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Lab 3 Report – Analyzing Steam Game Ratings with Hadoop MapReduce

Data Description

We selected the Steam Games Review 2024 dataset from Kaggle.

- **Size:** ~128 million reviews, >80,000 games, >30 million unique users. ~14 GB
- **Format:** CSV files
- **Key attributes used in our analysis:**
  - *appid* (game identifier, derived from file name)
  - *language* (review language)
  - *voted_up* (positive or negative review)
  - *early_access* (flag for early access reviews)

Example record (simplified):

```
appid, language, voted_up, early_access, review_text

730, english, true, false, "Great shooting mechanics…"
```

The dataset exceeds the 1 GB requirement and contains diverse attributes suitable for filtering and aggregation.

Data Cleaning Process

To ensure data quality and relevance, we applied the following filters in our **Mapper** code:

- **Removed headers and malformed lines.**
- **Filtered by language:** kept only English reviews *(language == english)*.
- **Excluded early access reviews** (to avoid bias from unfinished games).
- **Checked for corruption:** incremented counters for corrupt or filtered rows.

The cleaning ensured that our analysis focused only on high-quality, comparable reviews across games.

Data Analysis Process

We implemented the analysis using **Hadoop MapReduce** with the following pipeline:

1. **Mapper (ReviewMapper.java):**
    - Parsed each CSV line using *CsvParser*.
    - Extracted *appid, language, voted_up,* and *early_access*.
    - Emitted *(appid, (positive=1/0, total=1))*.
2. **Combiner (ReviewCombiner.java):**
    - Locally aggregated partial counts of positive and total reviews per game.
    - Reduced network overhead by sending fewer intermediate results.
3. **Reducer (ReviewReducer.java):**
    - Summed all *(positive, total)* values per appid.
    - Output format:

    ```
    appid positive total
    ```
4. **Driver (Main.java):**
    - Configured job with input splits (128 MB for efficiency).
    - Set Mapper, Combiner, Reducer, and custom *PairWritable* class for intermediate values.
    - Stored results in HDFS output directory.

This pipeline was run on **Hadoop 3.4.1** using a Maven-built JAR (*pom.xml* specifies dependencies).

Results of the Analysis

We collected review statistics per game and visualized the results:

Top Games by Positive Reviews (2024)

- Counter-Strike dominates with ~1.9 million positive reviews (out of ~2.1 million total).
- Other high-ranking games: *Terraria, Dota 2, Team Fortress 2, Rainbow Six Siege*.

Top 10 Total Reviews

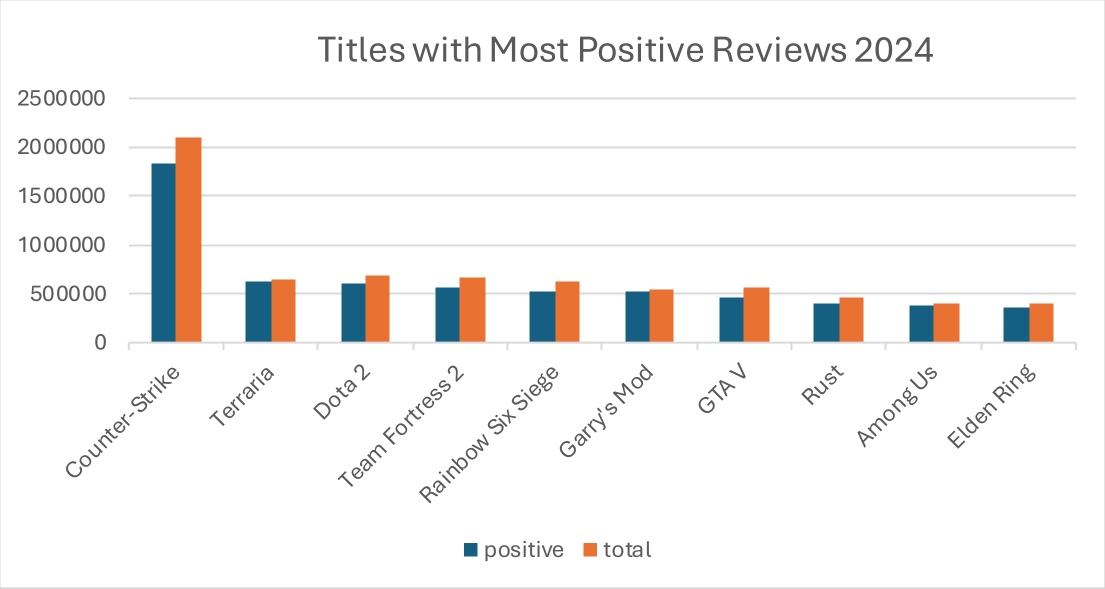
- Same trend: *Counter-Strike, Dota 2,* and *Team Fortress 2* remain at the top, confirming their large active communities.
- Smaller but strong performers include *Among Us, Rust,* and *Elden Ring*.

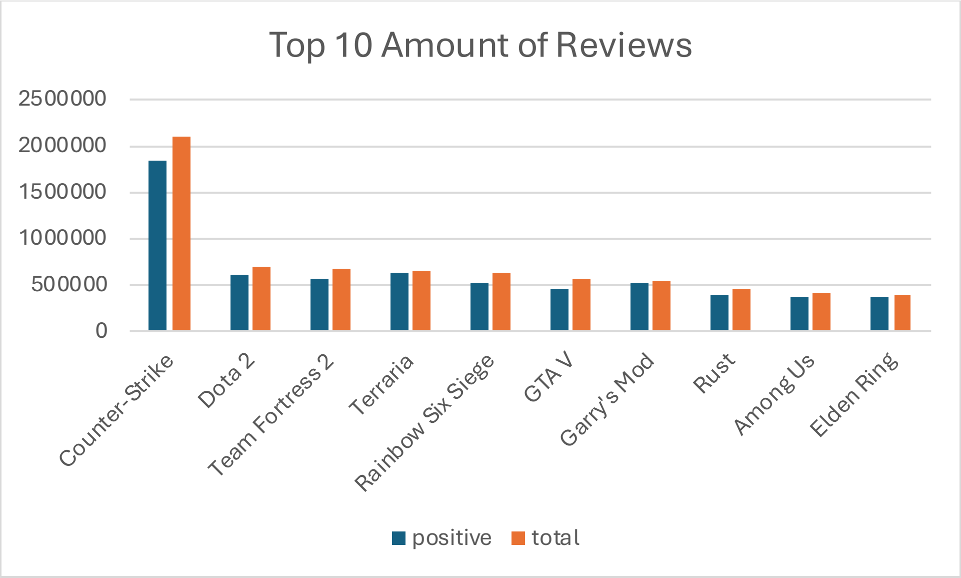
Top 30/ Bottom 30 Positive Review Ratios

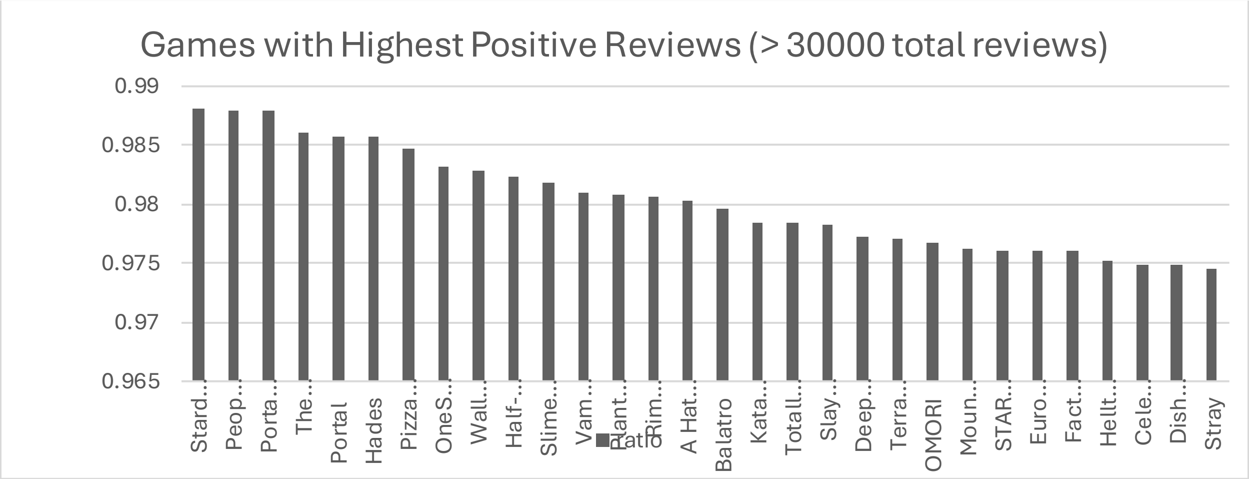
In 2024, it appears that most games receive large amounts of positive feedback, top 30 games barely dipped under 97.5% positive reviews.

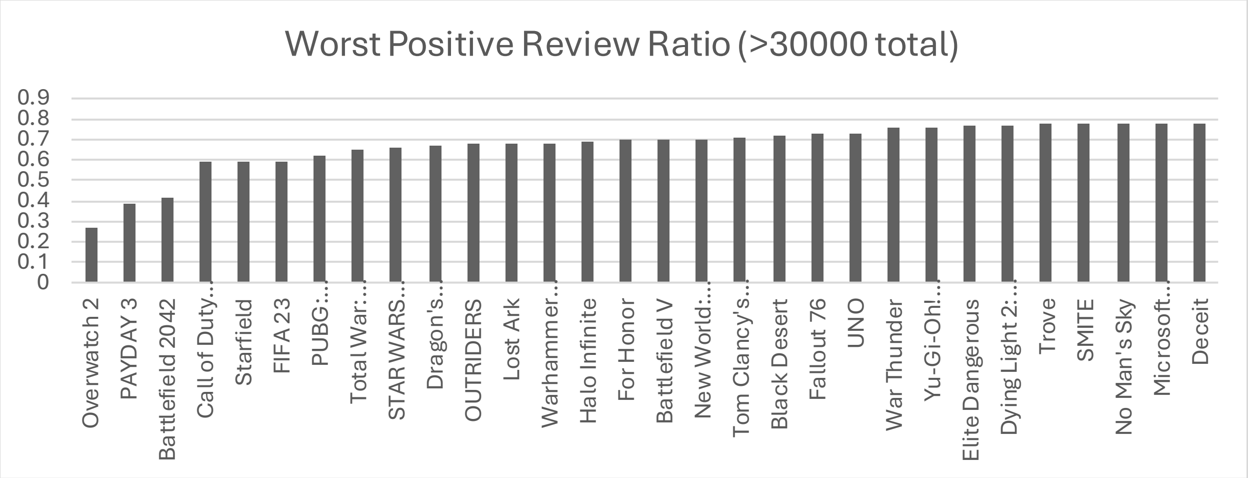
For games with over 30,000 reviews, there were only 3 games that were below 50% positive feedback.

(Charts shown below)




Top 10 Amount of Reviews
2500000
2000000
1500000
1000000
500000
0
Counter-Strike
Dota 2
Team Fortress 2
Terraria
Rainbow Six Siege
GTA V
Garry's Mod
Rust
Among Us
Elden Ring
positive
total


Games with Highest Positive Reviews (> 30000 total reviews)
0.99
0.985
0.98
0.975
0.97
0.965
Stard…
Peop…
Porta…
The…
Portal
Hades
Pizza…
OneS…
Wall…
Half-…
Slime…
Vam…
Plant…
Rim…
A Hat…
Balatro
Kata…
Totall…
Slay…
Deep…
Terra…
OMORI
Moun…
STAR…
Euro…
Fact…
Hellt…
Cele…
Dish…
Stray
ratio



Conclusion

This project demonstrated:

- The ability to clean and process a **multi-gigabyte dataset** with Hadoop.
- A custom MapReduce pipeline to count and filter Steam reviews efficiently.
- Clear insights into which games dominate both in volume and positivity of reviews.

Key points:

Older, community-driven games (*Counter-Strike, Dota 2*) have massive reviews, while new hits (*Elden Ring, Among Us*) are competitive but smaller in scale.