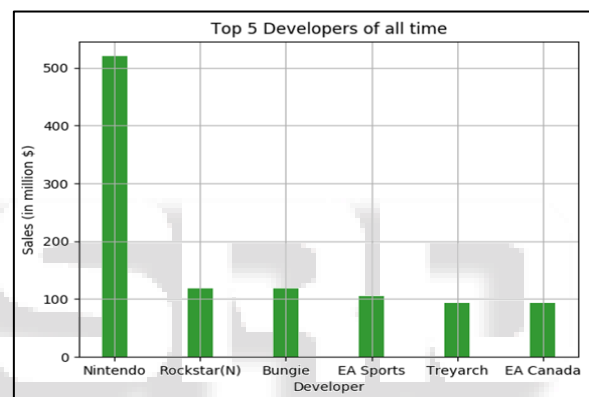


Fig. 1: Sales of Top Companies

Our own independent analysis on a video games sales dataset shows that over the past decade, this industry exists or is dominant in only big countries, like India, Japan, China, Canada, USA. Also major game producing companies and publishers also belong from these countries only; like Electronic Arts from the USA, Namco Ltd and Konami from Japan etc. A surprising fact has also been observed that the gaming platform companies are also based in these dominant country group.

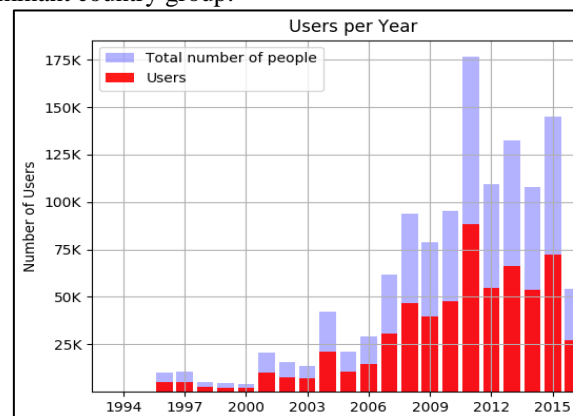


Fig. 2: Increasing Users Per Year

III. LITERATURE REVIEW

The following papers were referred to:

A. Gaming and Gender – A a (Nov 24, 2015).

Although it is common for both men and women to say that they play games, it is less common for individuals of either gender to describe themselves as a gamer. In particular, women are less likely than men to identify themselves as a gamer. Women are also more likely to lie about the time spent on gaming than men. By comparing self-reported data to data collected from game servers, it was found that women lied about their playing time by an average of 3.5 hours per week, while men did so by an average of 1 hour per week. Overall, men have more positive attitudes about gaming than women.

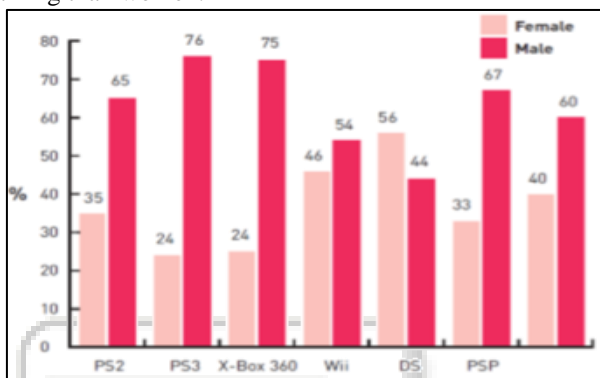


Fig. 3: Gender Comparison

B. Value Creation in the Video Game Industry (19 July 2013).

The growth of the game industry and market has coincided with an enormous expansion of the relevant gamer groups. Early console generations attracted mostly to children and male teenagers; subsequent generations attracted also young men (PlayStation) and then also females and families (Wii, but also the Kinect controller of the Xbox 360). The average age of console game users in the United States is 36.5 years, and 44% of players are women. Approximately 75% of American households spend money on games today. In addition to occasional players, leagues of professional players have developed, allowing players to compete and play on a global level.

IV. METHODOLOGY

Recommender system uses collaborative filtering discussed in the introduction part. Here, multiple linear regression algorithm is used.

Multiple linear regression is the most common form of linear regression. As a predictive analysis, the multiple linear regression is used to explain the relationship between one continuous dependent variable and two or more independent variables. The independent variables can be continuous or dummy. At the center of the multiple linear regression is the task of fitting a single line through a scatter plot. The multiple linear regression fits a line through a multi-dimensional space of data points. The simplest form has one dependent and two independent variables.

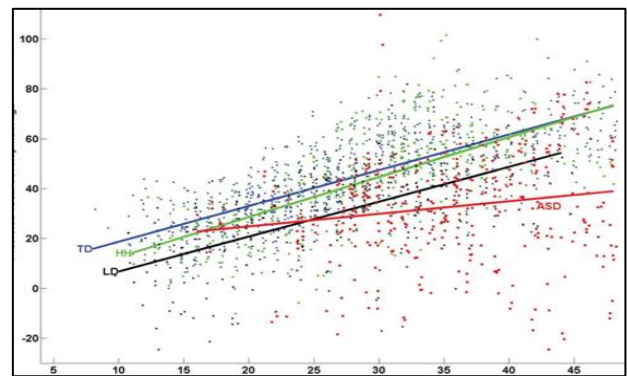


Fig. 4: Multiple Linear Regression Plot

V. PROCEDURE

A matrix of ratings is created which shows games rated by each user. Another matrix is created which justifies whether a user has rated a certain game or not. The user is then asked to rate some games based on his taste. After that the two matrices created are updated by adding an additional column in both of them. User preference matrix and game features matrix are also created and dot product is taken to provide absolute ratings. Mean distribution is applied on ratings matrix to make the average rating for a game as zero. A cost function is defined which aims at reducing errors. A gradient function is also defined which determines the slope. Optimizations are performed with both functions and after this a dot product is taken for user preferences' transpose and movie features. This results in predictions, which are then displayed to the user.

A. Algorithm

- Initialize ratings of games
- Find whether a user rated a game
- Describe user preferences and game aspects
- Ask user to rate some games
- Mean distribution of ratings
- Perform collaborative filtering via multiple linear regression
- Cost end gradient function minimization
- Provide predictions

B. Formulae Used

1) To Determine User Ratings For A Game

$$U = Gf \cdot Up$$

Where U = user ratings, Gf = game feature, Up = user preference, . = dot product

2) Optimization

$$O = C(x)/G(x) \cdot Reg$$

Where O = optimization parameter, C(x) = Cost function, G(x) = Gradient function, Reg = regular parameter

3) For Prediction

$$P = Gf \cdot \text{transpose}(Up)$$

Where Gf = game feature, Up = user preference, . = dot product

VI. ACCURACY

The root-mean-square error (RMSE) is a frequently used means of the differences between values predicted by an approach and the values actually observed. The RMSE

represents the standard deviation of the differences between predicted values and actually observed values. These individual differences are called residuals when the calculations are performed over the data sample that was used for estimation, and are called errors. The accuracy achieved for the algorithm was close to 0.98.

VII. FUTURE: INTERACTIONS, GROUPS

Although the recommender is functioning properly, there is to more to us than meets the eye. The recommender can be converted to an application containing user profiles, where users can store games as bookmarks and rate games that they have played. It can contain a slack where queries can be asked and answered by the users only. There can be a chat module which can enable the users to interact privately. Creation of group's option can come in handy as well. With all these components added, we can say that recommendations can be about interactions and groups as well.

VIII. CONCLUSION

The recommender system is working as efficiently as it can. It is recommending games based on user preferences and game features. Accuracy also exceeded expectations. Although the model still needs more working, it can act as a temporary source of providing good recommendations. With improvements like adding platform and spatial availability features, the system will evolve and grow exponentially.

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