Project Report: Analysis of Ad Campaign Performance

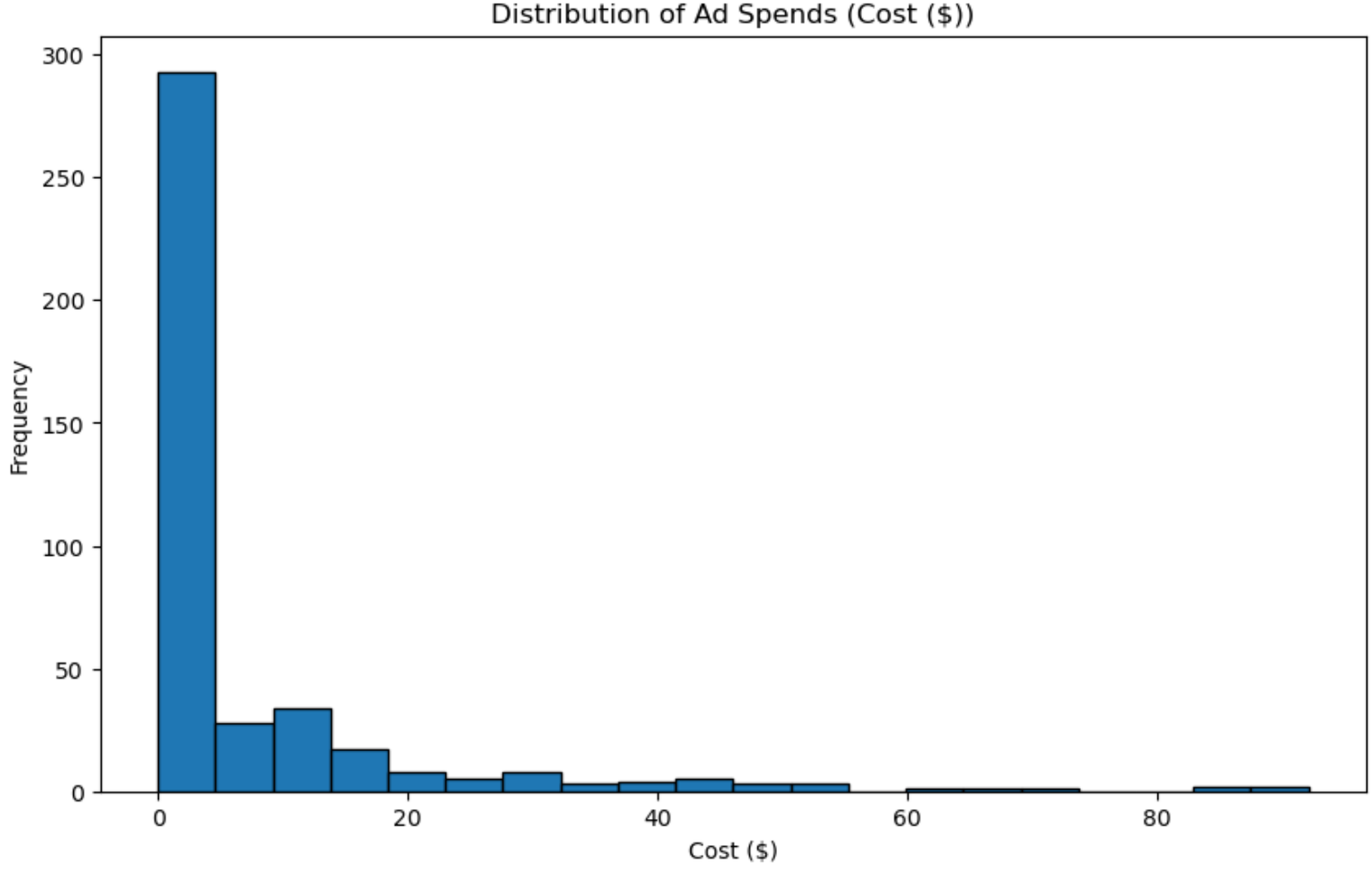
1. Introduction

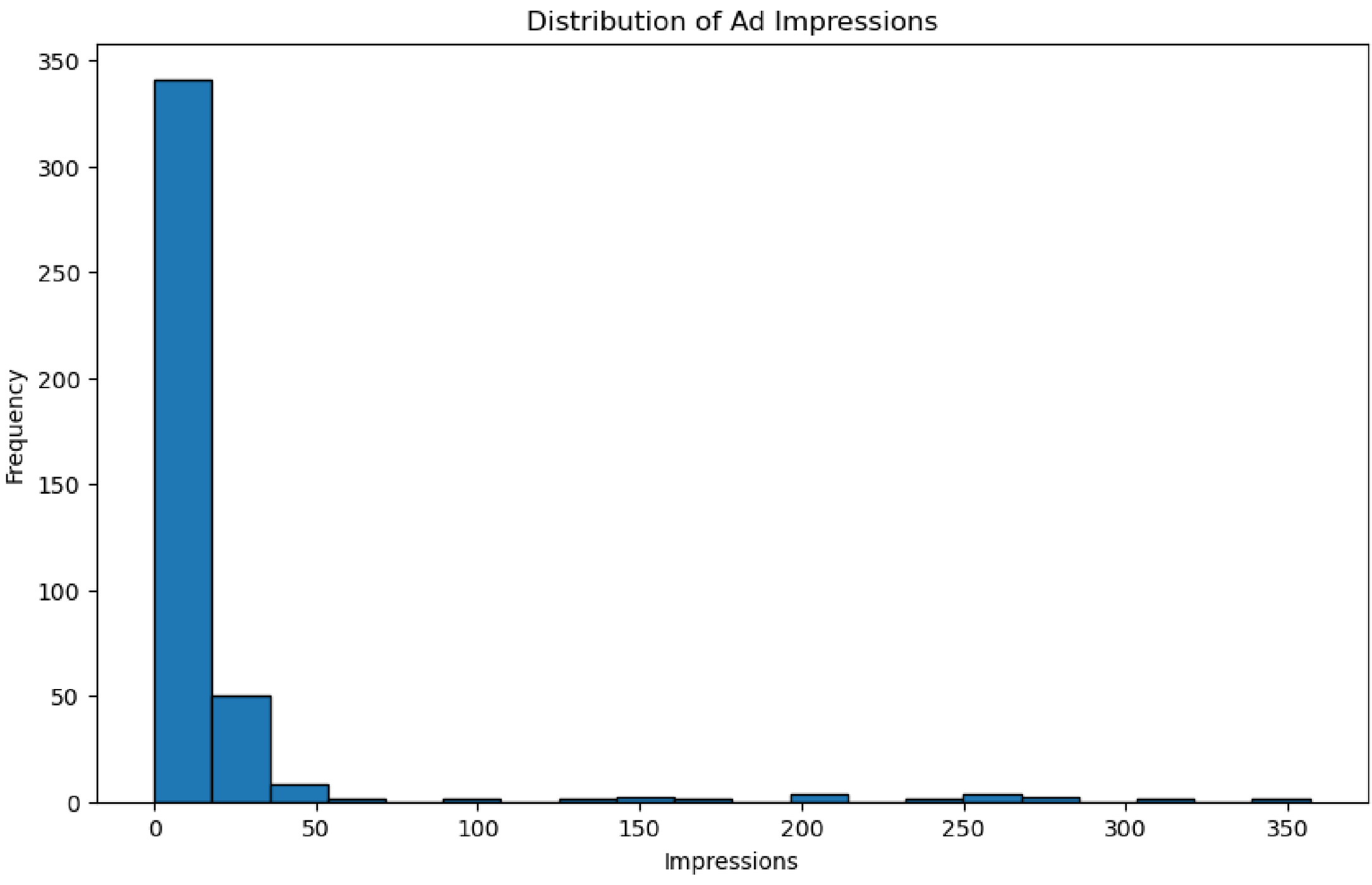
The purpose of this project is to analyze the performance of an advertising campaign using data collected in the "Omnify-Analyst-Intership-Task.xlsx" dataset. The dataset contains valuable information about the ad spends, impressions, clicks, prospects, and payment amounts for different ad campaigns.

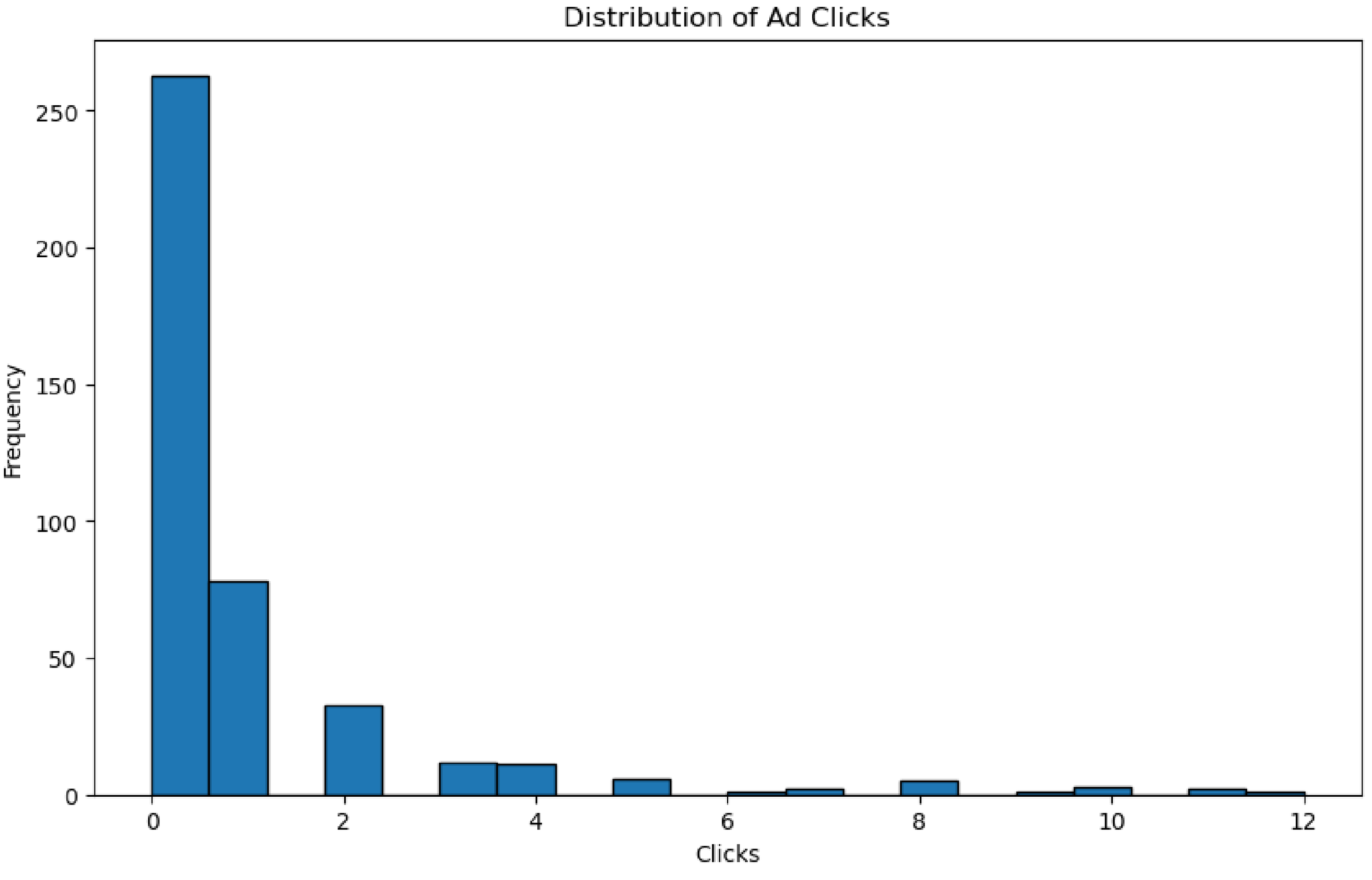
2. Data Import and Overview

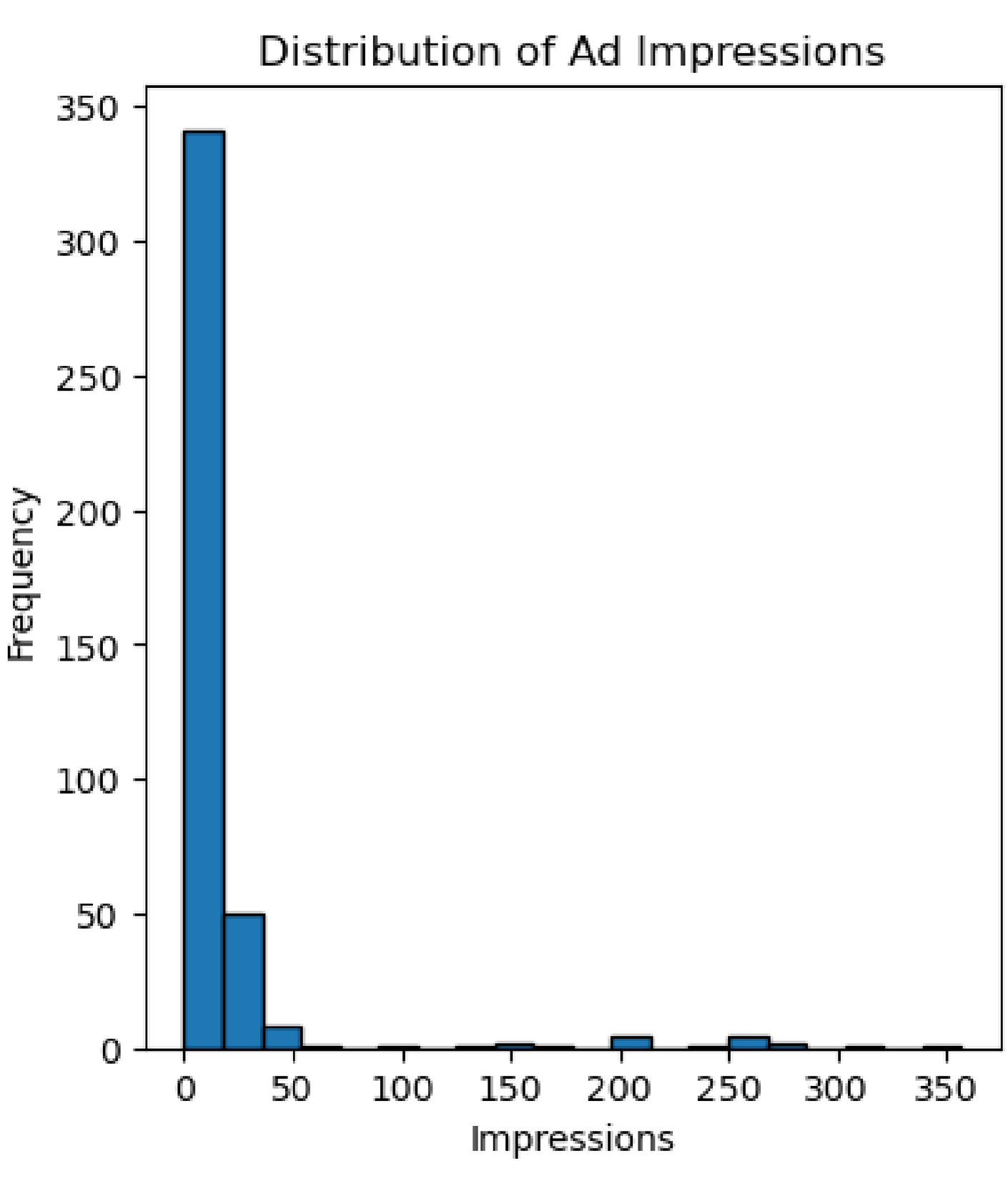
To begin our analysis, we first import the necessary libraries, namely Pandas, Matplotlib, and Seaborn, to handle data manipulation and visualization. Afterward, we load the dataset into a Pandas DataFrame. To better understand the data, we take an overview of the dataset by examining the first few rows, data types of columns, summary statistics, and identifying any missing values.

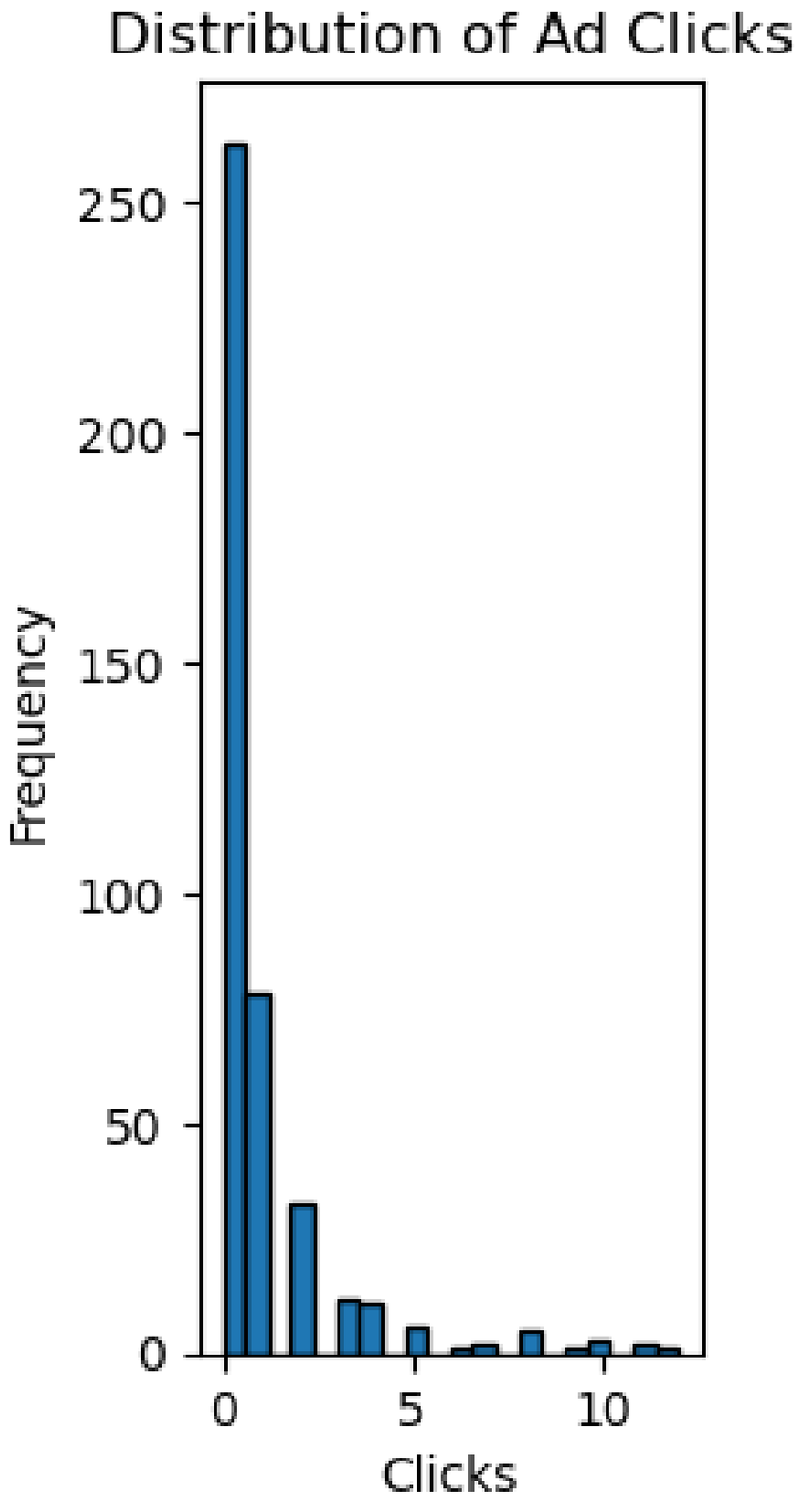
3. Data Visualization - Distribution of Key Metrics
Visualizations play a vital role in understanding the distribution of key metrics. We create histograms to visualize the distributions of 'Cost ($)', 'Impressions', 'Clicks', and 'Prospects'. These histograms provide us with insights into the spread and frequency of each metric, helping us identify any potential patterns or outliers.

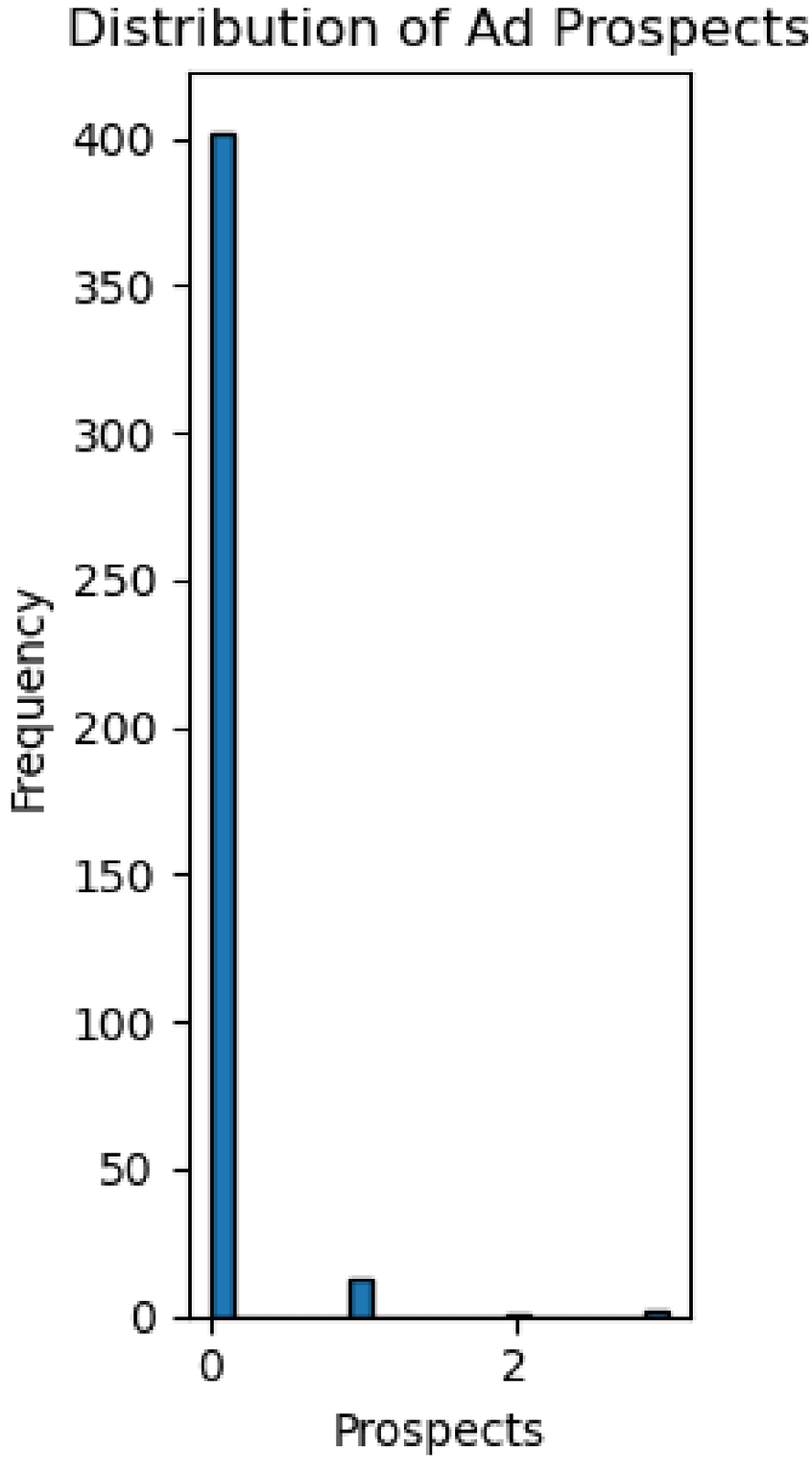



Distribution of Ad Impressions
Frequency
Impressions
0
50
100
150
200
250
300
350
0
50
100
150
200
250
300
350


Distribution of Ad Clicks
Frequency
250
200
150
100
50
0
0
2
4
6
8
10
12
Clicks


Distribution of Ad Impressions
Frequency
Impressions
0
50
100
150
200
250
300
350


Distribution of Ad Clicks
Frequency
250
200
150
100
50
0
0
5
10
Clicks

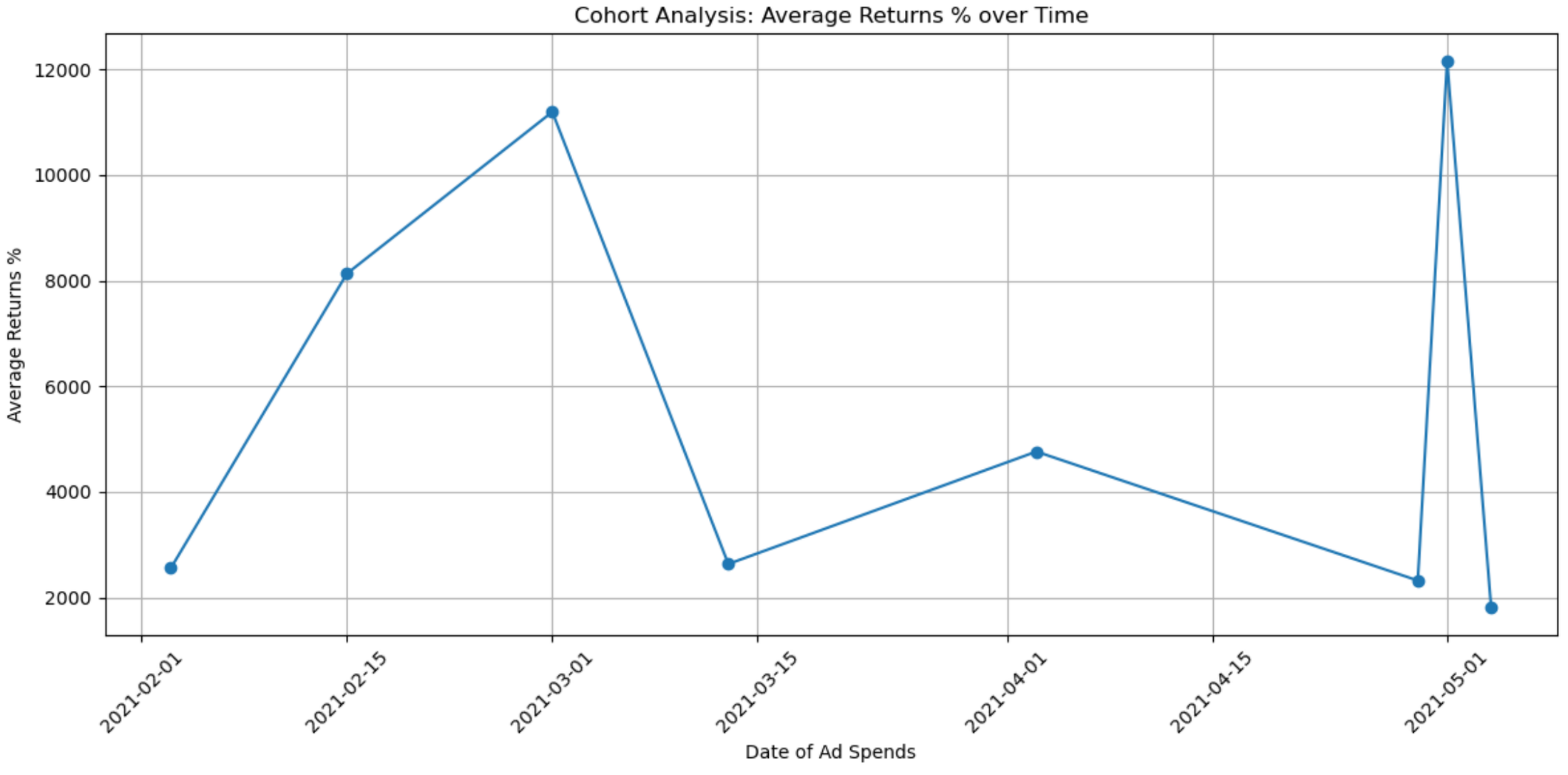

Distribution of Ad Prospects
Frequency
400
350
300
250
200
150
100
50
0
0
2
Prospects

4. Data Cleaning - Conversion and Calculation

To ensure data accuracy and consistency, we clean the data in this step. We convert the 'Payment ($)' and 'Cost ($)' columns from strings to floating-point numbers. This conversion allows us to perform numerical operations on these columns effectively. Additionally, we calculate the 'Returns %' metric, which represents the percentage of returns based on the ad spends. This metric will be essential for evaluating the campaign's overall performance.

5. Cohort Analysis - Average Returns % Over Time

A cohort analysis is conducted to observe the average returns percentage over time. By grouping the data based on the 'Payment Date,' we calculate the mean 'Returns %' for each date. We present the trend using a line plot, enabling us to visualize the campaign's performance fluctuations over the course of its run.


Cohort Analysis: Average Returns % over Time
Average Returns %
12000
10000
8000
6000
4000
2000
2021-02-01
2021-02-15
2021-03-01
2021-03-15
2021-04-01
2021-04-15
2021-05-01
Date of Ad Spends

6. Key Metrics in Weekly and Monthly Format

In this section,

we transform the data into weekly and monthly reports. By aggregating the 'Cost ($)' and 'Returns %' metrics based on the 'Week' and 'Month' of the 'Payment Date,' respectively, we gain insights into the campaign's performance on a weekly and monthly basis. These reports provide a clear overview of the campaign's spending patterns and overall returns percentage during different time intervals.

Weekly Report:

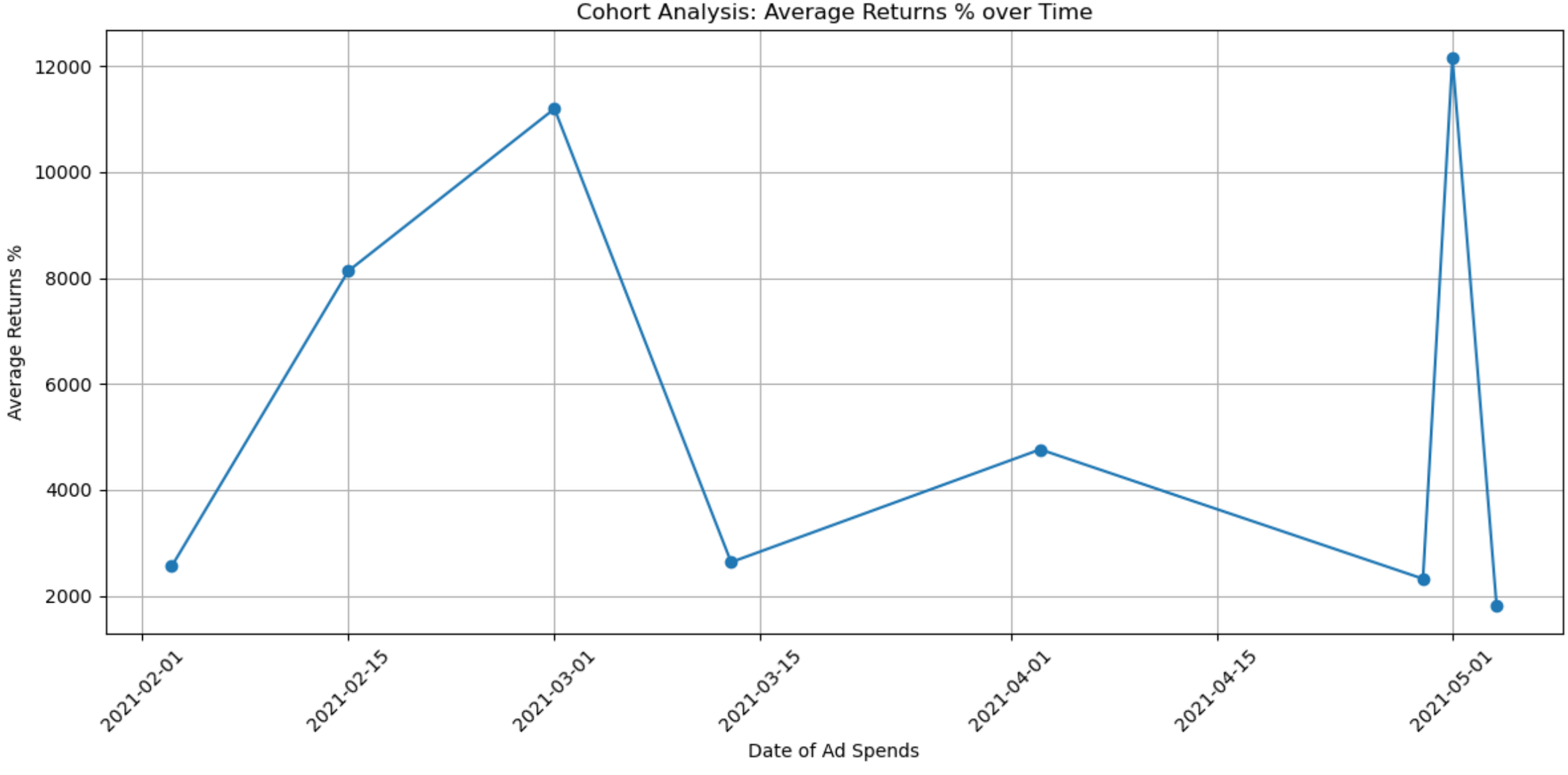
Week	Cost ($)	Returns %
2021-01-25	154.79	2594.569684
2021-02-01	192.58	NaN
2021-02-08	216.13	8132.780083
2021-02-15	235.30	11195.992486
2021-02-22	190.90	NaN
2021-03-01	141.40	2318.977757
2021-03-08	258.20	NaN
2021-03-15	184.36	NaN
2021-03-22	308.73	4761.714855
2021-03-29	172.11	NaN
2021-04-05	176.96	NaN
2021-04-12	137.21	12158.859470
2021-04-19	87.38	NaN
2021-04-26	103.26	NaN
2021-05-03	229.37	1809.320743

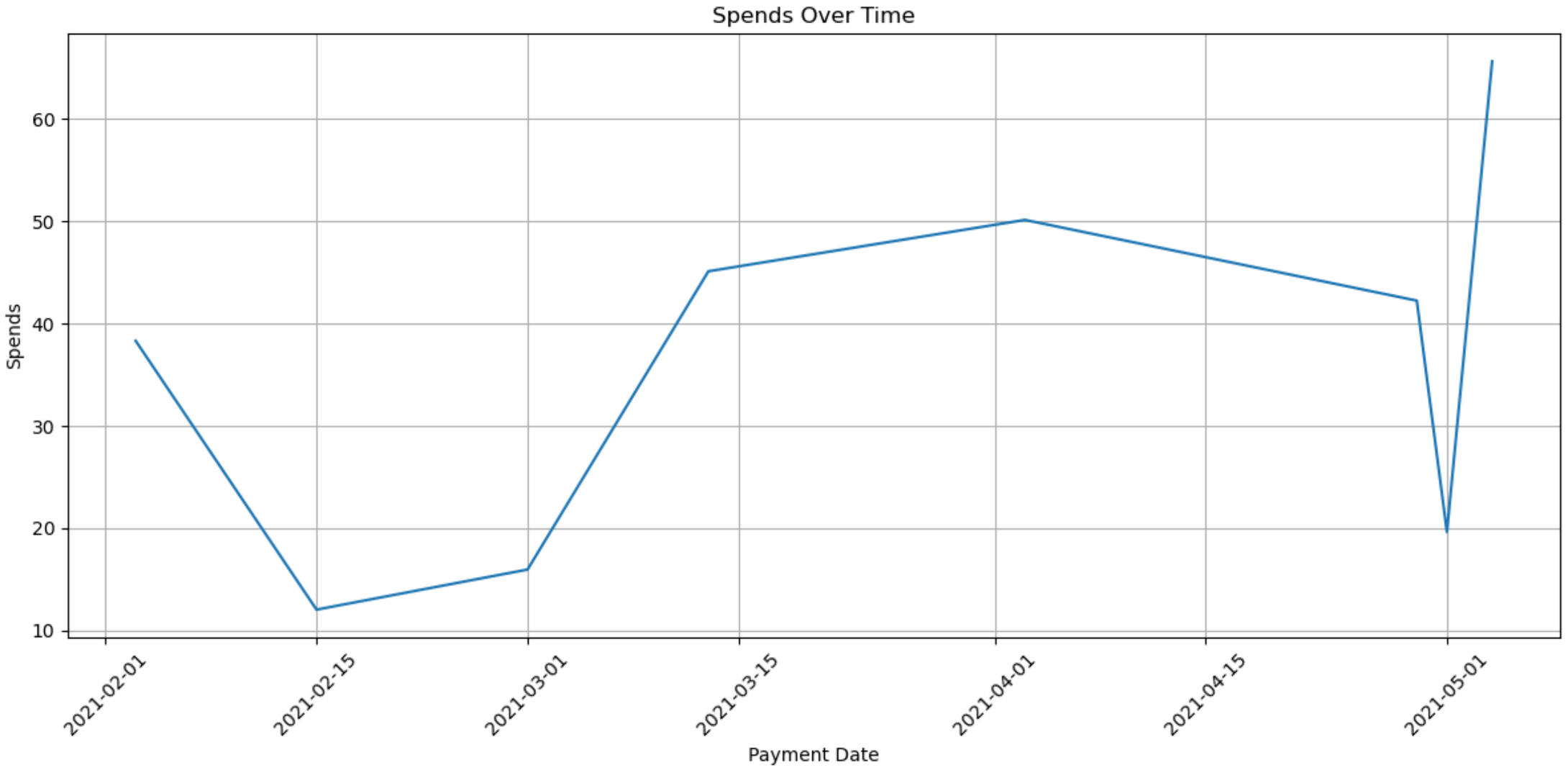
7. Identifying the Most Profitable Channel and Category/Keyword

Determining the most profitable channel and category/keyword is crucial for campaign optimization. By calculating the average 'Returns %' for each 'Campaign' and 'Search Keyword,' respectively, we can identify the most successful elements in the campaign. The results will assist in making data-driven decisions to allocate resources more effectively.

8. Time Series Graphs - Spends and Returns % Over Time

To visualize the trends in ad spends and returns percentage over time, we plot time series graphs. The first graph shows the 'Cost ($)' over time, while the second graph displays the 'Returns %' over time. These line plots offer valuable insights into how ad spends and returns have evolved throughout the campaign duration.


Cohort Analysis: Average Returns % over Time
Average Returns %
12000
10000
8000
6000
4000
2000
2021-02-01
2021-02-15
2021-03-01
2021-03-15
2021-04-01
2021-04-15
2021-05-01
Date of Ad Spends


Spends Over Time
Spends
60
50
40
30
20
10
2021-02-01
2021-02-15
2021-03-01
2021-03-15
2021-04-01
2021-04-15
2021-05-01
Payment Date

Conclusion:

In conclusion, this project provides a comprehensive analysis of an ad campaign's performance. Through data visualization, data cleaning, cohort analysis, and identification of key metrics, we gain a deeper understanding of the campaign's effectiveness. The findings allow us to pinpoint the most profitable aspects of the campaign and provide valuable insights for optimizing future advertising strategies. The time series graphs further highlight the temporal trends of ad spends and returns percentage, aiding in making informed decisions to improve the campaign's overall success.