

Multivariate Analysis in Video Games sales *

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In this article, we perform several dimensionality reduction techniques and clustering algorithms on a video game sales dataset available on Kaggle (<https://www.kaggle.com/datasets/gregorut/videogamesales/data>). Specifically, we use Principal Component Analysis (PCA) and Multidimensional Scaling (MDS) to reduce the dimensionality of the dataset. The article discusses the advantages and limitations of each technique and provides insights into the video game market based on the analysis.

Keywords: PCA, Videogames, Sales

About the dataset

The dataset under consideration contains information on video games with sales greater than 100,000 copies between 1980 and 2016. The dataset includes 11,493 unique game sales, detailing the name, year of release, genre, platform, and sales figures across numerous regions.

The dataset contains the following fields:

- **Rank** - Ranked by overall sales
- **Name** - Name of each videogame
- **Platform** - The games platform
- **Year** - Year of Release
- **Genre** - Genre of Game
- **Publisher** - Publisher of Game
- **NA_Sales** - Sales in NA (per Million)
- **EU_Sales** - Sales in EU (per Million)
- **JP_Sales** - Sales in JP (per Million)
- **Other_Sales** - Sales in ROW¹ (per Million)
- **Global_Sales** - Total worldwide sales (per Million)

Data Preprocessing

The dataset contains 11 variables, including quantitative variables like sales figures across various regions (NA_Sales, EU_Sales, JP_Sales, Other_Sales, and Global_Sales), the release year, and the rank of the game based on overall sales. Additionally, it includes multi-state categorical variables

*Replication files are available on the author's Github account (<https://github.com/AlvaroNovillo>). **Current version:** noviembre 06, 2023; **Corresponding author:** alvanovi@ucm.es.

¹Net Sales (ROW) means the gross amount billed or invoiced on sales by Company and its Affiliates and Sublicensees of Licensed Products, less the following: (a) customary trade, quantity, or cash discounts and commissions to non-affiliated brokers or agents to the extent actually allowed and taken; (b) amounts repaid or credited by reason of rejection or return; (c) to the extent separately stated on purchase orders, invoices, or other documents of sale, any taxes or other governmental charges levied on the production, sale, transportation, delivery, or use of a Licensed Product which is paid by or on behalf of Company; (d) outbound transportation costs prepaid or allowed and costs of insurance in transit; and (e) allowance for bad debt that is customary and reasonable for the industry and in accordance with generally accepted accounting principles. ("Net Sales (ROW) Definition," n.d.)

like the genre, platform, and publisher of the game. To conform with the desired format, which requires at least two binary variables, we will filter out the video games of recent years and focus on titles that we are already acquainted with. Moreover, we will limit our research to two primary platforms, namely, Xbox One and PS4.

Table 1: Top five videogames, according to the sales ranking, that we are going to work with

Rank	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Other_Sales	Global_Sales	
34	34	Call of Duty: Black Ops 3	PS4	2015	Shooter	Activision	5.77	5.81	0.35	2.31	14.24
78	78	FIFA 16	PS4	2015	Sports	Electronic Arts	1.11	6.06	0.06	1.26	8.49
93	93	Star Wars Battlefront (2015)	PS4	2015	Shooter	Electronic Arts	2.93	3.29	0.22	1.23	7.67
102	102	Call of Duty: Black Ops 3	XOne	2015	Shooter	Activision	4.52	2.09	0.01	0.67	7.30
110	110	Fallout 4	PS4	2015	Role-Playing	Bethesda Softworks	2.47	3.15	0.24	1.10	6.96
222	222	FIFA 17	PS4	2016	Sports	Electronic Arts	0.28	3.75	0.06	0.69	4.77

In Table 1. the top five selling games for 2015 and 2016, in PS4 and Xbox One are shown. As we can see, the first one, which is Call Of Duty: Black Ops 3 is among the top 50 best selling games of the dataset (in PS4).

References

“Net Sales (ROW) Definition.” n.d. <https://www.lawinsider.com/dictionary/net-sales-row>.