

# 1. Revenue Analysis

## Objective:

- Identify top-grossing movies.
- Analyze revenue trends over time.
- Compare high-revenue movies based on different factors like genre, year, and production companies.

## Findings:

- **Top Revenue Movies:** A list of the highest-grossing movies was extracted, showing that blockbuster franchises (e.g., Marvel, Star Wars) dominate the list.
- **Revenue Growth Trend:** Over time, movie revenues have shown an increasing trend, with occasional dips due to economic factors or global events.
- **Influence of Budget:** Higher-budget films generally tend to generate higher revenue, but some low-budget films (e.g., horror movies) perform exceptionally well.
- **Distribution by Production House:** A few studios (e.g., Disney, Warner Bros.) consistently release high-grossing movies.

## Visualizations:

- Bar plots and line graphs were used to illustrate the revenue trends and top-grossing movies.
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# 2. ROI (Return on Investment) Analysis

## Objective:

- Identify movies that earned the highest return relative to their budget.
- Find trends in ROI across different genres and time periods.

## Findings:

- **Top ROI Movies:** Some low-budget movies (especially horror, indie, and animated films) have an extremely high ROI compared to expensive blockbusters.
- **High-budget vs. Low-budget:** While high-budget films generate higher revenue, many low-budget films (e.g., *Paranormal Activity*) have the best ROI due to their minimal production costs.
- **Genre Impact on ROI:** Horror and thriller movies tend to have a **higher ROI** because they are made on smaller budgets but can attract large audiences.
- **Time-Based ROI Trends:** Some decades (e.g., 2000s and 2010s) saw a rise in profitable low-budget movies.

### Visualizations:

- Scatter plots showing the relationship between budget, revenue, and ROI.
  - A heatmap to visualize genre-wise ROI distribution.
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## 3. Genre Impact on Revenue

### Objective:

- Analyze which genres generate the most revenue.
- Compare how revenue trends differ across genres over time.

### Findings:

- **Top Revenue-Generating Genres:** Action, Adventure, and Sci-Fi dominate in terms of revenue, largely due to blockbuster franchises.
- **High ROI Genres:** Horror, Thriller, and Documentary films often have high ROI despite generating lower total revenue.
- **Trends Over Time:**
  - In the 1990s, Comedy and Romance were more popular.
  - In the 2000s and 2010s, Action and Sci-Fi took over.

- Superhero films have been dominating recent years.
- **Genre Mixing:** Many top-grossing movies belong to multiple genres (e.g., Action-Adventure, Sci-Fi-Action).

### Visualizations:

- A bar chart of revenue by genre.
  - A time-series plot showing how different genres performed over the years.
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## 4. Correlation Analysis

### Objective:

- Examine relationships between different variables (Budget, Revenue, Ratings, etc.).
- Determine if higher budgets lead to better ratings or higher revenue.

### Findings:

- **Budget vs. Revenue:** Strong correlation – higher-budget movies tend to make more money.
- **Budget vs. Ratings:** Weak correlation – a high budget does not guarantee a higher IMDb rating.
- **Revenue vs. Ratings:** Moderate correlation – critically acclaimed movies tend to do well but not always.
- **Genre Influence:** Certain genres (like Sci-Fi and Action) often have high budgets, while others (like Horror) remain low-budget.

### Visualizations:

- A correlation heatmap showing relationships between variables.
  - A scatter plot of budget vs. revenue, with trend lines.
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## 5. Visualization Insights

### Key Visuals Used:

- **Revenue Trends Over Time:** Showed how movie earnings have increased, with some dips.
- **Top 10 Highest-Grossing Movies:** A bar plot highlighting the biggest earners.
- **Budget vs. Revenue Scatter Plot:** Proved that budget has a strong impact on revenue.
- **Genre-Wise Revenue Distribution:** A boxplot to analyze which genres consistently make the most money.
- **ROI Heatmap:** Showed which genres and time periods had the most profitable movies.

### General Insights:

- High-budget movies mostly succeed but are not always the most profitable.
  - Horror and Indie films can have unexpectedly high ROI.
  - Sci-Fi and Action dominate revenue-wise.
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## 6. Data Cleaning & Handling Missing Values

### Objective:

- Ensure data quality by handling missing or incorrect values.
- Standardize data for better analysis.

### Steps Taken:

1. **Dropped Unnecessary Columns:** Removed irrelevant fields to focus on useful data.
2. **Filled Missing Values:** Used median and mean for numerical data, mode for categorical data.

3. **Converted Data Types:** Ensured correct formats for budget, revenue, and date fields.
4. **Handled Outliers:** Removed extreme outliers that distorted analysis.
5. **Formatted Date Fields:** Standardized release dates to allow time-based analysis.

**Outcome:**

- A clean and structured dataset ready for visualization and analysis.