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# Efficient Prediction of Sales in Video Games using Random Forest Algorithm in Comparison with Decision Tree Algorithm to Improve Accuracy

## INTRODUCTION

- This analysis aims to enhance the accuracy of sales predictions in the video game industry by comparing the Random Forest algorithm with Decision Tree algorithm
- Lack of accuracy is the main problem in video game sales predictions. This may leads to significant challenges like customers disappointment, uncertainty in investment decisions and financial instability
- Machine learning algorithms like DT and RF gives accurate predictions in video games sales. This study suggests a direct comparison between the Random Forest algorithm and the Decision Tree algorithm
- The Decision Tree Algorithm is a supervised learning method used for classification and regression tasks. It operates by recursively partitioning the input space into smaller regions based on the features of the data
- Random Forest Algorithm builds multiple decision trees and combines their predictions to improve accuracy and reduce overfitting. It operates by aggregating the results of multiple decision trees


Fig.1 Video games sales prediction

## MATERIALS AND METHODS

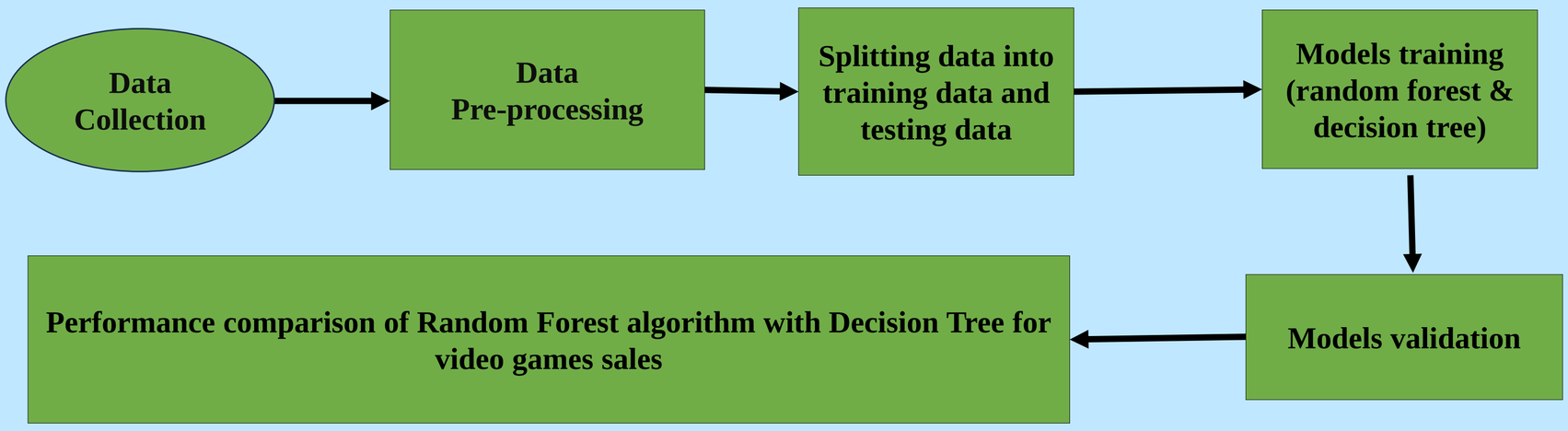


Fig.2 Flow Chart for Video game Sales Prediction using algorithm like RF and the DT

- Sample Size: 20
- Group-1 (Random Forest): 10 samples
- Group-2 (Decision Tree): 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

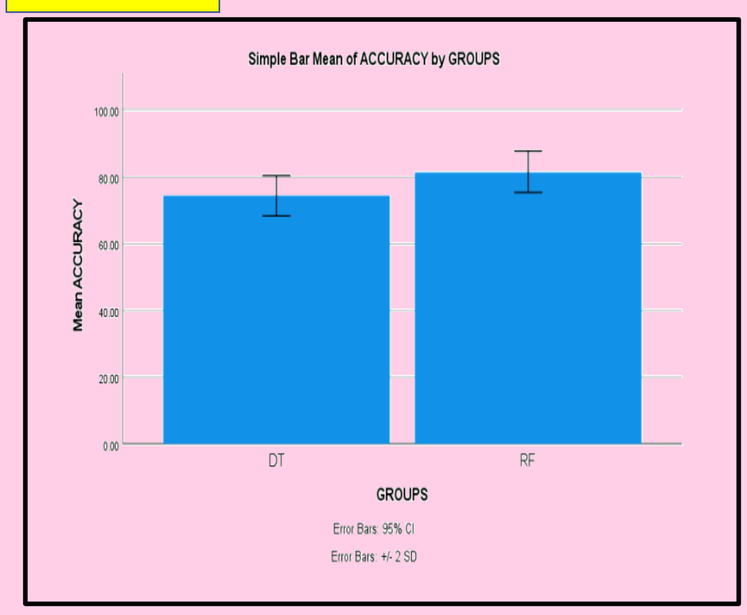


Fig.3 Mean Accuracy Analysis of DT and RF

Table.1 Group Statistics for Random Forest and Decision Tree Algorithms which contains mean, Standard deviation and the standard deviation Error

| Groups | | N | Mean | Standard deviation | Standard deviation error |
|---|---|---|---|---|---|
| Accuracy rate | RF | 10 | 86.40 | 3.027 | 0.957 |
| | DT | 10 | 79.32 | 3.027 | 0.952 |

- In the present work, Random Forest Algorithm is compared with DT algorithm and it depicts that the Random Forest algorithm gives more accuracy than the Decision Tree
- A Random Forest model attained 86.40% accuracy, on the other hand Decision Tree Algorithm attained an accuracy of 79.32%

## 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 Decision Tree. The accuracy values of two Algorithms: Random Forest Algorithm(RF) - 86.40% Decision Tree(DT) – 79.32%
- 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
- Further exploration could involve extending the comparison to include other machine learning algorithms or ensemble methods to optimize sales prediction models for diverse gaming genres and platforms
- Additionally, integrating real-time data streams from social media could enhance the predictive capabilities, offering deeper insights into consumer behavior and preferences in the ever-evolving gaming landscape
- This comparative study sheds light on the efficiency of Random Forest and Decision Tree algorithms in refining sales predictions within the video game industry

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