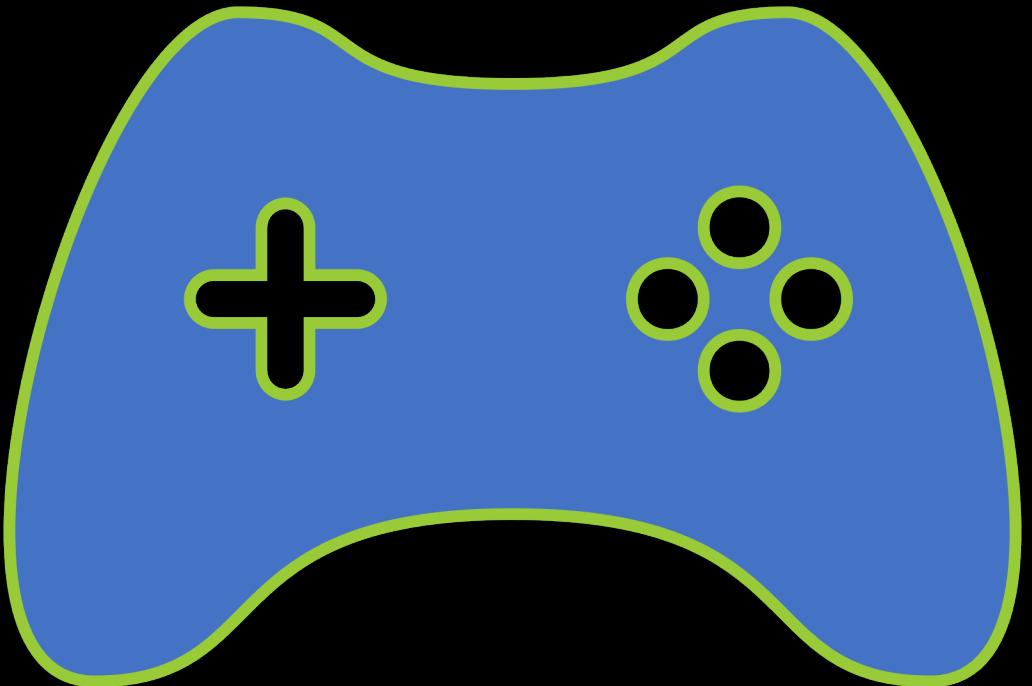


TRENDS IN GAMING

An analysis by Vika Vijayanand

ABSTRACT:

The purpose of this project is to help Game vendors, marketers, and advertisers glean insights into what genre or platform is most popular or successful, and where they are most successful. It aims to give them information they can then utilize to improve efficiency and sales. This is done using data visualization strategies using seaborn, plotly, and matplotlib, and using LS to see if there is any correlation between the variables. The findings from this project show that there seems to be no correlation between genre of video game and video game sales, or video game platform and sales regardless of location. It is concluded that the games with the best sales are shooting and action games in North America, Shooting and Sports games in Europe, and Role-playing games in Japan. This info can then be used to help advertisers decide what ads to push in each location, and companies to decide what game to develop next.



INTRODUCTION:

- The goal is to be able to predict the sales trends in types of games and platforms in North America, Europe and Japan in order to then apply the results to help game developers, vendors, and marketers effectively push products.
- Essentially split the original dataset by location, and create data visuals using plotly, seaborn, and matplotlib
- From there run OLS models on the data frames and check for correlation

THE PROBLEM:

From Game development to selling the video games themselves, game developers, vendors, and marketers all have to predict what games to either create, push and or stock up on in order to get the best sales possible.

Game Developers:

- What game genre sells best where?
- What platform is more popular?
- What will help improve sales?

Game Vendors:

- What genre is popular in their location?
- What platform is more popular there?

Game Marketers:

- Where to advertise what genre?
- Where to advertise what platform?

To Conclude, the aim of this project is to help these target personas increase sales and become more efficient.

ADDITIONAL AIMS:

Does the type of game or platform affect sales trends in NA, EU, and JP?

- How do the trends vary from location to location?
- What does this mean for developers/vendors/marketers?

What type of game or platform does the best in each location?

- Is there a game and platform combination that sells well?
- Are there any sales trends that are the same across all 3 locations?

THE PURPOSE:

Desired Outcomes:

It is expected that we find that there is a correlation between game genre or platform and sales

There should be a pattern over time in the trend of sales for a genre of game or type of platform

THE DATASET

VGSALES.CSV

- Has 11 Columns:
 - Rank (just an index)
 - Name (name of game)
 - Platform (what device game is played on)
 - Year (what year the game was released)
 - Genre (Type of game)
 - Publisher (Game Company)
 - NA_Sales (North American Sales)
 - EU_Sales (European Sales)
 - JP_Sales (Sales in Japan)
 - Other_Sales (Sales in other locations)
 - Global_Sales (Global Sales)
- 16.6k rows

HYPOTHESIS:

- It is expected that we find that there is a correlation between game genre or platform and sales.
- There should be a pattern over time in the trend of sales for a genre of game or type of platform.

WORKFLOW:

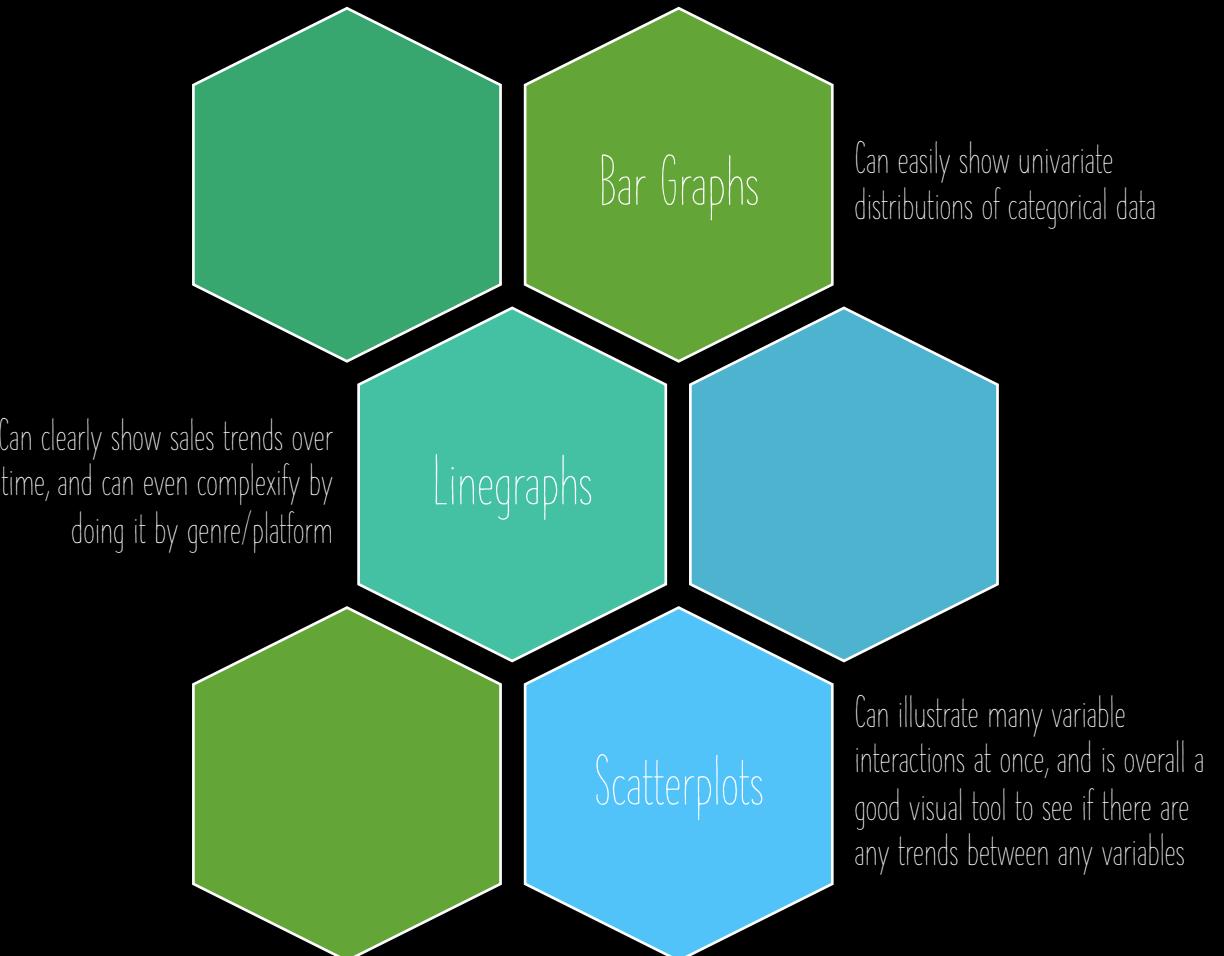
The processes followed are:

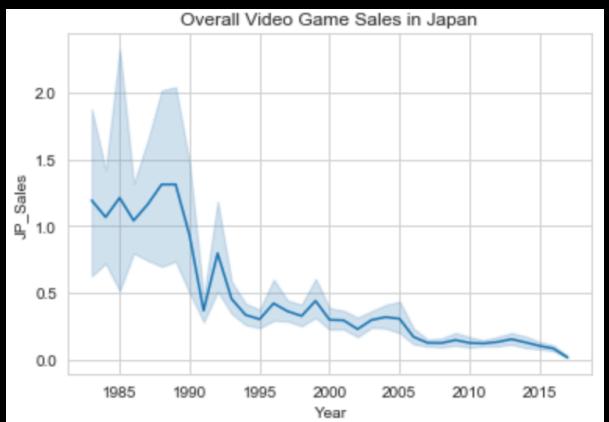
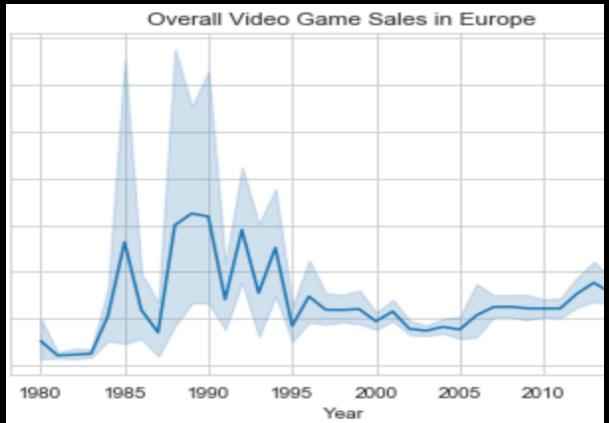
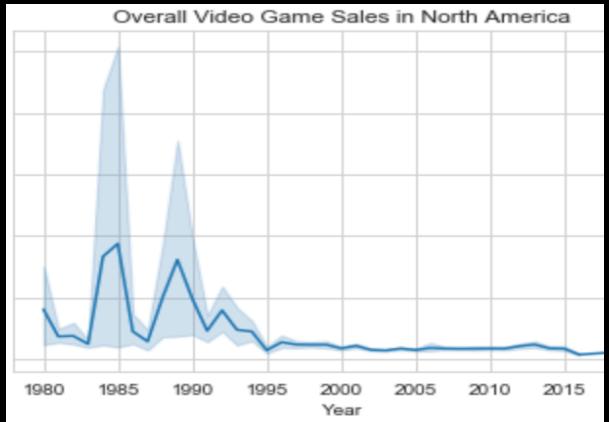
- Clean and separate the dataframe based on location
- Model some Univariate distributions for Platform, Genre, and the relevant sales columns
- Do bivariate distributions for the 3 new DataFrames
- Linear Regression and see if there is any Correlation

if there is correlation:

- predict future sales trends

METHODS CHOSEN AND WHY:





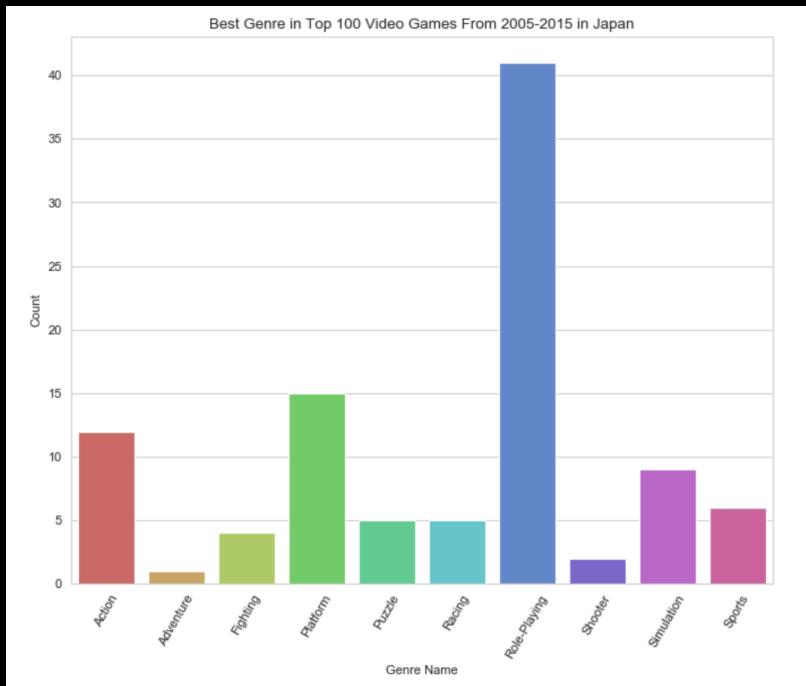
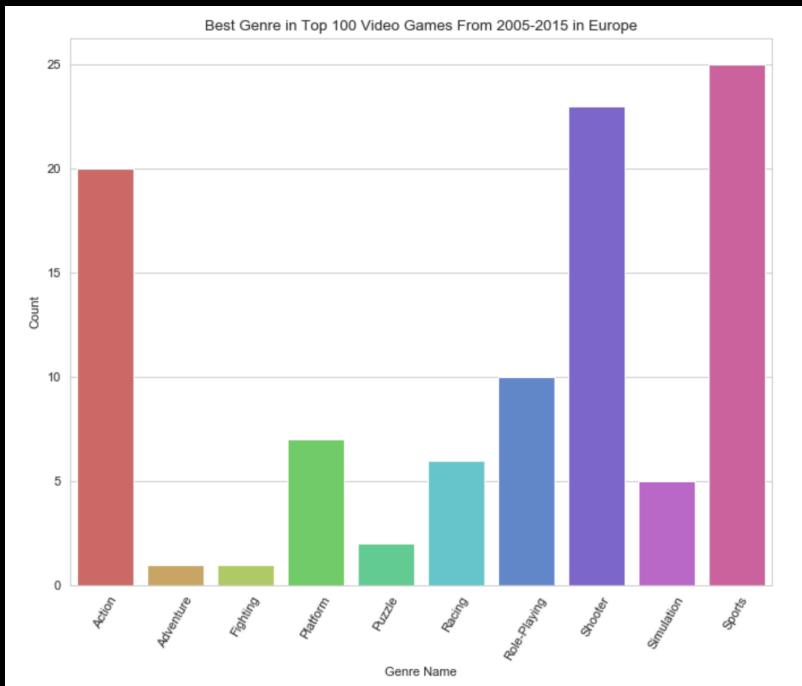
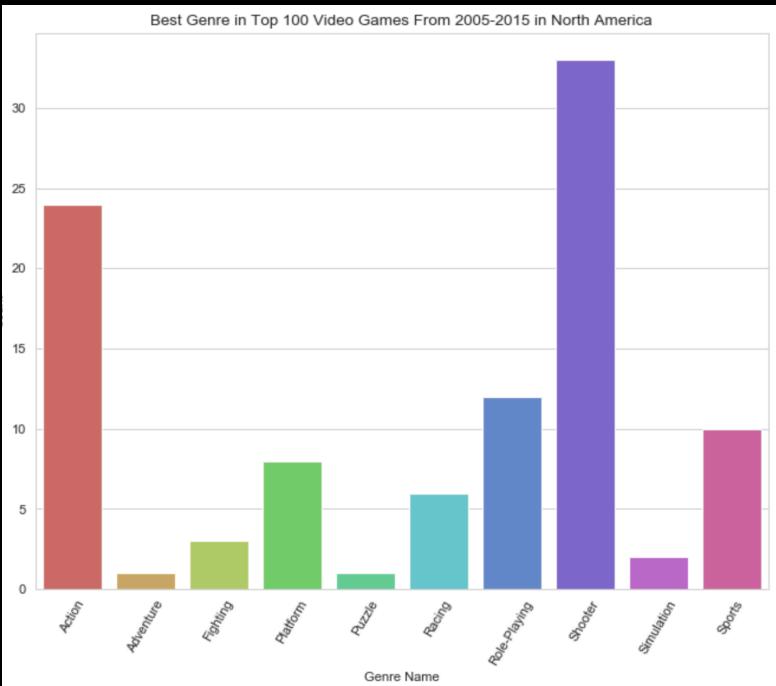
OVERALL SALES TRENDS FROM AROUND 1980 - 2020

- In North America, From 1980 to 1995 sales fluctuated extremely but post 1995 sales held steady till there was a spike in sales in around 2013, but sales started to decline after that. In Europe sales were also fluctuating till 1995, but after that sales trended upward slowly till about 2013, at which point sales started to decline. In Japan sales were overall steady until a drop in the early 1990s, but after 1995 there is a steady decline. The overall sales trend in all 3 locations has declined over the given time frame, Since it is not uniform over all 3 locations, and sales prior to 2000s are extremely variable and extreme, to minimize the variability the timeframe we are looking at is going to be shortened to one decade, between the years of 2005-2015.

UNIVARIATE BAR GRAPHS:

(Genre)

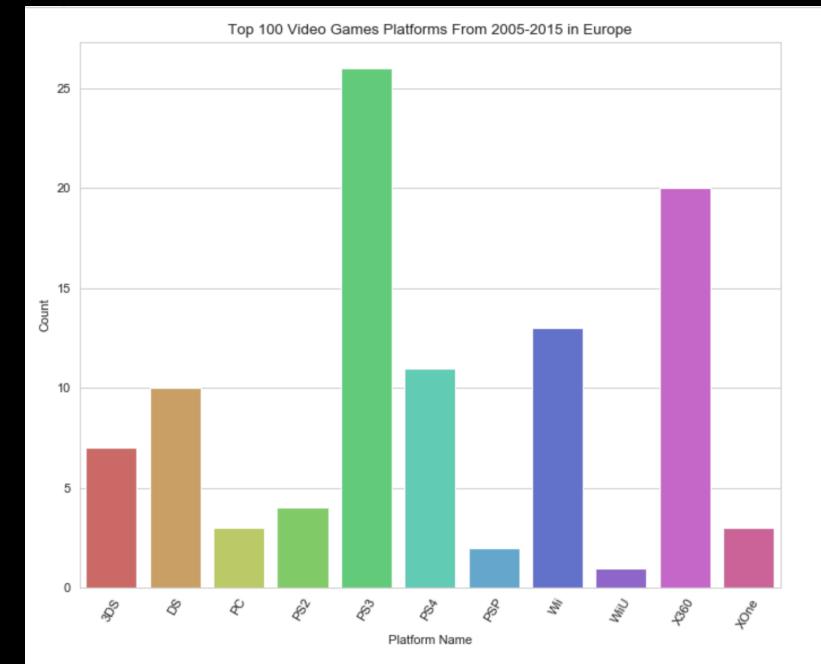
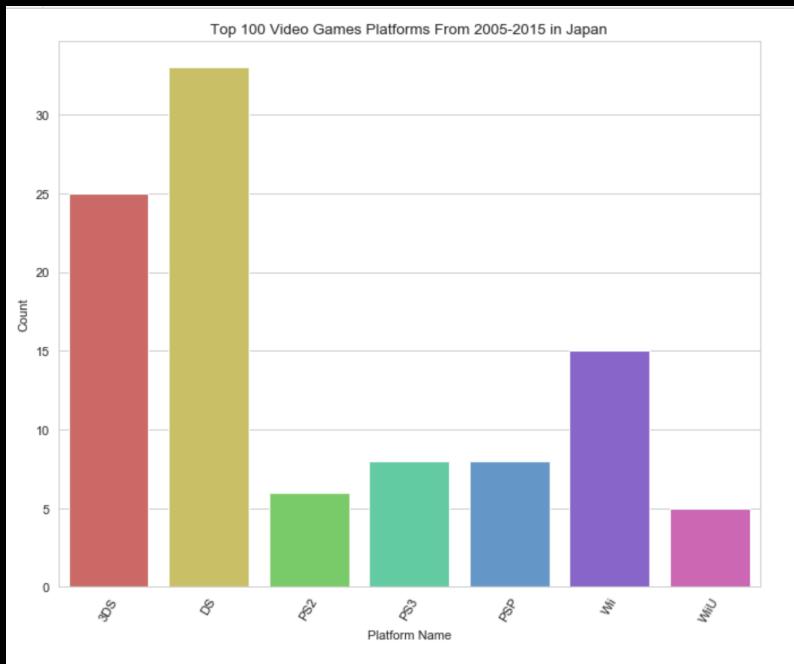
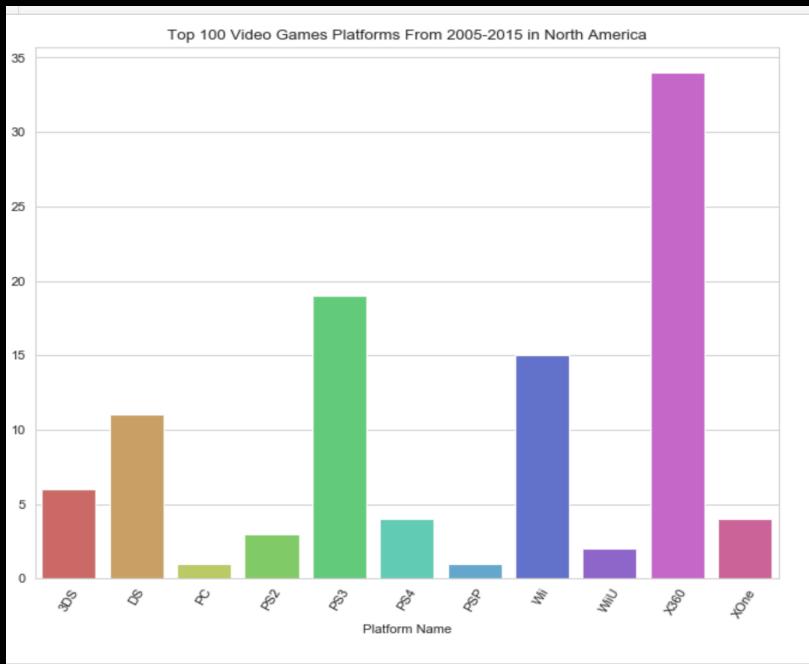
- In the years between 2005 and 2015 the games that sold the best in North America are shooter and Action Games, in Europe the best sold were shooter, Action, and Sports games, in Japan role-playing, platform, and action games sold the best. Across all 3 locations Action games were in the top 3 categories of best games sold. In Europe and North America shooter, sports and action games were the top 3. In all 3 locations, adventure, fighting, and simulation games did the worst.



UNIVARIATE BAR GRAPHS:

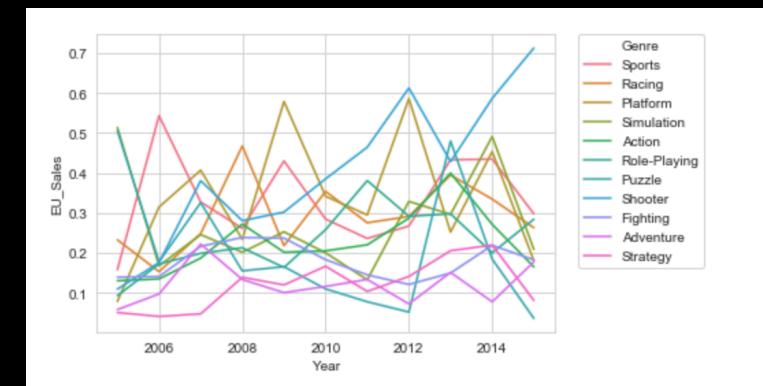
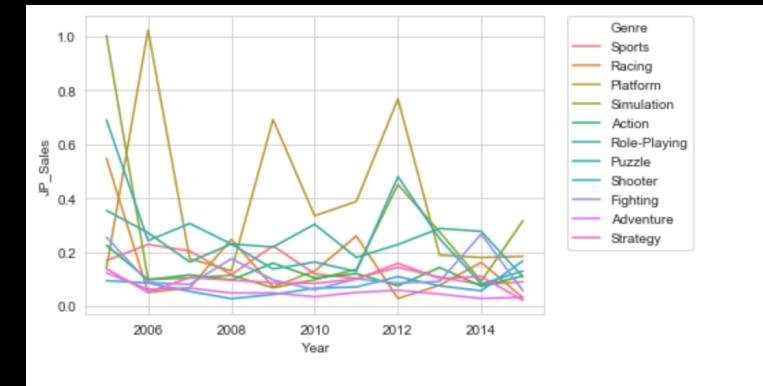
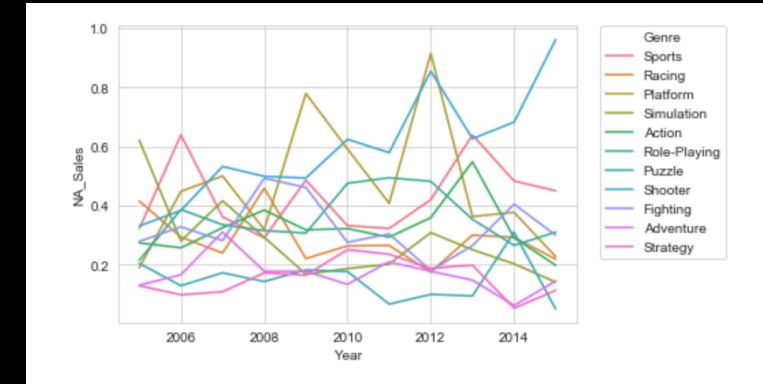
(Platform)

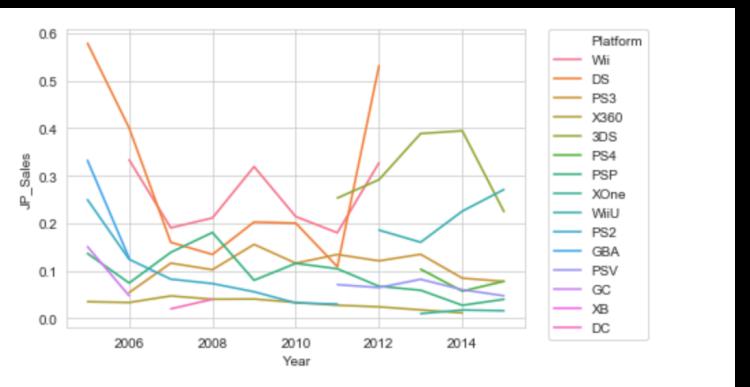
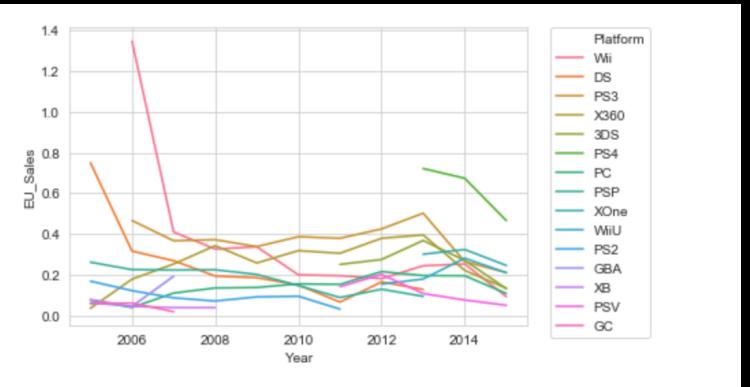
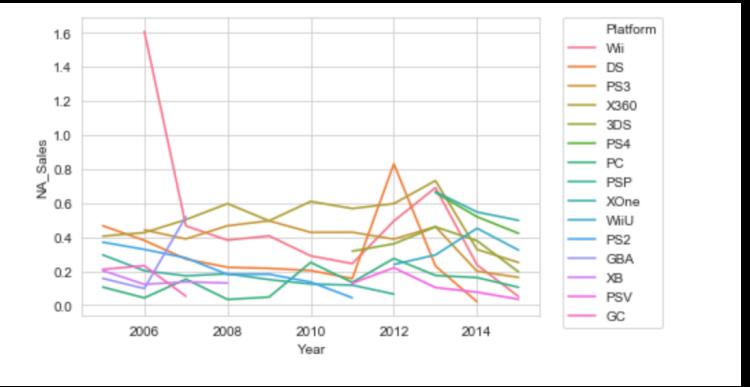
- In Japan we can see that the overall number of platforms that were in the top 100, are only 7, versus an 11 in both Europe and North America. However, the most popular platform in all three locations differ drastically, in Japan it is the DS, in Europe it is the Playstation 3, in North America it is the Xbox 360. However, when looking at platforms that did badly the PS2, WiiU, and PSP all did not do as well in sales comparatively.



BIVARIATE ANALYSES OF SALES TRENDS BY GENRE OR PLATFORM FROM 2005-2015:

- In both Europe and North America shooter game sales have rose rapidly in the years between 2005 and 2015, whereas in Japan they have stagnated/declined. However, something interesting is how platform game sales, which were greatly popular for the first half of the decade, dropped and stagnated after 2012, but simulation game sales began to rise. In Japan, game sales are overall pretty low, and there isn't much distinction from genre to genre, but in Europe and America shooter game sales are the highest, and sports game sales follow in second.





BIVARIATE ANALYSES OF SALES TRENDS BY GENRE OR PLATFORM FROM 2005-2015:

- Although the sales of gaming platforms has declined across all three locations, the new release of some platforms like the 3DS, and the PS4 had high sales in Japan and Europe respectively. In 2007 there was a sharp decline in the sales of gaming platforms across all three locations. Although the PSP had the highest sales as of 2015, there isn't a large gap separating it from other platforms.

SCATTERPLOTS:

- Fig 1 shows that after 2006, video game sales did not break 20 million in sales, and very rarely crossed 10 million in sales. However as time passes you can see the increase in the number of shooter games, and the increasing success of these games.
- Fig 2 illustrates how after 2006 video games did not break 15 million in sales, and very rarely even crossed 10 million in sales. The increase in individual shooter game releases are also shown as the years go on.
- Fig 3 in total shows how none of the video game sales broke 10 million, however the variability in the types of games is significant. there doesn't seem to be a trend in which a genre of game becomes more popular, but rather as time passes the number of role playing games, and their success decline over this time period.

Fig 1.

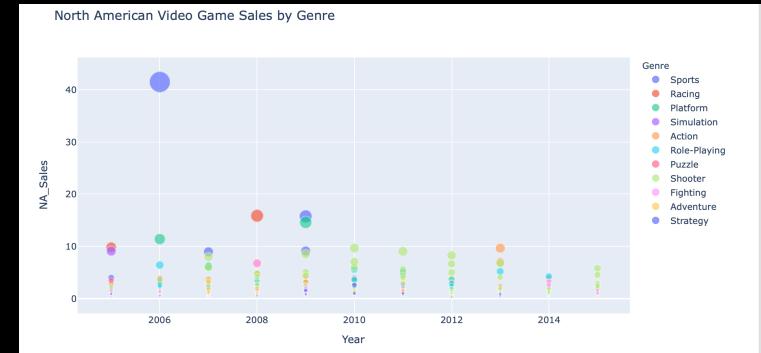


Fig 2.

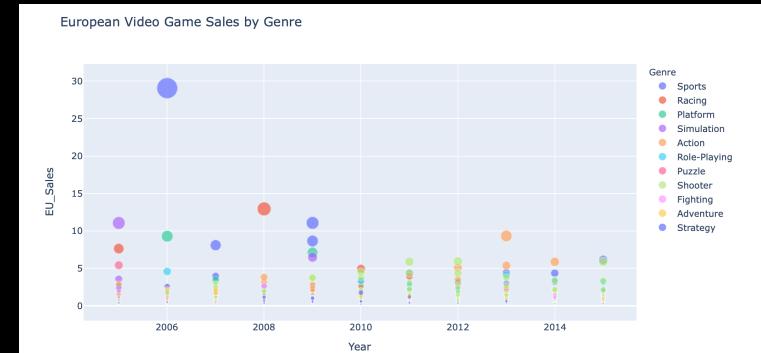


Fig 3.

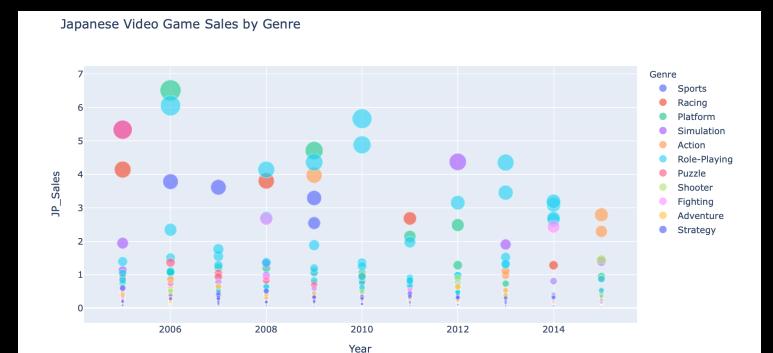
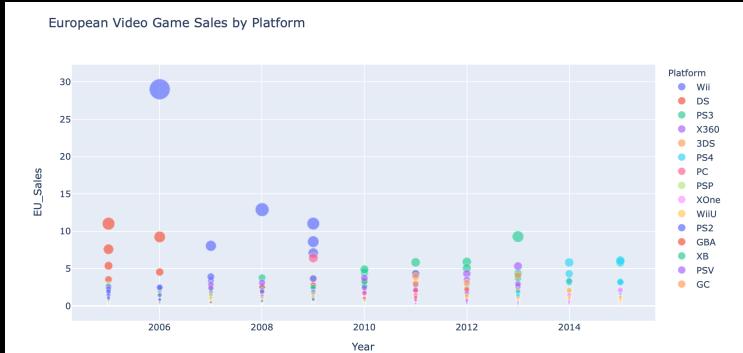


Fig 1.

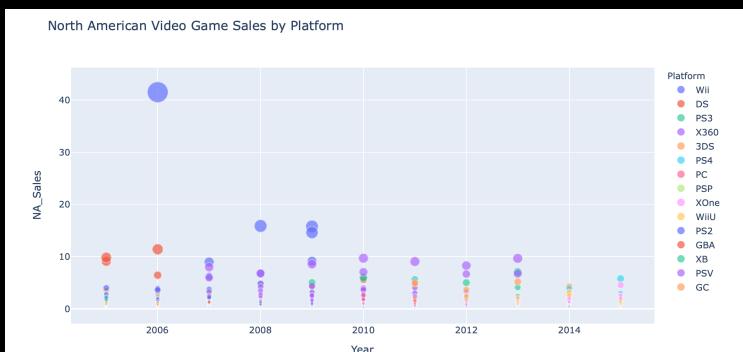
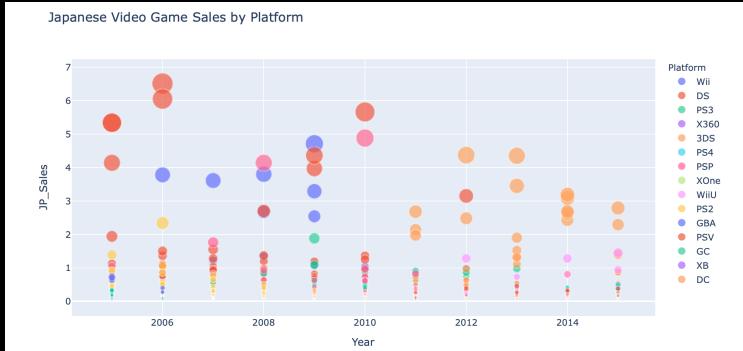


SCATTERPLOTS:

Fig 2.

- Fig 1 shows that after 2006, platform sales did not break 20 million in sales, but there does not seem to be any one platform that is beginning to trend in sales.
- Fig 2 illustrates how after 2006 platforms did not break 15 million in sales, and very rarely even crossed 10 million in sales. You can, however see the slight increase in sales of the PS4

Fig 3.



- Fig 3 shows how no platform sales broke 10 million, however the variability in the platform seems to be split with the Ds for the first half of the decade, and the 3DS for the second half.

IS THERE CORRELATION?

- The correlation is very low in all of these, meaning that there isn't a relationship between genre, platform, and sales, regardless of the location. All of the R-Squared values are extremely low.

```
Linear Regression Models
```

```
In [36]: 1 model_1 = smf.ols(formula = 'NA_Sales ~ Platform*Genre + Publisher + Year', data=na).fit()
```

```
In [37]: 1 model_1.summary()
```

```
Out[37]: OLS Regression Results
```

Dep. Variable:	NA_Sales	R-squared:	0.149
Model:	OLS	Adj. R-squared:	0.096
Method:	Least Squares	F-statistic:	2.823
Date:	Wed, 09 Dec 2020	Prob (F-statistic):	1.86e-61
Time:	22:17:52	Log-Likelihood:	-8203.0
No. Observations:	6691	AIC:	1.719e+04
Df Residuals:	6299	BIC:	1.986e+04
Df Model:	391		
Covariance Type:	nonrobust		

```
In [38]: 1 model_2 = smf.ols(formula = 'EU_Sales ~ Platform*Genre + Genre + Year', data=eu).fit()
```

```
In [39]: 1 model_2.summary()
```

```
Out[39]: OLS Regression Results
```

Dep. Variable:	EU_Sales	R-squared:	0.056
Model:	OLS	Adj. R-squared:	0.027
Method:	Least Squares	F-statistic:	2.009
Date:	Wed, 09 Dec 2020	Prob (F-statistic):	1.79e-12
Time:	22:17:53	Log-Likelihood:	-6098.5
No. Observations:	5780	AIC:	1.252e+04
Df Residuals:	5618	BIC:	1.380e+04
Df Model:	161		
Covariance Type:	nonrobust		

```
In [40]: 1 model_3 = smf.ols(formula = 'JP_Sales ~ Publisher*Genre + Publisher + Year', data=jp).fit()
```

```
In [41]: 1 model_3.summary()
```

```
Out[41]: OLS Regression Results
```

Dep. Variable:	JP_Sales	R-squared:	0.271
Model:	OLS	Adj. R-squared:	0.162
Method:	Least Squares	F-statistic:	2.475
Date:	Wed, 09 Dec 2020	Prob (F-statistic):	1.88e-49
Time:	22:17:58	Log-Likelihood:	-1241.9
No. Observations:	3750	AIC:	3486.
Df Residuals:	3259	BIC:	6525.
Df Model:	490		
Covariance Type:	nonrobust		

THE RESULTS:

- The hypothesis was proved false, as there was not a strong linear correlation between either Platform or Genre and Sales in any location.

CONCLUSION

Future Directions:

- in order to find why video game sales fluctuated so much, adding more variables, such as a dataset explaining the economy, in these locations could help explain some of the sharp dips in sales.
- Adding variables such as the consumers age, could help find a correlation between age and genre.

To answer the original questions:

- What game genre sells best where?
 - Over the time period of 2005–2015, in North America shooter games sold the best, and their sales upon release of a game has started to increase in this same time period.
 - Over this same time period, in Europe, sports sales were the highest, with shooter sales in a close second. However, following a similar trend to that in North America, shooter game sales are also increasing.
 - In Japan this pattern is not seen, Role-Playing game sales are extremely high in comparison to all other game sales. However towards the end of that decade, role-playing sales began to trend downwards, and simulation games upwards.
- What platform is more popular?
 - Over the time period of 2005–2015, in North America Xbox 360 was the most sold platform. However there has been a steady decrease in platform sales as a whole, but since the release of the Xbox 1 those platform sales, have increased.
 - Over this same time period, in Europe, PS3 sales were the highest, but Xbox 360 was in a close second as well. Yet the downward trend on the sales of platforms is also continuing, when the PS4 was released, the upward sales trend was short-lived.
 - In Japan the best selling platform was the DS, followed by the 3DS. The downward trend of platform sales also followed, but the release of Xbox one helped a small upward trend.
- What will help improve sales?
 - this question was not able to be answered due to the low correlation between variables.
 - Where to advertise what genre?
 - In North America, shooter and action games should be advertised, in Europe shooter and sports games, and in Japan role play and simulation games.
- Where to advertise what platform?
 - Due to the downward trend of platform sales, it would be best if gaming companies focused more on the game releases than on the platform.