

Enhanced Prediction of Sales in Video Games using Random Forest Algorithm in Comparison with Generalized Linear Model Algorithm to Improve Accuracy

INTRODUCTION

- This study focuses on comparing the Random Forest Algorithm with the Generalized Linear Model (GLM) Algorithm, aiming to determine which method gives more accurate predictions for video game sales
- The problem with video games sales is that there aren’t enough accurate sales predictions in the competitive video games platform. This may leads to major problems like underproduction or overproduction and customer dissatisfaction
- By analyzing and contrasting machine algorithms like RF and GLM will give more accurate sales predictions in video gaming industry
- The GLM algorithm creates modeling relationships between a response variable and one or more predictor variables. It extends the ordinary linear regression model by allowing for non-normal error distributions
- Random Forest algorithm that builds multiple decision trees and combines their predictions to improve accuracy and reduce overfitting. It operates by aggregating the results of multiple decision trees, making it robust and versatile for classification

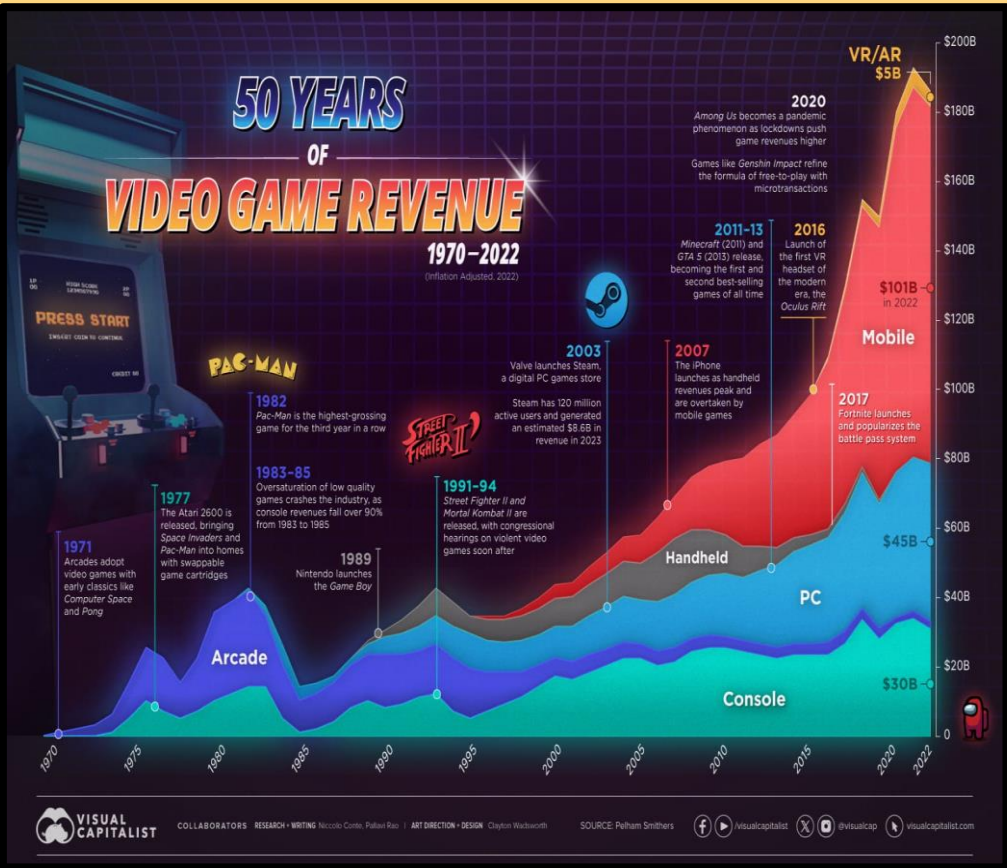


Fig.1 Video games sales prediction

MATERIALS AND METHODS

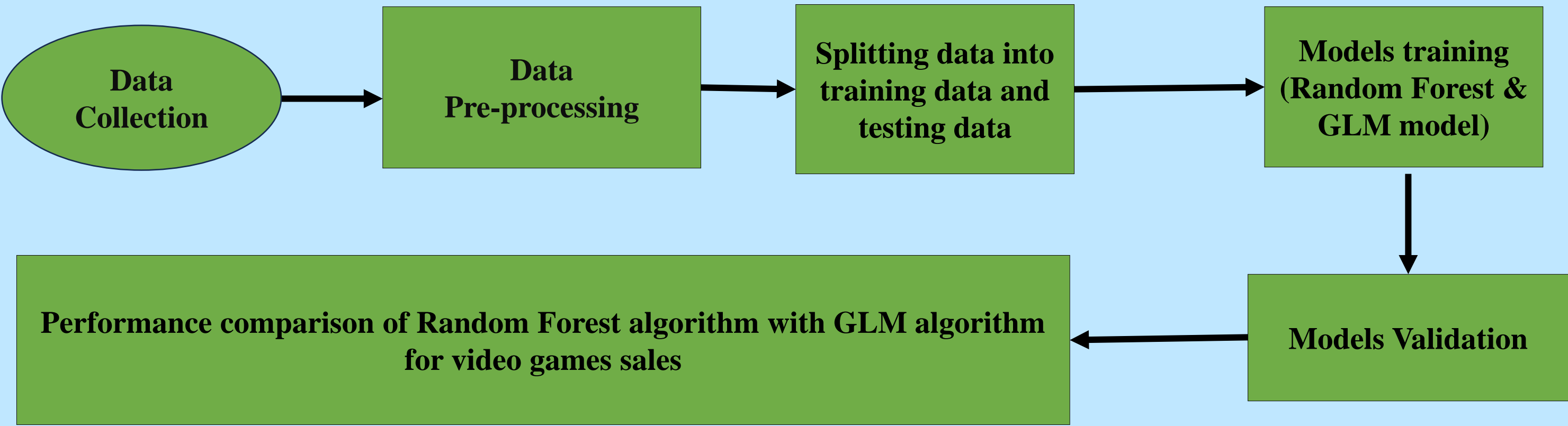


Fig.2 Flow chart for Video game Sales Prediction using random forest algorithm and GLM Algorithm

- Sample Size: 20
- Group-1 (Random Forest): 10 samples
- Group-2 (Generalized Linear Model): 10 samples
- The samples are tested in SPSS statistical analysis and outputs have been derived
- The statistical features extracted are count of samples, mean, standard deviation, minimum and maximum
- Non-number data is converted into numerical data for comparison between two algorithms in the dataset

RESULTS

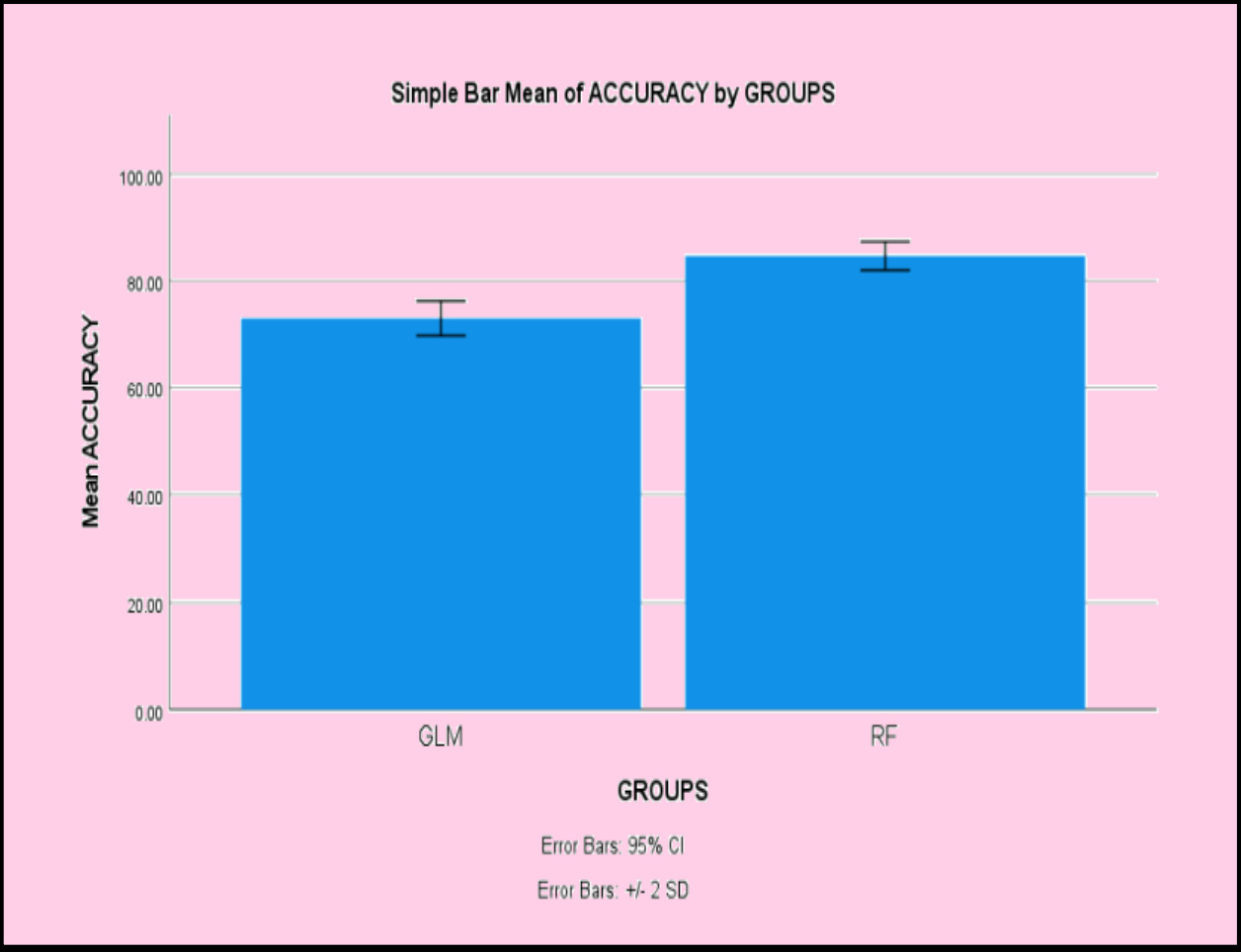


Fig.3 Mean Accuracy Analysis of GLM and RF

Table.1 Group Statistics of the RF and GLM Algorithms which contains mean, standard deviation and standard deviation error

Groups		N	Mean	Standard deviation	Standard deviation error
Accuracy rate	RF	10	86.40	1.33749	0.42295
	GLM	10	74.89	1.63299	0.51640

- In the present work, Random Forest Algorithm is compared with GLM algorithm and it depicts that the proposed algorithm gives more accuracy than GLM
- The Random Forest model attained 86.40% accuracy, on the other hand GLM Algorithm attained an accuracy of 74.89%

DISCUSSION AND CONCLUSION

- Based on t-test statistical analysis, the significance value of $p=0.001$ (independent sample t - test $p<0.05$) is obtained and shows that there is a statistical significant difference between the Random Forest and GLM Algorithms. The average accuracy values of two Algorithms: Random Forest Algorithm - 86.40% GLM - 74.89%
- From the work , it is concluded that the Random Forest algorithm attains the high accuracy when comparing with other Machine Learning Algorithms in video games sales Prediction. In the future, researchers could explore the incorporation of additional variables such as user engagement metrics, platform-specific data, and market trends to further enhance the predictive capabilities of the models
- Additionally, investigating the effectiveness of other advanced machine learning techniques, such as neural networks or ensemble methods, in combination with Random Forest and Generalized Linear Model algorithms could offer deeper insights into optimizing sales forecasts in the video game industry
- This study highlights the importance of improving sales prediction accuracy in the dynamic and competitive landscape of the video game industry. Through the comparison of Random Forest and Generalized Linear Model algorithms, valuable insights have been gained into the efficacy of different predictive modeling

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