UCLA

Forecasting Player Trends of Top Steam Games using Prophet

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STAT 418

Overview

Purpose:

- Predict average monthly player counts for CS2, Pubg and Dota2.
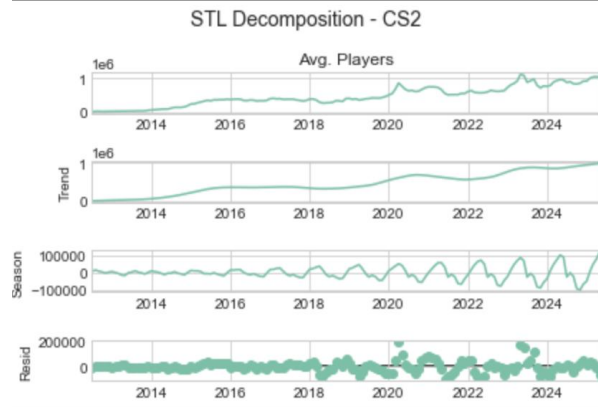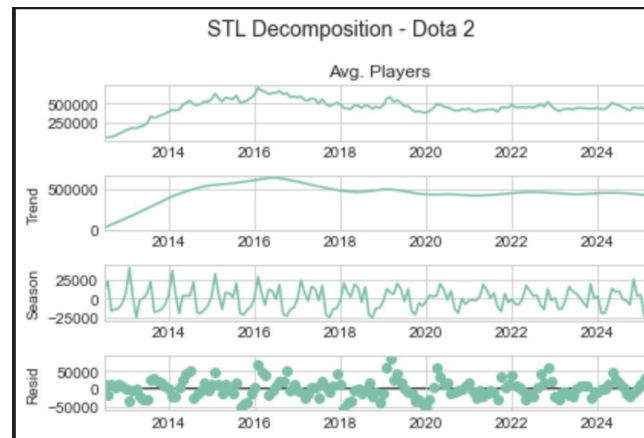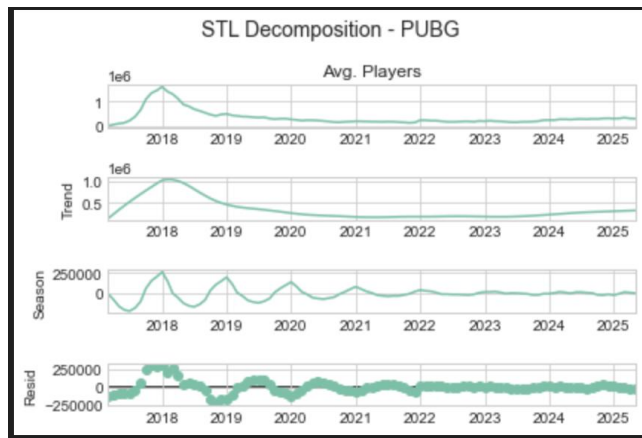
- Identify genre-level trend over time

Variables:

- Avg. Players (target)

- Patch_Count and Google_Trends_Index (external regressors)

Tools and methods:

- Using request, BeautifulSoup, pytrends to extract data

- Using Prophet which is a time series forecasting model developed by Facebook.

- The api is created through Flask and hosted in Google Cloud Run

Seasonal and Trend decomposition using Loess

STL Decomposition - PUBG

STL Decomposition - Dota 2

STL Decomposition - CS2

Predicted Result

```
  "game": "dota2",
  "months": 10,
  "Patch_Count": 5,
  "Google_Trends_Index": 70
}' http://localhost:5001/predict
[{"ds":"Sun, 01 Jun 2025 00:00:00 GMT","yhat":452392.6083055851},{"ds":"Tue, 01
Jul 2025 00:00:00 GMT","yhat":412035.4225222018},{"ds":"Fri, 01 Aug 2025 00:00:0
0 GMT","yhat":352809.0392150729},{"ds":"Mon, 01 Sep 2025 00:00:00 GMT","yhat":29
3265.02581051894},{"ds":"Wed, 01 Oct 2025 00:00:00 GMT","yhat":221260.0555628068
4},{"ds":"Sat, 01 Nov 2025 00:00:00 GMT","yhat":203163.74105366057},{"ds":"Mon,
01 Dec 2025 00:00:00 GMT","yhat":155108.85334136907},{"ds":"Thu, 01 Jan 2026 00:
00:00 GMT","yhat":130377.96630508582},{"ds":"Sun, 01 Feb 2026 00:00:00 GMT","yha
t":68273.70191638486},{"ds":"Sun, 01 Mar 2026 00:00:00 GMT","yhat":35533.1988231
80464}]
] -d '{
  "game": "cs2",
  "months": 10,
  "Patch_Count": 5,
  "Google_Trends_Index": 70
}' http://localhost:5001/predict
[{"ds":"Sun, 01 Jun 2025 00:00:00 GMT","yhat":1374827.4236285184},{"ds":"Tue, 01
 Jul 2025 00:00:00 GMT","yhat":1443315.8912583329},{"ds":"Fri, 01 Aug 2025 00:00
:00 GMT","yhat":1660085.3381260224},{"ds":"Mon, 01 Sep 2025 00:00:00 GMT","yhat"
:1772161.363788191},{"ds":"Wed, 01 Oct 2025 00:00:00 GMT","yhat":1860043.4938486
323},{"ds":"Sat, 01 Nov 2025 00:00:00 GMT","yhat":2037668.583223907},{"ds":"Mon,
 01 Dec 2025 00:00:00 GMT","yhat":2272265.461100732},{"ds":"Thu, 01 Jan 2026 00:
00:00 GMT","yhat":2699578.818491059},{"ds":"Sun, 01 Feb 2026 00:00:00 GMT","yhat
":2976357.00632786},{"ds":"Sun, 01 Mar 2026 00:00:00 GMT","yhat":3149230.4335965
235}]
```

The average player counts for dota2 is gradually decreasing after ten months starting from June 1st 2025, while CS2 shows a sharp upward trend.

The possible reason for this huge increase is because I set the changepoint scale for Prophet as 1, which increase sensitivity to recent trend shift.

Conclusion

- The average player counts for CS2 and Pubg is still increasing in the future, but the number of players of Dota2 is decreasing.

- We can imply that in the future, less people will play moba games. And FPS and Battle Royale is still hot genre for games. This might support game developers in content planning.

- Future work: Adding more interesting variables like Twitch Viewers to improve the accuracy of the model and tried some other models such as XgBoost to compare.