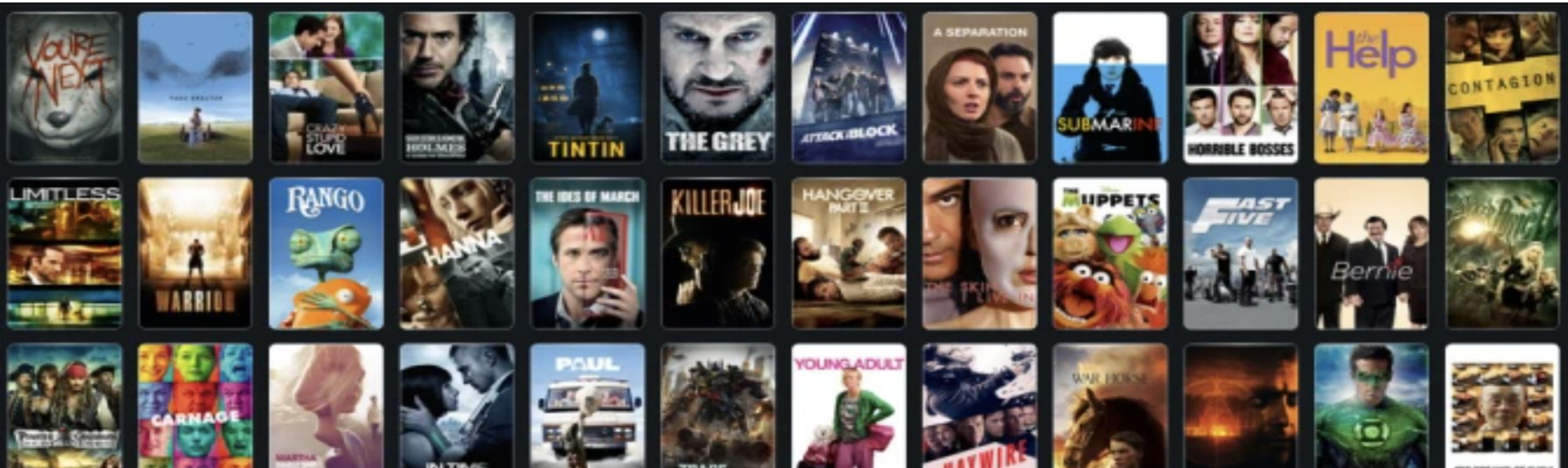
Predicting IMDb Movie Ratings



Group Members

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Objective

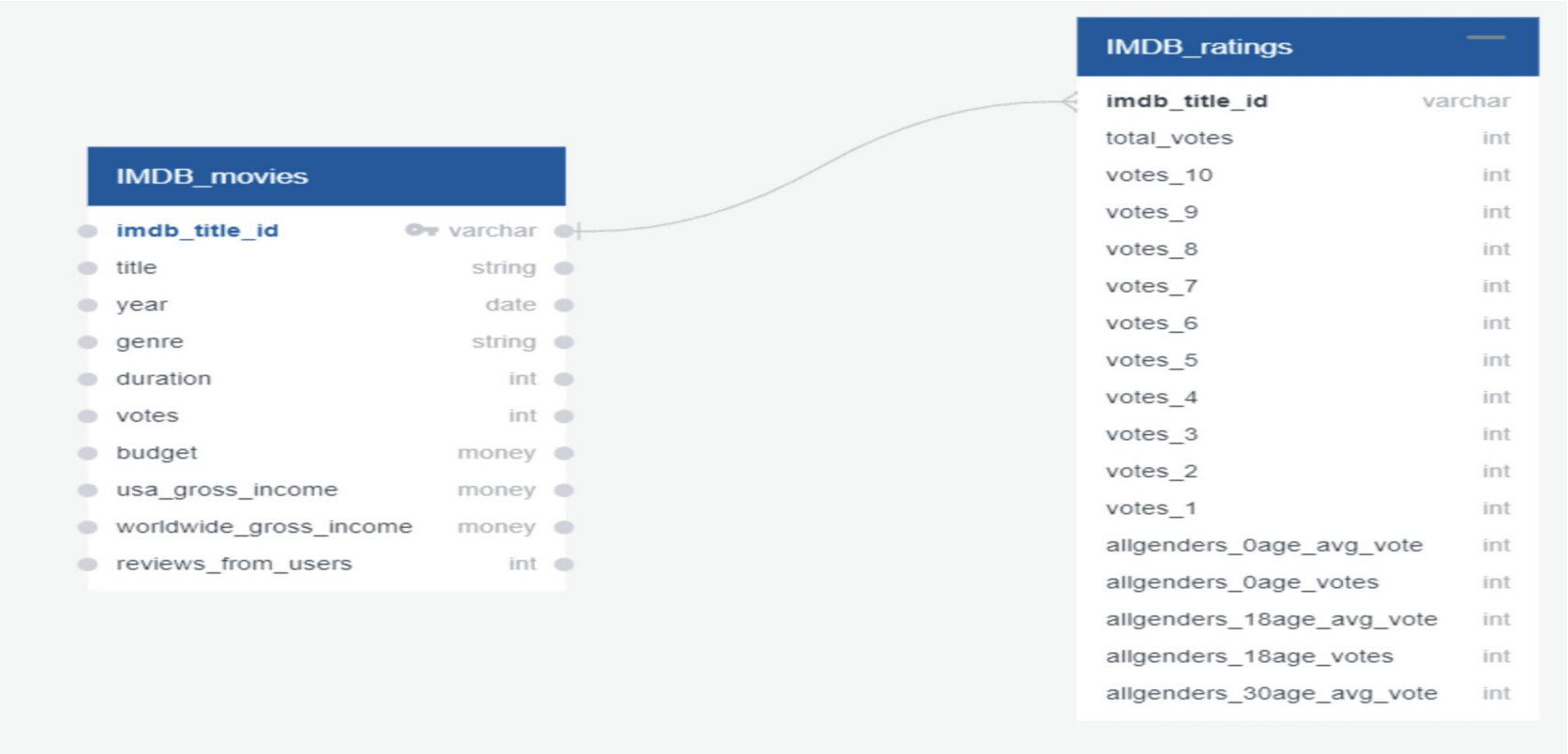
The purpose of the project is to predict the IMDb Movie Rating from the features contained in the IMDb dataset, execute exploratory Data Analysis and Visualization for the IMDb Dataset
And finally utilise Machine Learning Models to achieve ideal model performance by comparing suitable Machine Learning Algorithms

Why we chose the topic?

- IMDb, whose full English name is Internet Movie Database, is a web-based data set identified with films, TV shows, home recordings, games... Also, streaming internet-based substance, including full team: entertainers, creation group. What's more, IMDb gives a wide scope of film-related data, be it individual memoirs, plot synopses, tests, or client audits. From that point, you can likewise effectively see the sorts of rankings dependent on a wide range of rules, so new clients can undoubtedly see the issues and content that get the most client consideration.

- We chose this topic because it makes it easy for people to find good movies. Besides, with the current situation, the Covid-19 makes people still afraid to watch movies in cinemas, people often choose the movies to watch at home. Therefore, IMDb makes it easy for people to pick out which movies they love, with high ratings, or their favorite actors.

ERD Diagram


IMDB_movies
imdb_title_id varchar
title string
year date
genre string
duration int
votes int
budget money
usa_gross_income money
worldwide_gross_income money
reviews_from_users int
IMDB_ratings
imdb_title_id varchar
total_votes int
votes_10 int
votes_9 int
votes_8 int
votes_7 int
votes_6 int
votes_5 int
votes_4 int
votes_3 int
votes_2 int
votes_1 int
allgenders_0age_avg_vote int
allgenders_0age_votes int
allgenders_18age_avg_vote int
allgenders_18age_votes int
allgenders_30age_avg_vote int

Percentage of voting

Votes	Quantity	Total votes	Percentage
8 - 8.9	1686	85855	1.96%
9 - 9.9	55	85855	0.06%

Highest genre of votes from 8 to 10

Genre	Max Quantiry
Drama	325

Comparing the duration from 8 to 10

Duration	Total
Less than 60 minutes	19
Greater than 100 minutes	1281

Dashboard


Genre vs Rating
Genre
Imdb Title Id
Adventure, Drama..
Biography, Crime, ..
Biography, Drama
Biography, Drama, ..
Crime, Drama
Crime, Drama, ..
Drama
Drama, Fantasy, ..
Drama, History
Drama, War
H
tt0000009
tt0000574
tt0001892
tt0002101
tt0002130
tt0002199
tt0002423
tt0002445
tt0002452
tt0002461
tt0002646
tt0002844
tt0003014
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tt0003102
tt0003131
tt0003165
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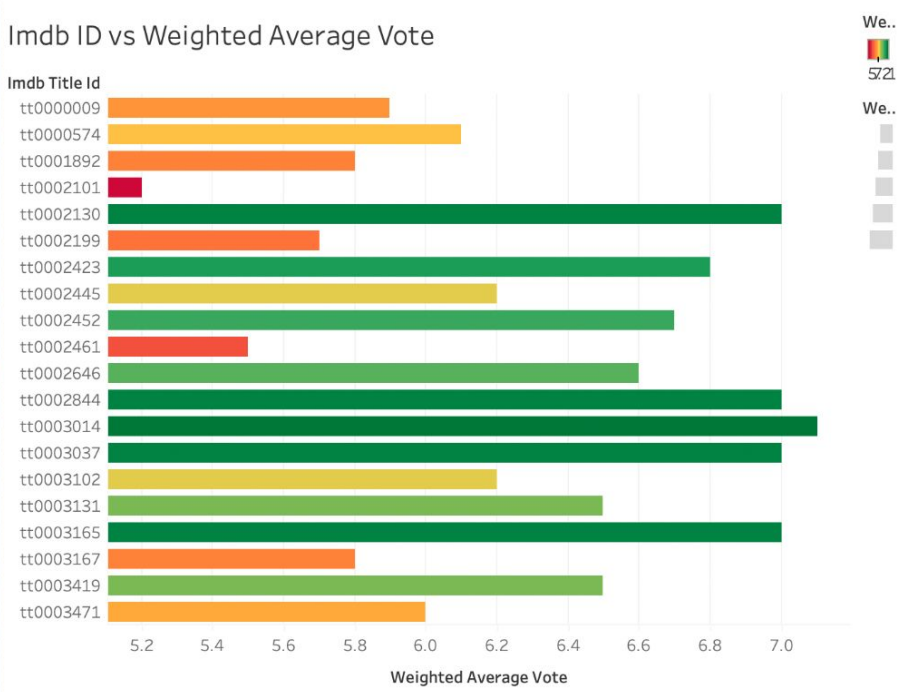
tt0003419
tt0003471


Imdb ID vs Weighted Average Vote
Imdb Title Id
tt0000009
tt0000574
tt0001892
tt0002101
tt0002130
tt0002199
tt0002423
tt0002445
tt0002452
tt0002461
tt0002646
tt0002844
tt0003014
tt0003037
tt0003102
tt0003131
tt0003165
tt0003167
tt0003419
tt0003471
5.2
5.4
5.6
5.8
6.0
6.2
6.4
6.6
6.8
7.0
Weighted Average Vote
We..
5.21
We..

Machine Learning Model Proposal

The purpose of the project is to find the best Machine learning Algorithms that can predict the imdb rating based on the features given in the four tables taken from our IMDB Dataset. To achieve this from Various Models the model with the lowest root mean squared error, best accuracy, and best confusion matrix is selected.

IMDB Movie Dataset Tables

Datasets selected from Kaggle

IMDB Movies.csv

imdb_title_id	weighted_averag...	total_votes	mean_vote	median_vote	votes_10
title ID on IMDb	total weighted average rating	total votes received	total mean vote	total median vote	number of votes with rating equal to 10
85855 unique values	 1 9.9	 99 2.28m	 1 9.8	 1 10	 0 1.26m

IMDB Ratings.csv

imdb_title_id	title	original_title	year	date_published	genre
title ID on IMDb	title name	original title name	year of release	date of release	movie genre
85855 unique values	82094 unique values	80852 unique values	 1894 2020	22012 unique values	Drama 15% Comedy 9% Other (65619) 76%

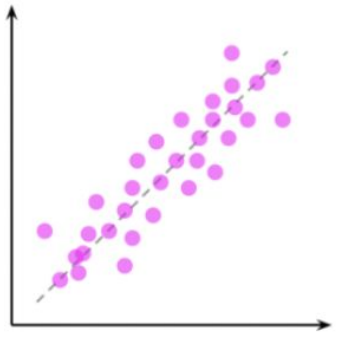
Machine Learning Models

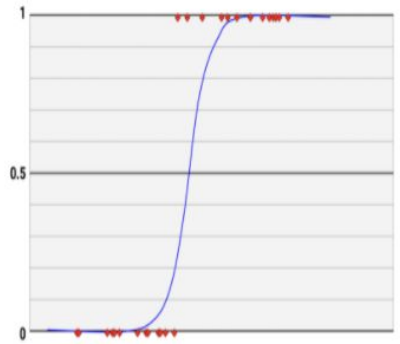
Linear Regression, Logistic Regression, Random Forest, SVM, K-means Algorithm

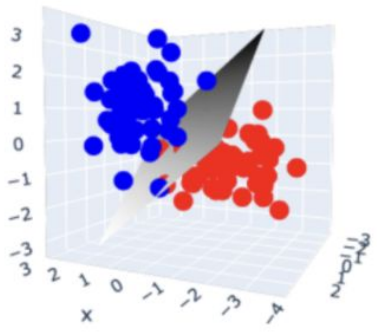
Target: IMDb Total Average Weighted Rating
Output: IMDb Rating

Feature: Imdb_title_id, title, year, date_published, genre, duration, country, language, director, writer, reviews
Categorical Feature: title, year, genre, country, language, direction, reviews
Quantitative Feature: Date, Duration, vote, budget, gross income, total votes, us_voters rating,

Results: Accuracy, Confusion Matrix







Multiple Linear Regression

Inputs, X: title, date_published, genre, duration, country, language, director, writer, reviews, title, year, genre, country, language, direction, reviews
Output, Y: Average Weighted Rating

Decision Tree:
Inputs, X: title, date_published, genre, duration, country, language, director, writer, reviews, title, year, genre, country, language, direction, reviews
Output, Y: Average Weighted Rating

Random Forest

Inputs, X: title, date_published, genre, duration, country, language, director, writer, reviews, title, year, genre, country, language, direction, reviews
Output, Y: Average Weighted Rating

SVM
Inputs, X: title, date_published, genre, duration, country, language, director, writer, reviews, title, year, genre, country, language, direction, reviews
Output, Y: Average Weighted Rating

Datatype of Inputs and Outputs

Inputs

```
title                    object
original_title           object
year                     object
date_published           object
genre                    object
duration                  int64
country                  object
language                 object
director                 object
writer                   object
production_company       object
actors                   object
description              object
avg_vote                float64
votes                    int64
budget                   object
usa_gross_income         object
worlwide_gross_income    object
metascore               float64
reviews_from_users      float64
reviews_from_critics    float64
dtype: object
```

Outputs

```
weighted_average_vote    float64
total_votes                int64
```

Summary of Significant Steps

1. Join the four tables to create a single table, analyze the datasets
2. Data Cleaning, and dropping unwanted rows and columns
3. Find the relationship between the feature and the target, find the importance of each feature, drop the columns according to the importance ranking
4. Data splitting into training and testing sets
5. Train and Fit the Machine Learning Model using the processed and cleaned data
6. Calculated the balanced accuracy score along with the confusion matrix
7. Compare accuracy in different models ; SVM, Random Forest and Neural Networks
8. Add results to database such as Postgres pgAdmin
9. Reports outcomes in Tableau for Visualization.
10. Final Summary

Thank You