Executive Summary: Titanic Data Analysis

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1. Data Overview

The Titanic dataset consists of 891 passengers with key attributes such as Passenger Class (Pclass), Age, Sex, Fare, and Survival Status.

Data preprocessing included handling missing values, cleaning, and feature engineering before conducting exploratory data analysis (EDA).

2. Key Findings & Insights

Survival Rate Trends:

- Overall survival rate: 38.38% (342 out of 891 passengers survived).
- Death rate: 61.62% (549 out of 891 passengers did not survive).

Class-Wise Survival Analysis:

- First Class (Pclass 1): 62.96% survived, indicating that wealthier passengers had a better chance.
- Second Class (Pclass 2): 47.28% survived, showing a moderate survival rate.
- Third Class (Pclass 3): Only 24.24% survived, making it the most affected group.

Gender-Based Survival Analysis:

- Female passengers: 74.20% survival rate, confirming that women had a significantly higher chance of survival.
- Male passengers: Only 18.89% survived, showing that men were less likely to be rescued.

Age-Based Survival Analysis:

- Children (Age < 18): 58.30% survival rate, indicating that younger individuals had a better chance of survival.
- Adults (Age 18-50): 36.20% survival rate.
- Older Adults (Age > 50): 32.40% survival rate.

Fare-Based Survival Analysis:

- Passengers who paid a higher fare (top 25%) had a 65.60% survival rate.
- Those who paid a lower fare (bottom 25%) had only a 23.90% survival rate.

Other Observations:

- Passengers traveling alone had a lower survival rate than those with family members on board.
- People who embarked from Cherbourg (C) had a higher survival rate (55.36%) compared to Southampton (33.70%) and Queenstown (38.96%).

3. Data Visualization Insights

- Various charts and histograms confirmed a strong correlation between passenger class, gender, fare, and survival rate.
- The Age vs. Survival graph highlighted that younger children had better survival chances, while elderly passengers faced higher risk.
- Fare distribution analysis suggested that wealthier individuals had priority in rescue efforts.

4. Conclusion & Implications

This analysis highlights the socio-economic factors that influenced survival rates on the Titanic. The findings suggest:

- First-class passengers, women, and children had the highest probability of survival.
- Economic status played a crucial role, as passengers who paid higher fares were more likely to survive.
- Male passengers and third-class travelers had the lowest survival chances, emphasizing the prioritization of rescue efforts.

These insights provide a deeper understanding of how privilege, gender, and class disparities impacted survival outcomes.