

E-SPORTS

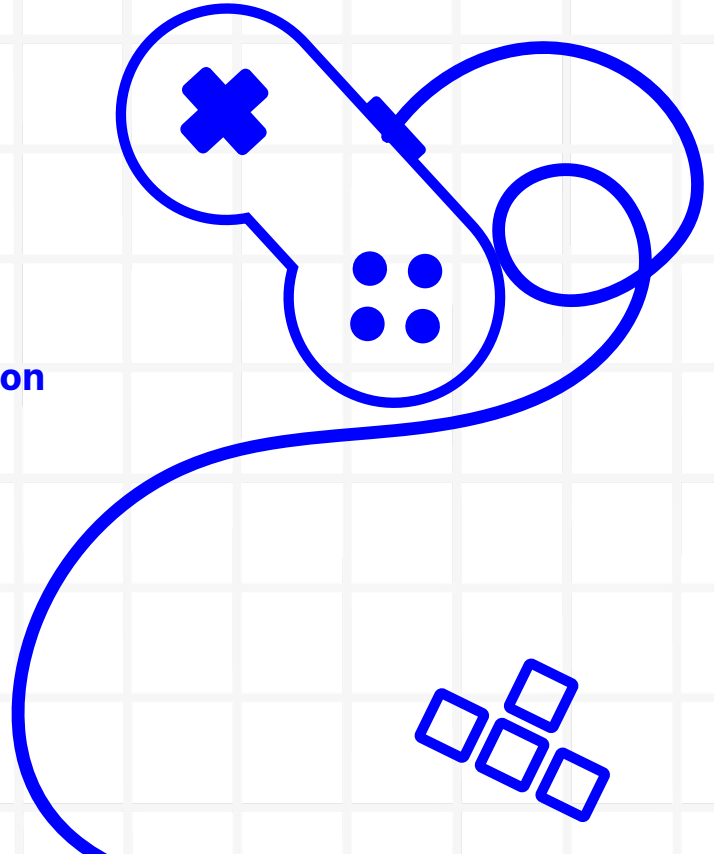
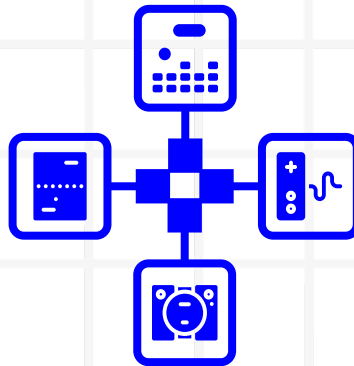
-Raghad

-Ahmad

-Fahad

-Ali

-Hatoun

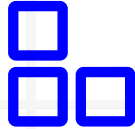


CONTENTS



Introduction

Why we chose games dataset?



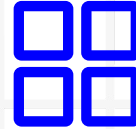
Data Challenges & Solutions

What were the main data challenges we faced, and how did we address them?



Data Overview

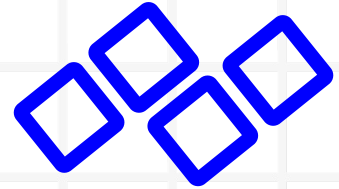
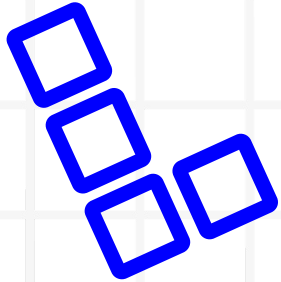
How was the data collected?



Model Building & Deployment

How did we select and evaluate our model?

**Why did we choose games
dataset?**

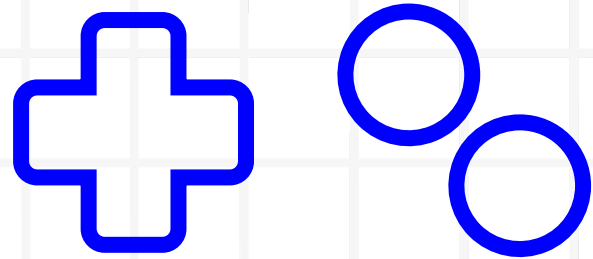


INTRODUCTION

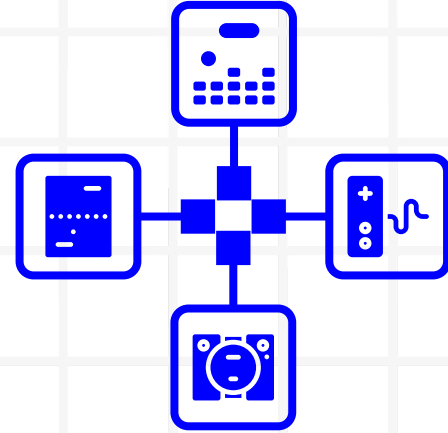
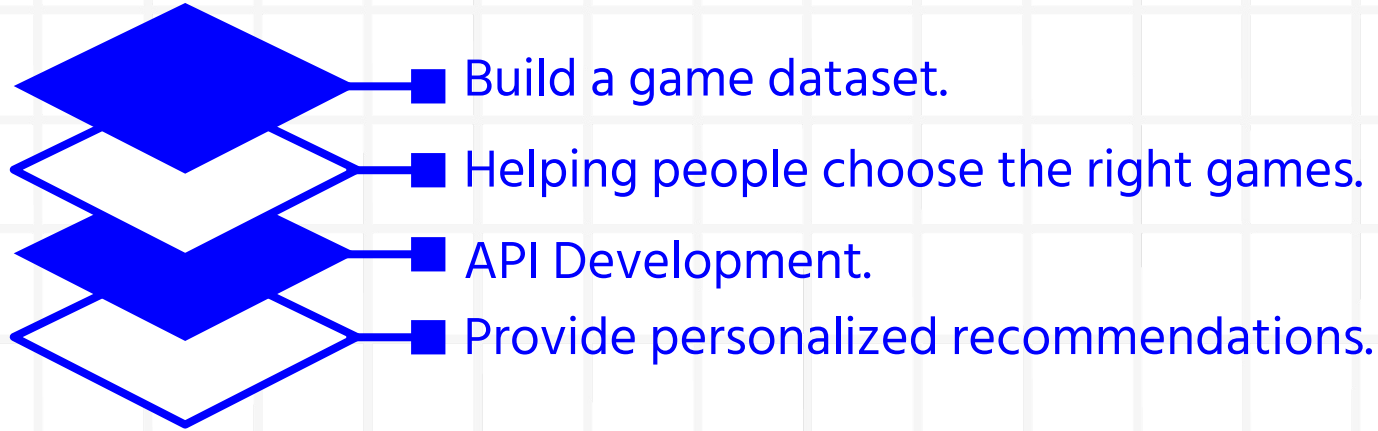
Introduction

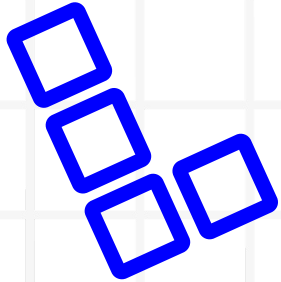
We touched on E-Sports because of the spotlight on them at the moment, and as we witnessed about a week ago the end of the largest esports tournament in the world with a prize of over \$60 million, and this is what motivates people to participate.

Call of Duty Modern Warfare

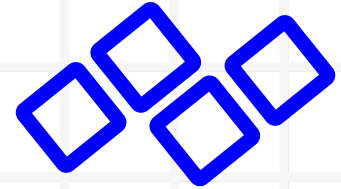


GOALS



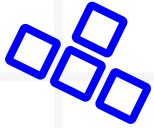


02



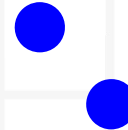
Data Overview

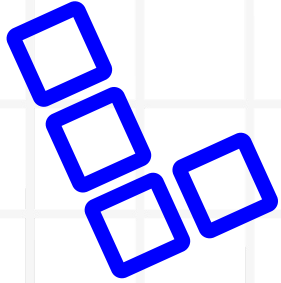
DATA OVERVIEW



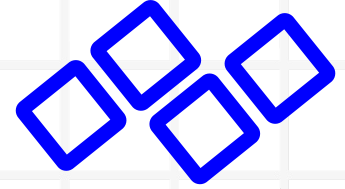
The data is sourced from Steam and it is relevant for assessing hardware compatibility with top-selling games.

The dataset provides system requirements including key specifications such as processor, memory, storage for optimal performance.





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Data Challenges & Solutions

DATA CHALLENGES & SOLUTIONS

- Data Before Cleaning

Links	Game Names	Price	OS	Processor	Memory	Graphics	DirectX	Storage	month	day	years
https://store.steampowered.com/app/816340/King...	Kingdom Rush Origins Tower Defense	Your Price:248.95 SR	*: Windows 7	Dual Core CPU	1 GB RAM	OpenGL 3.0 compliant with 512MB of video RAM.	NaN	500 MB available space	Oct	18	2018
https://store.steampowered.com/app/34270/SEGA_...	SEGA Mega Drive and Genesis Classics	No Price	*: Windows® XP or higher	NaN	NaN	32MB or greater	Version 9.0 VR Support: SteamVR or Oculus PC. ...	NaN	Release	No	No Release Date
https://store.steampowered.com/app/2407261/War...	War Thunder Su39 Pack	No Price	*: Windows XP SP2, Windows Vista SP1, Windows 7	2,2 GHz	1 GB RAM	Nvidia GeForce 6XXX series or higher; AMD Rade...	®: 9.0c Hard Drive: 8 GB HD space Other Requir...	NaN	Jun	14	2023
https://store.steampowered.com/app/874390/The_...	The Battle of Polytopia	79.04 SR	*: Windows XP SP2 or later	Dual Core 2.0 Ghz	1 GB RAM	128mb Video	Version 9.0	160 MB available space	Aug	4	2020
https://store.steampowered.com/app/2506610/The...	The Riftbreaker Heart of the Swamp	Your Price:106.00 SR	*: Windows 8.1	and operating system	8 GB RAM	Nvidia GTX 750 2GB or AMD R7 265 2GB	Version 11	12 GB available space Sound Card:	Jun	21	2024

8977 rows × 13 columns

DATA CHALLENGES & SOLUTIONS

Before:

- Dealing with 'n' values

```
df_steam[df_steam['Storage'] == 'n'] # it gives 383
```

	Game Names	Price	Processor	Memory	Graphics	Storage	years
4798	Revue Starlight El Dorado	No Price	Intel Core 2 DUO 2.0GHz 相当以上	2 GB RAM	VRAM 320MB	n	2024
4805	The Jackbox Party Starter	No Price	2.66 Ghz Core 2 Duo or Greater	4 GB RAM	GeForce 500+ / Radeon 5000+ or Greater	n	2022
4834	THE KING OF FIGHTERS XV DLC Team Pass Team Pa...	35.70 SR	Intel Core i5	8 GB RAM	Nvidia GeForce GTX 770 2GB / AMD Radeon R9 280...	n	2022
4852	Age of Empires II Retired	No Price	1.2GHZ CPU	1 GB RAM	Direct X 9.0c Capable GPU	n	2013

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4852	Age of Empires II Retired	No Price	1.2GHZ CPU	1 GB RAM	Direct X 9.0c Capable GPU	n	2013

After:

```
# 1: check 8 GB RAM
# there are 64 rows with memory 8 GB RAM and have 'n' value in storage
df_steam[(df_steam['Storage'] == 'n') & (df_steam['Memory'] == '8 GB RAM')].value_counts().sum()

# now we will calculate the mode of 'Storage' where 'Memory' is '8 GB RAM' and 'Storage' is not 'n'
mode_storage_8gb = df_steam[(df_steam['Memory'] == '8 GB RAM') & (df_steam['Storage'] != 'n')]['Storage'].mode()[0]

# impute the 'Storage' feature where 'Memory' is '8 GB RAM' and 'Storage' is 'n'
df_steam.loc[(df_steam['Memory'] == '8 GB RAM') & (df_steam['Storage'] == 'n'), 'Storage'] = mode_storage_8gb

df_steam[(df_steam['Memory'] == '8 GB RAM') & (df_steam['Storage'] == mode_storage_8gb)]
```

	Game Names	Price	Processor	Memory	Graphics	Storage	years
4834	THE KING OF FIGHTERS XV DLC Team Pass Team Pa...	35.70 SR	Intel Core i5	8 GB RAM	Nvidia GeForce GTX 770 2GB / AMD Radeon R9 280...	10 GB	2022
4846	SKYBOX VR Video Player	No Price	Intel i3-6100 / AMD Ryzen 3 1200, FX4350 or gr...	8 GB RAM	NVIDIA GTX 960 / AMD Radeon R9 290 or greater	10 GB	2017
4864	Dealer Simulator	20.11 SR	Intel Core i5 3.0 GHz	8 GB RAM	Nvidia Geforce GTX 1050ti 4 GB	10 GB	2024

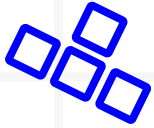
DATA CHALLENGES & SOLUTIONS

Before:

- Dealing with null values

```
df_half.isnull().sum()
```

```
Unnamed: 0      0
Links           0
Game Names      0
Price           0
OS              378
Processor       597
Memory         721
Graphics       1218
DirectX        1627
Storage        939
month           0
day             0
years           0
dtype: int64
```



DATA CHALLENGES & SOLUTIONS

Before:

- Dealing with null values

```
df_half.isnull().sum()
```

```
Unnamed: 0      0
Links           0
Game Names      0
Price           0
OS              378
Processor       597
Memory         721
Graphics       1218
DirectX        1627
Storage        939
month           0
day             0
years           0
dtype: int64
```

After:

```
# now we want to fill in missing Processor values based on the most common processor type for a specific memory configuration

# calculate the mode of the 'Processor' for each 'Memory' group
processor_mode_per_memory = df_steam.groupby('Memory')['Processor'].transform(lambda x: x.mode()[0] if not x.mode().empty else np.nan)

# fill the missing 'Processor' values with the calculated mode
df_steam['Processor'].fillna(processor_mode_per_memory, inplace=True)

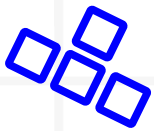
df_steam[df_steam['Processor'].isnull()]
```

```
Game Names  Price  Processor  Memory  Graphics  Storage  years
```


DATA CHALLENGES & SOLUTIONS

Before:

- Memory MB & GB



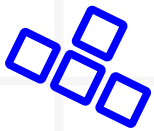
	Game Names	Price	Processor_main	Memory	Graphics	Storage	years
0	Kingdom Rush Origins Tower Defense	Your Price:248.95 SR	Dual Core CPU	1 GB RAM	OpenGL 3.0 compliant with 512MB of video RAM.	500 MB	2018
1	War Thunder Su39 Pack	No Price	2,2 GHz	1 GB RAM	Nvidia GeForce 6XXX series or higher; AMD Rade...	2 GB	2023
2	The Battle of Polytopia	79.04 SR	Dual Core 2.0 Ghz	1 GB RAM	128mb Video	160 MB	2020
3	The Riftbreaker Heart of the Swamp	Your Price:106.00 SR	Intel i5 gen 2 or AMD Bulldozer (4 cores)	8 GB RAM	Nvidia GTX 750 2GB or AMD R7 265 2GB	12 GB	2024
4	Soulash	Your Price:62.00 SR	2 cores	500 MB RAM	OpenGL	400 MB	2022



DATA CHALLENGES & SOLUTIONS

Before:


- Memory MB & GB



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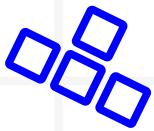
After:

	Game Names	Price	Processor_main	Memory	Graphics	Storage	years
0	Kingdom Rush Origins Tower Defense	Your Price:248.95 SR	Dual Core CPU	1.0 GB	OpenGL 3.0 compliant with 512MB of video RAM.	0.48828125 GB	2018
1	War Thunder Su39 Pack	No Price	2,2 Ghz	1.0 GB	Nvidia GeForce 6XXX series or higher; AMD Rade...	2.0 GB	2023
2	The Battle of Polytopia	79.04 SR	Dual Core 2.0 Ghz	1.0 GB	128mb Video	0.15625 GB	2020
3	The Riftbreaker Heart of the Swamp	Your Price:106.00 SR	Intel i5 gen 2 or AMD Bulldozer {4 cores}	8.0 GB	Nvidia GTX 750 2GB or AMD R7 265 2GB	12.0 GB	2024
4	Soulash	Your Price:62.00 SR	2 cores	0.48828125 GB	OpenGL	0.390625 GB	2022




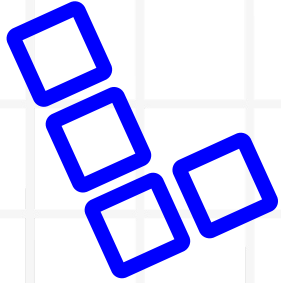
DATA CHALLENGES & SOLUTIONS

- Data After Cleaning

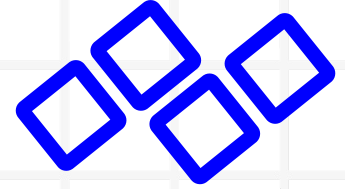


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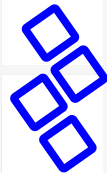


04



Data Building & Deployment

Feature Engineering



Converting

convert storage, memory,
and processor to
numerical values.



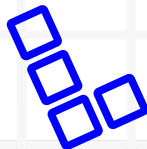
Scaling

Standardizing the
features.



Selection

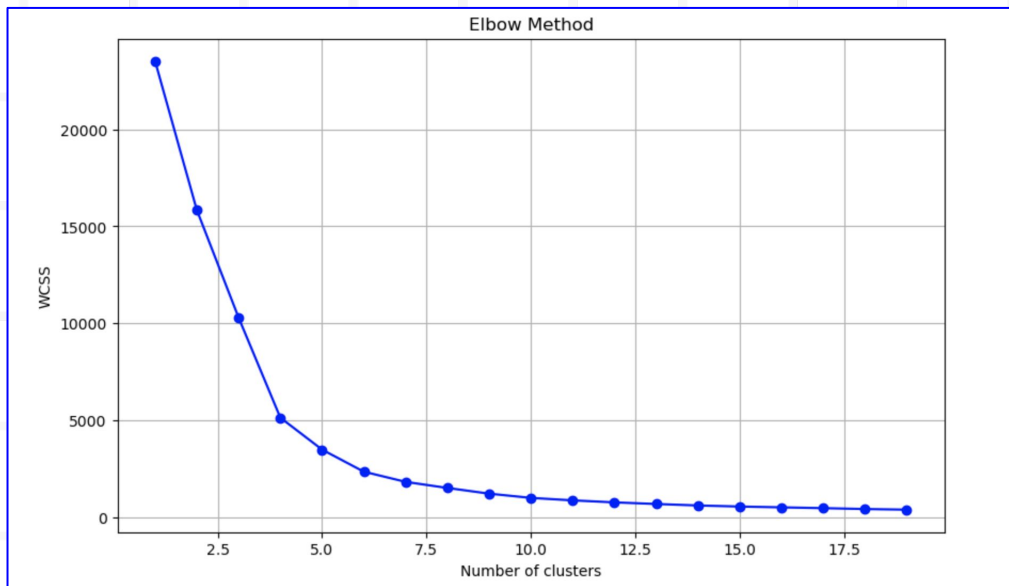
Selecting features for the
model (processor,
memory, storage).



MODEL BUILDING & Performance

1. K-Means Model:

```
# Fit KMeans and assign cluster labels  
df_steam['cluster'] = kmeans.fit_predict(X_scaled)
```

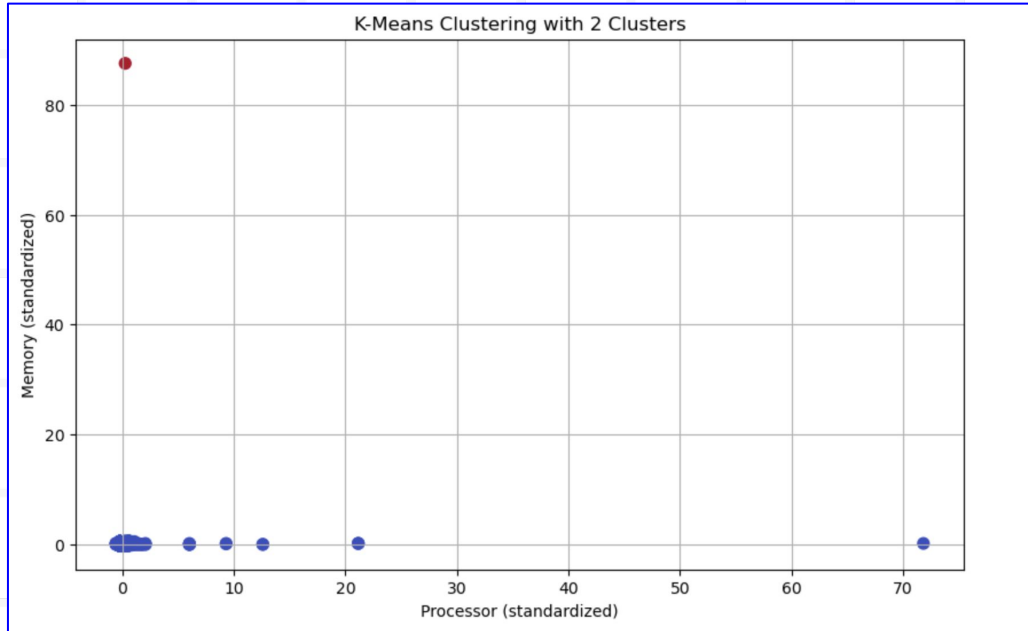


MODEL BUILDING & Performance

1. K-Means Model:

```
silhouette_avg = silhouette_score(X_scaled, df_steam['cluster'])  
silhouette_avg
```

0.987297492095043

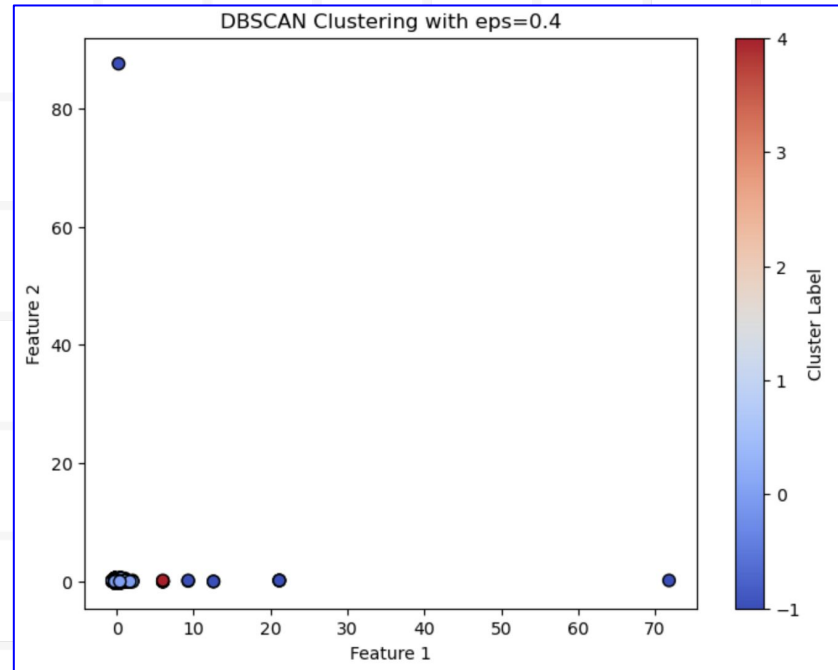


MODEL BUILDING & Performance

2. DBSCAN Model:

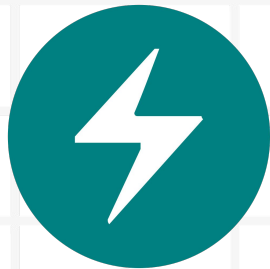
```
silhouette_avg = silhouette_score(X_imputed[sill_score], df_steam['DBSCAN_Cluster'][sill_score])  
print(silhouette_avg)
```

```
0.6943848597283018
```



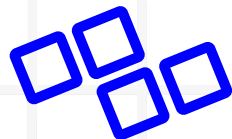
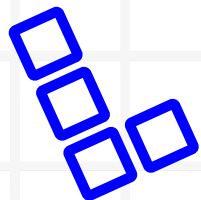
MODEL Deployment

- We used FastAPI to deploy our model,
- And Streamlit to make the model interactive with the users

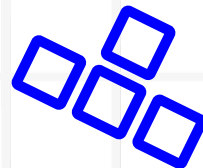
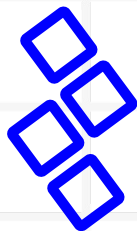


Streamlit

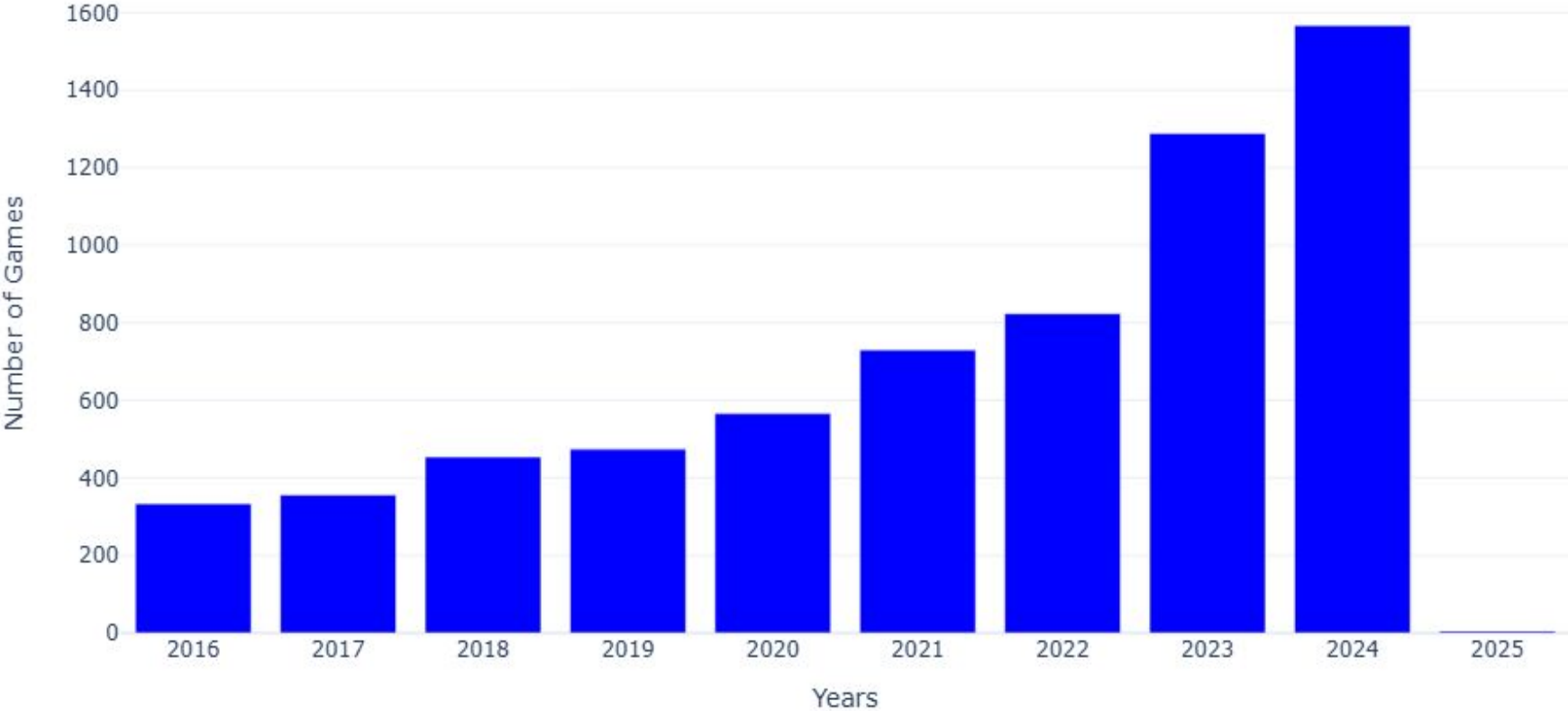




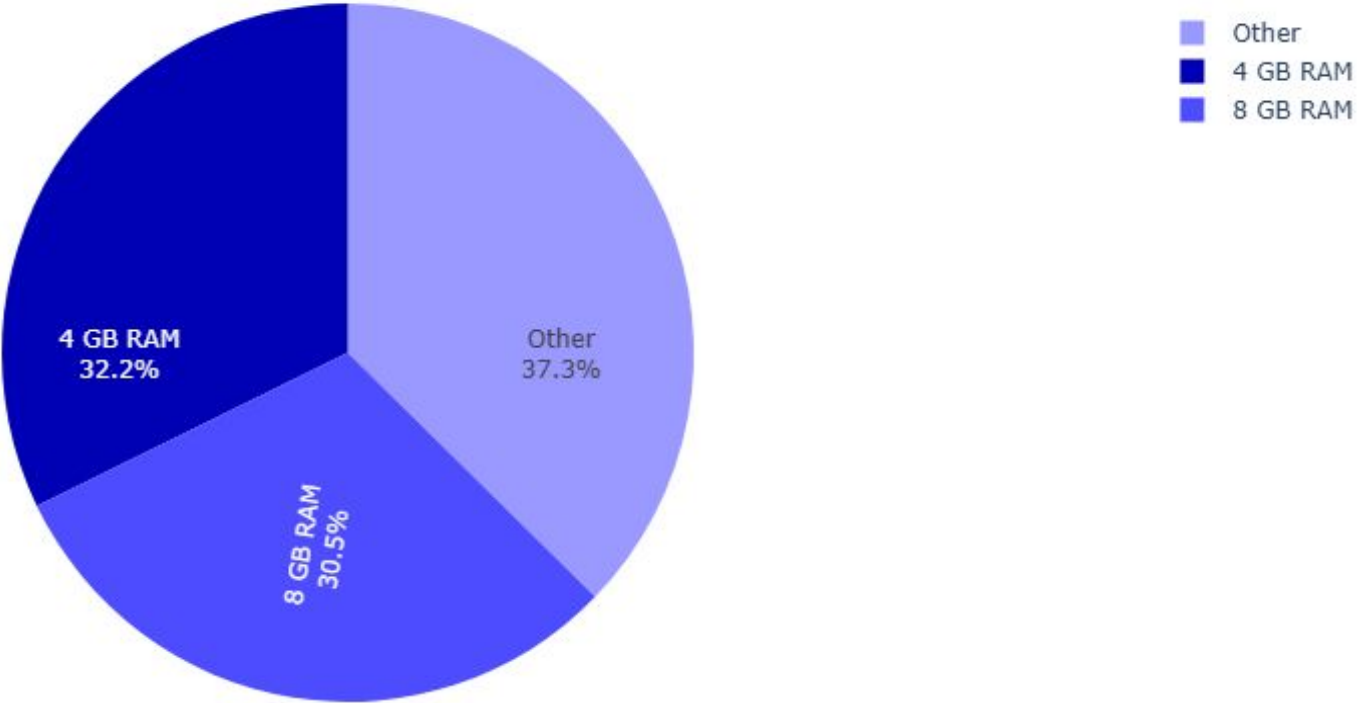
**Insights
Uncovered ;)**



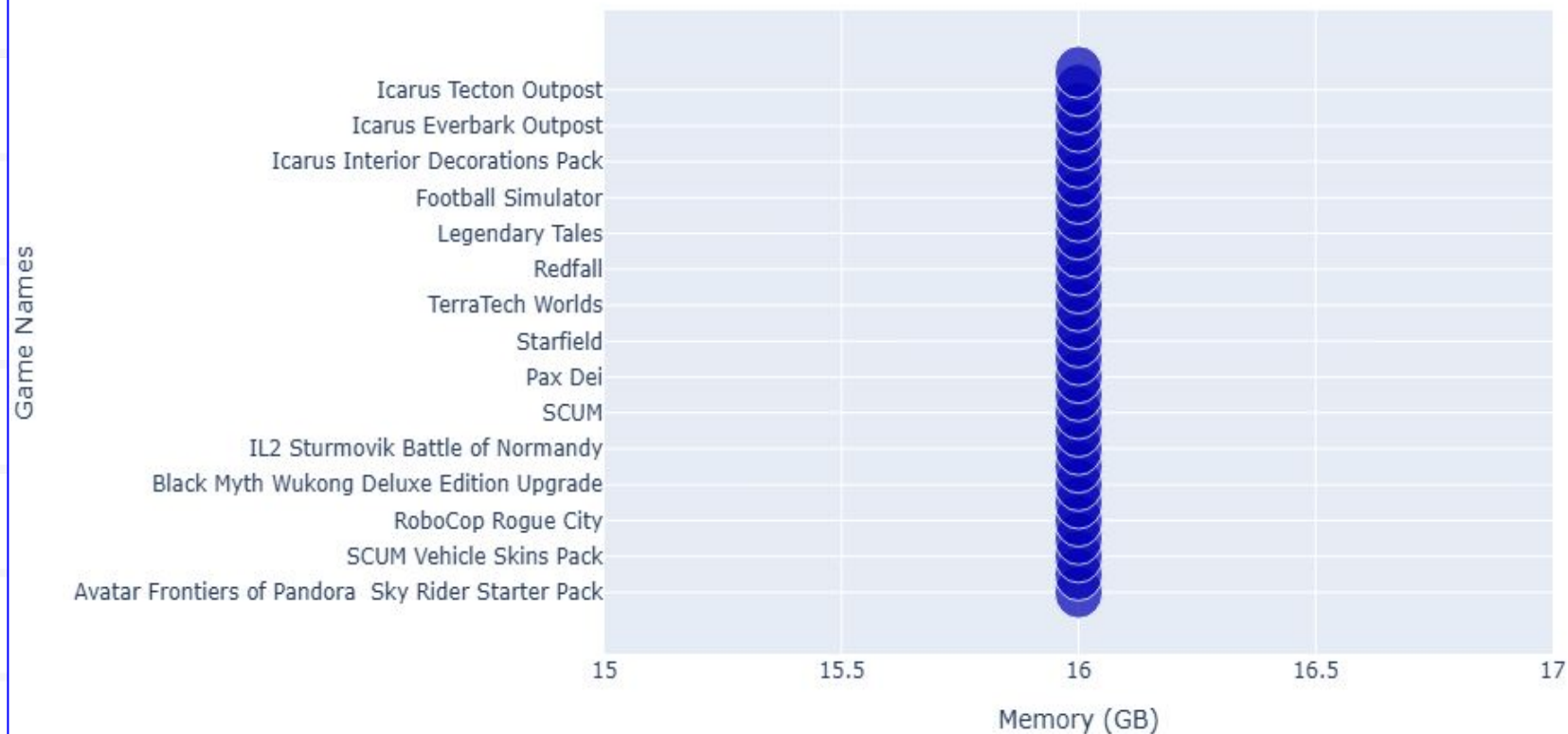
Number of Games Released Over the Last 10 Years



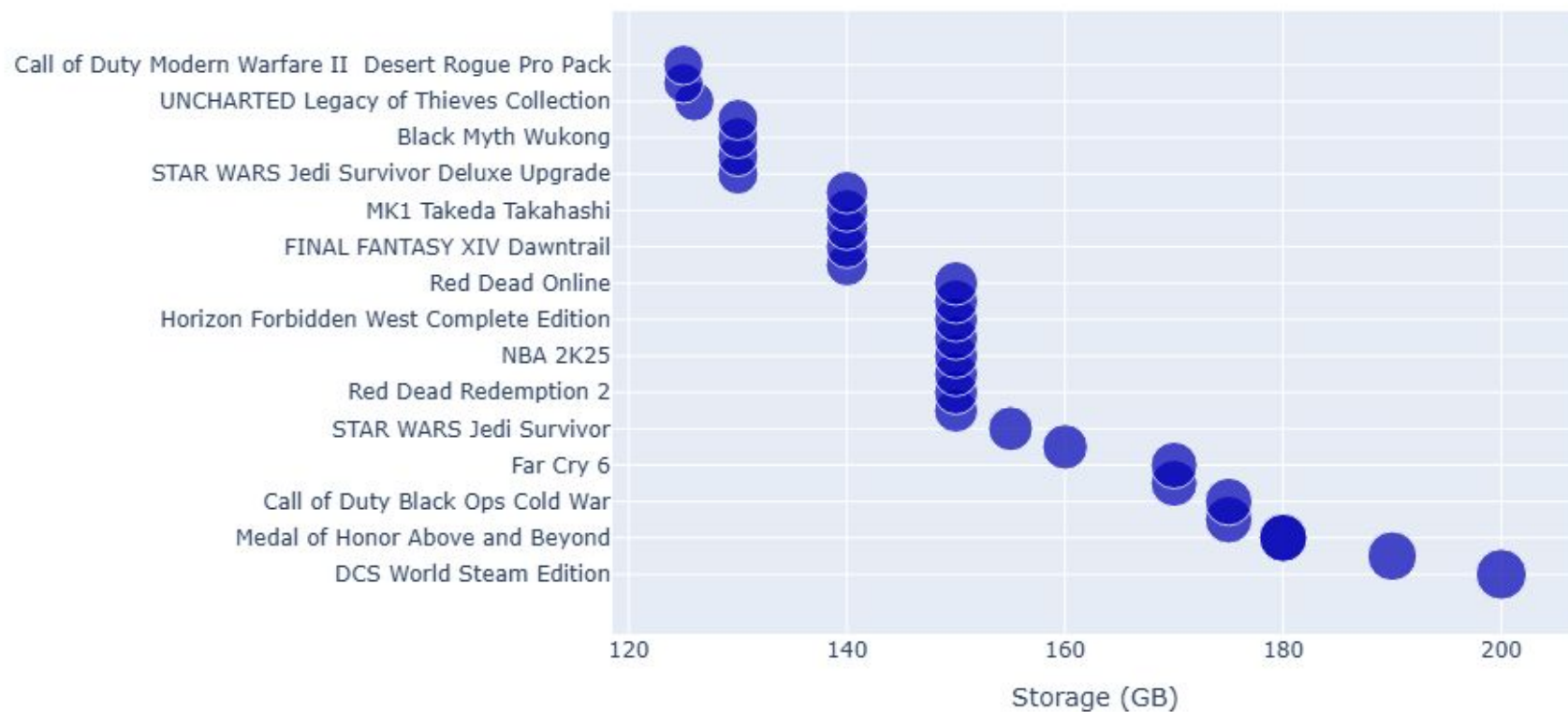
Percentage of Games Requiring 4GB or 8GB RAM



Top 10 Games by Memory Requirements (GB)

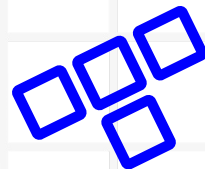
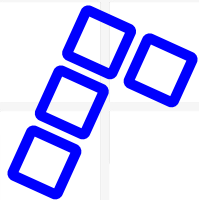
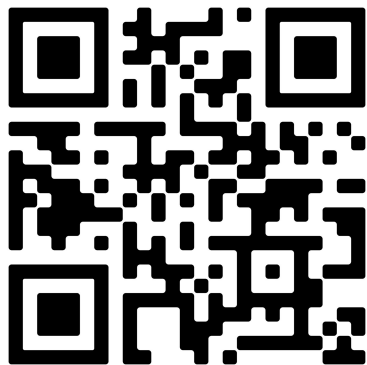


Top 10 Games by Storage Requirements (GB)



DEMO

Do you want to show what game
Compatible with your device?





**We hope you enjoyed
our presentation ;)**

