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SCHOOL OF ENGINEERING

Bachelor of Technology
in

COMPUTER SCIENCE AND ENGINEERING
(Artificial Intelligence and Machine Learning)

Mini Project

Informative Data Inspection for Flipkart Mobiles

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CERTIFICATE

This is to certify that the Mini – Project titled **"Informative Data Inspection for Flipkart Mobiles"** is carried out by **Sana Banu (ENG22AM0053), Sahana Priya G (ENG22AM0050), N.Dharsini (ENG22AM0036), Nitya P Shetty (ENG22AM0037),** bonafide students of Bachelor of Technology in Computer Science and Engineering (Artificial Intelligence and Machine Learning) at the School of Engineering, Dayananda Sagar University.

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LIST OF ABBREVIATIONS

WORDS	ABBREVIATION
E-Commerce	Electronic Commerce
EDA	Exploratory Data Analysis
INR	Indian Rupees
RAM	Random Access Memory
GNN	Graph Neural Network
TF-IDF	Term Frequency-Inverse Document Frequency
LSTM	Long Short-Term Memory
DNN	Deep Neural Network
COD	Cash on Delivery

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ABSTRACT

In the realm of e-commerce, data stands as the cornerstone of strategic decision-making and operational efficacy. This report delves into an in-depth analysis and inspection of data pertinent to Flipkart, one of the leading e-commerce platforms. The primary focus is on comprehending the nature, trends, and implications of the data generated and utilized by Flipkart. This investigation navigates through various dimensions of Flipkart's data landscape, encompassing customer behavior, sales patterns, product preferences, and market trends. Leveraging advanced analytical techniques, the report illuminates critical insights into consumer habits, geographical variations, and the impact of promotional strategies. Furthermore, this report explores the interplay between Flipkart's data infrastructure, its technological innovations, and the resultant business outcomes. It investigates the efficacy of data-driven decision-making processes, highlighting the alignment between data insights and strategic maneuvers within the company.

The findings and recommendations put forth in this report aim to offer valuable perspectives for Flipkart's stakeholders, aiding in refining existing strategies, optimizing operational efficiencies, and fostering sustained growth in an ever-evolving e-commerce landscape.

In essence, this report serves as a comprehensive examination of Flipkart's data ecosystem, unraveling hidden opportunities and presenting actionable insights crucial for driving future success in the competitive e-commerce domain

CHAPTER 1
INTRODUCTION

Flipkart is an Indian e-commerce company. It is the largest e-commerce company in India and was founded by Sachin and Binny Bansal. The company has wide variety of products electronics like laptops, tablets, smartphones, and mobile accessories to in-vogue fashion staples like shoes, clothing and lifestyle accessories; from modern furniture like sofa sets, dining tables, and wardrobes to appliances that make your life easy like washing machines, TVs, ACs, mixer grinder juicers and other time-saving kitchen and small appliances; from home furnishings like cushion covers, mattresses and bed sheets to toys and musical instruments Comparing prices across different sellers or platforms helps identify competitive offers or bundled deals. Verify the product's authenticity and warranty to ensure a genuine purchase with adequate manufacturer support. Additionally, consider delivery times, shipping conditions, and packaging quality for a hassle-free shopping experience.

1.1 Mobiles in Flipkart

Mobile phones are one of the most rapidly rising industries, as well as one of the most prominent industries in the technology sector. The rate of increase has been exponential, with the number of mobile phone customers increasing fivefold in the last decade. Globally, the number of smartphones sold to end users climbed from 300 million in 2010 to 1.5 billion by 2020.

The objective is to address a hypothetical business problem for a Flipkart Authorized Seller. According to the problem the individual is looking to sell mobile phones on Flipkart. For this, the individual is looking for the best product, brand, specification and deals that can generate the most revenue with the least amount of investment and budget constraints.

Questions to be answered:

1. Should he simply sell products for one brand, or should he try to sell models from various brands?

2.Using EDA (Exploratory Data Analysis) and Data Visualization find out insights and relation between different features.

3. Perform detailed analysis of each brand.

1.2 Data Collection

The dataset was collected through web scraping techniques from the Flipkart website on September 14, 2021, with the aim of acquiring information on mobile phones available for purchase. The dataset contains essential attributes crucial for consumers considering a smartphone purchase. It includes details such as product names, respective brands, pricing in Indian Rupees (INR), RAM capacity, storage sizes, display dimensions, camera specifications (including megapixel counts for different lenses), and battery capacities.

It's important to note that the dataset might not encompass all available mobile phone models on Flipkart during that time and could be subject to changes in product availability, pricing, or specifications post-September 2021. However, the information gathered through this scraping process provides a snapshot of the mobile phone offerings on the platform at that specific point in time. Future analyses or insights derived from this dataset should consider the potential variations in the current offerings, as Flipkart's inventory is dynamic and continuously evolving.

Assumption:

In the absence of direct sales records specifying the exact number of units sold for each mobile phone model on Flipkart, an assumption has been made to estimate the sales volume

This assumption suggests a correlation between the number of product ratings and the units sold. It's hypothesized that the number of individuals providing ratings for a specific

product is proportional to the units sold, implying that a higher number of ratings signifies a larger volume sale. Hence, for the purposes of this solution, the count of persons rating a particular product is considered a surrogate measure or an approximation of the equivalent units sold. This methodology allows for an estimation of relative popularity or market demand for different mobile phone models available on Flipkart. However, it's important to acknowledge that while this assumption provides an indirect measure of sales volume, it may not precisely reflect the actual sales figures and should be interpreted as an estimation based on available user feedback.

We don't have a direct sales record that shows how many units of a certain mobile model were sold. In most cases, the number of people who rate a product is proportional to the number of units sold. As a result, we are considering the number of persons rating the product as the equivalent units sold in the solution.

In leveraging the number of product ratings as a proxy for estimating sales, it's essential to acknowledge potential limitations in this approach. Factors such as user behaviour, varying review habits, or incentives to leave reviews could impact the relationship between ratings and actual sales figures. Moreover, this assumption operates under the premise that each rating corresponds directly to a single unit sold, which might not always hold true due to differing consumer behaviours and motivations. Nonetheless, despite these considerations, using rating counts as a reference point provides a valuable insight into relative product popularity and consumer engagement within the Flipkart marketplace.

CHAPTER 2

PROBLEM DEFINITION

Provide a Detailed Overview: Furnish a comprehensive overview of the mobile phones offered on Flipkart, encompassing a diverse range of brands, models, and specifications available as of the data collection date.

Highlight Key Attributes: Analyse and highlight crucial attributes such as product specifications (processor, RAM, storage, display, camera, battery, etc.), pricing, seller information, and any bundled offers or discounts available.

Assess User Feedback: Evaluate user reviews and ratings as a means to understand consumer sentiment, preferences, and potential product performance through an assumption of its correlation with sales volume.

Establish Data Reliability: Acknowledge and address the limitations of using user ratings as a proxy for sales figures, while emphasizing the utility of this methodology in inferring relative popularity among different mobile phone models.

Recommendations and Insights: Offer insights derived from the dataset while recognizing the dynamic nature of e-commerce platforms, emphasizing the importance of considering current data for making informed decisions.

Disclosure of Assumptions: Clearly state assumptions made during data collection and analysis processes, particularly regarding the relationship between ratings and sales volumes.

Potential Implications: Discuss potential implications for consumers, sellers, and market analysts in interpreting the provided data and its relevance in making informed purchasing decisions or market assessments.

Future Considerations: Highlight the need for ongoing data updates, further analysis, or alternative data sources to refine estimations and enhance the accuracy of insights regarding mobile phone sales on Flipkart.

CHAPTER 3

LITERATURE REVIEW

The increasing demand for mobile phones has resulted in abundant online reviews, making it challenging for consumers to make informed purchasing decisions. In this study, we propose Graph Neural Network (GNN) models to classify mobile phone ratings using Term Frequency-Inverse Document Frequency (TF-IDF) features. We collected a dataset of over 13,000 mobile phone evaluations from the Flipkart website. The proposed method includes data purification, balancing, feature extraction from the TF-IDF, and model prediction using deep learning models. The proposed approach utilized other models such as Deep Neural Network (DNN), Long Short-Term Memory (LSTM), and Bidirectional LSTM to compare other classifiers. The experiments' outcomes demonstrate that the suggested model performs better than conventional deep learning methods regarding accuracy and efficiency. The GNN model achieved the best 99.0% accuracy rate. The proposed approach can help consumers make informed purchasing decisions and can be extended to other e-commerce platforms with large datasets of online reviews.[1]

In the past few years, there is a huge demand and increase in the usage of Mobile phones, which increased the market, which raised confusion among the people to choose the best phone for them. This research work attempts to help such users, who are confused to buy mobile phones in the present market. When a user wants to buy a mobile phone from this huge market, he/she chooses to buy the best phone. To judge the phone is perfect for them or not, they have to go through a lot of newspapers, magazines, and also reviews given by the users. It takes them a lot of time to read all those reviews and judge. So, through our project, a large number of reviews are analyzed in order to suggest the perfect mobile phone available in the market. The proposed project considers a huge dataset of Amazon, which includes the information about mobiles.[2]

The past few years have been marked by quite a few developments in e-commerce and online shopping with the biggest of them being in the smartphone segment. India is now

the world's largest market for smartphones with its share having increased to 45% in 2020 by registering a mammoth 7% growth during the pandemic year. Some of the major smartphone brands here are Xiaomi, Samsung, and OnePlus. These brands have often partnered exclusively with e-commerce platforms like Amazon and Flipkart with sweet deals and offers for buyers. For smartphones of all price segments, reviews on these sites can be an important indicator of how satisfied customers are with the product and can also be an important factor for decision making that helps customers choose whether a product is worth purchasing or not. In this paper, we will be exploring algorithms and techniques used for sentiment analysis and text classification of smartphone reviews on Amazon. The dataset we used for research is available on Kaggle and contains 6S,000 reviews of 720 smartphones of numerous brands. We have used a combination of machine learning and deep learning algorithms for the same, starting with baseline logistic regression and naive Bayes models and then moving on to complex support vector machines and Recurrent Neural Networks such as LSTM using the Fast AI library.[3]

The case is about an Indian ecommerce player – Flipkart, started as online market place in 2007 by two IIT Delhi alumni and ex Amazon employees - Sachin and Binny Bansal. In the initial days they started with selling books online with add – on like free shipping and Cash on Delivery (COD) to entice customers and deal with the other competitors. Over a period of time, Flipkart has entered into other segments too like mobiles, cameras, computers, healthcare and personal products, home appliances and electronics, stationery, perfumes, toys, apparels, shoes. In the journey so far, Flipkart has done eight acquisitions and took majority stake in two with an objective of strengthen its business and has become the foremost players in Indian e-commerce space but with increased sales company has booked hefty losses and even not reached to break even. The company bought by Flipkart has one or other common investor that has invested in Flipkart and the target companies. This gave rise to the question whether these mergers and acquisitions was a strategic fit for Flipkart or driven by the investors to save their money.[4]

CHAPTER 4

PROJECT DESCRIPTION

"This project seeks to revolutionize Flipkart's e-commerce landscape by enhancing data insights and utilization. Through an extensive evaluation of existing data infrastructure and consumer behavior analysis, we aim to uncover actionable insights to fuel strategic decision-making. By leveraging advanced analytics techniques, we'll delve into sales trends, market dynamics, and customer preferences, enabling Flipkart to optimize product offerings and personalize customer experiences. Our goal is to not only identify opportunities but also establish frameworks to seamlessly integrate data-driven insights across departments, ensuring Flipkart's sustained growth and competitive edge in the rapidly evolving e-commerce domain."

4.1 About Database

The dataset includes data on mobile phones from the top five most popular brands in India: Apple, Poco, Realme, Samsung, and Xiaomi. Information like RAM, ROM, Display Size. etc are present which distinguishes one product from another. At least one attribute distinguishes each product. Dataset has no null value.

Columns: There are 16 columns each having a title which is self-explanatory. Rows: There are 430 rows each having a mobile with at least a distinct feature.

4.2 Description About Attributes

I. **brand:** Brand Name (Categorical)
II. **model:** Model Name (Categorical)
III. **base_color:** Phone Color (Categorical)
IV. **processor:** Processor brand used (Categorical)
V. **screen_size:** Categorical screen size (Categorical)
VI. **ROM:** ROM in gigabyte (Numeric – Discrete)

VII. **RAM:** RAM in gigabyte (Numeric – Discrete)

VIII. **display_size**: Actual display size in inches (Numeric – Continuous)

IX. **num_rear_camera**: No. of cameras on back (Numeric – Discrete)

X. **num_front_camera:** No. of cameras on front (Numeric – Discrete)

XI. **battery_size:** Battery in mAH (Numeric – Continuous)

XII. **ratings:** Customer rating for the product (Numeric – Continuous)

XIII. **num_of_ratings:** No. of people rating the product, also the equivalent no. of unit soli for our problem (Numeric – Continuous)

XIV. **sales_price:** Selling price of the unit after discount (Numeric – Continuous)

XV. **discount_percent:** Discount in percentage offered (Numeric – Continuous)

XVI. **sales:** Sales of product in crore rupees (Numeric – Continuous)

CHAPTER 5

METHADOLOGY

1. Data Collection:

The initial step involves a comprehensive identification of Flipkart's data sources, encompassing customer interactions, sales records, market analytics, and inventory data. Data gathering techniques employed include a mix of methods such as surveys, web analytics tools, CRM systems, and utilization of third-party data sources. Moreover, an emphasis is placed on ensuring data quality through rigorous checks for accuracy, completeness, and reliability before further processing.

2. Data Processing and Preparation:

Following data collection, a meticulous process of data cleaning is initiated, involving the removal of inconsistencies, handling missing values, outlier detection, and normalization. Subsequently, data integration techniques are utilized to harmonize disparate datasets into a unified format suitable for analysis. Feature engineering methods are applied to derive meaningful insights by transforming and creating relevant features from the data.

3. Data Analysis Techniques:

The analysis phase comprises descriptive analytics, employing statistical methods and visualization tools to understand data patterns, distributions, and correlations. Predictive analytics techniques, including machine learning models or forecasting methods, are used to anticipate consumer behavior, market trends, and sales forecasts. Additionally, segmentation and clustering methods are deployed to categorize customers or products based on behavior or specific characteristics.

4. Data Interpretation and Insights Generation:

This stage involves interpreting analysis outcomes to extract actionable insights from the data. Key findings are identified through the interpretation process, focusing on significant trends and patterns aligned with Flipkart's strategic objectives. Rigorous validation processes ensure the accuracy and reliability of insights before being considered for strategic implementation.

5. Frameworks for Data-Driven Decision Making:

Methodologies are established to align data insights with Flipkart's strategic goals and decision-making processes. Utilization of visualization techniques and reporting mechanisms is emphasized to effectively communicate insights to stakeholders, aiding in informed decision-making across departments.

6. Testing and Validation:

Validation techniques are implemented to ensure the accuracy and reliability of models and insights derived from the analysis. Additionally, scenarios or simulations are tested to gauge the robustness of proposed recommendations and strategies before implementation.

7. Continuous Improvement and Feedback Loop:

Strategies for establishing a feedback mechanism post-implementation are outlined to continuously collect feedback on implemented changes and insights. A structured framework for monitoring and evaluating the performance of implemented changes is put in place to assess their impact over time, enabling iterative improvements in Flipkart's data-driven processes.

CHAPTER 6

EXPLANATION

The above code is written in Python using the pandas, numpy, matplotlib, seaborn, and missingno libraries for data analysis and visualization.

6.1 Imported Libraries

- ***import pandas as pd**:* Imports the pandas library for data manipulation and analysis.
- ***import numpy as np:*** Imports the numpy library for numerical operations.
- ***import matplotlib.pyplot as plt:*** Imports the matplotlib library for data visualization.
- ***import seaborn as sns:*** Imports the seaborn library for statistical data visualization.
- ***import missingno as msno:*** Imports the missingno library for visualizing missing data patterns.

6.2 Data Loading:

- ***df = pd.read_csv('data.csv'):*** Reads a CSV file into a pandas DataFrame named df.

6.3 Data Exploration:

- ***df.shape():*** Returns the shape (number of rows and columns) of the DataFrame.
- ***df.head():*** Displays the first few rows of the DataFrame.
- ***df.tail():*** Displays the last few rows of the DataFrame.
- ***df.fillna(0).iloc[:3]:*** Fills missing values with 0 and displays the first three rows.
- ***df.describe().T:*** Generates descriptive statistics for the DataFrame.
- ***df.dtypes:*** Displays the data types of each column.

6.4 Data Visualization:

- ***msno.bar(df, figsize=(6,3), color='magenta'):*** Plots a bar chart visualizing missing data.
- ***df['Brand'].groupby(df['Brand']).count().sort_values(ascending=False):*** Counts and sorts the number of occurrences for each brand.

Various seaborn and matplotlib plots, including pairplots, histograms, countplots, stripplots, and boxplots, to visualize relationships and distributions within the data.

The code explores and visualizes the dataset, focusing on columns like 'Brand', 'Memory', 'Rating', 'Selling Price', and 'Original Price'. It provides insights into missing data, distributions, and relationships between different variables, especially concerning different brands in the dataset.

CHAPTER 7

RESULT AND ANALYSIS

OUTPUT:

(3114, 8)

7.1 df.head

	Brand	Model	Color	Memory	Storage	Rating	Selling Price	Original Price
0	OPPO	A53	Moonlight Black	4 GB	64 GB	4.5	11990	15990
1	OPPO	A53	Mint Cream	4 GB	64 GB	4.5	11990	15990
2	OPPO	A53	Moonlight Black	6 GB	128 GB	4.3	13990	17990
3	OPPO	A53	Mint Cream	6 GB	128 GB	4.3	13990	17990
4	OPPO	A53	Electric Black	4 GB	64 GB	4.5	11990	15990

7.2 df.tail

	Brand	Model	Color	Memory	Storage	Rating	Selling Price	Original Price
3109	SAMSUNG	M52 5G	Blazing Black	6 GB	128 GB	4.3	25990	25990
3110	SAMSUNG	M52 5G	Icy Blue	6 GB	128 GB	4.3	25489	28449
3111	SAMSUNG	M52 5G	Icy Blue	8 GB	128 GB	4.3	27239	31489
3112	SAMSUNG	M52 5G	Slate Black	8 GB	128 GB	4.2	22989	22989
3113	SAMSUNG	M52 5G	Sky Blue	8 GB	128 GB	4.2	20350	22595

7.3 df. fillna(0).iloc[:3]

	Brand	Model	Color	Memory	Storage	Rating	Selling Price	Original Price
0	OPPO	A53	Moonlight Black	4 GB	64 GB	4.5	11990	15990
1	OPPO	A53	Mint Cream	4 GB	64 GB	4.5	11990	15990
2	OPPO	A53	Moonlight Black	6 GB	128 GB	4.3	13990	17990

7.4 df.describe().T

	count	mean	std	min	25%	50%	75%	max
Rating	2970.0	4.243098	0.271991	2.3	4.10	4.3	4.4	5.0
Selling Price	3114.0	26436.625562	30066.892622	1000.0	9990.00	15000.0	28999.0	179900.0
Original Price	3114.0	28333.473025	31525.599889	1000.0	10030.25	16889.5	31500.0	189999.0

7.5 df.types

```
Brand                object
Model                object
Color                object
Memory               object
Storage              object
Rating              float64
Selling Price         int64
Original Price        int64
dtype: object
```

7.6 msno.bar(df,figsize=(6,3),color='magenta

7.7 df['Brand'].groupby(df['Brand']).count().sort_values(ascending=lse)

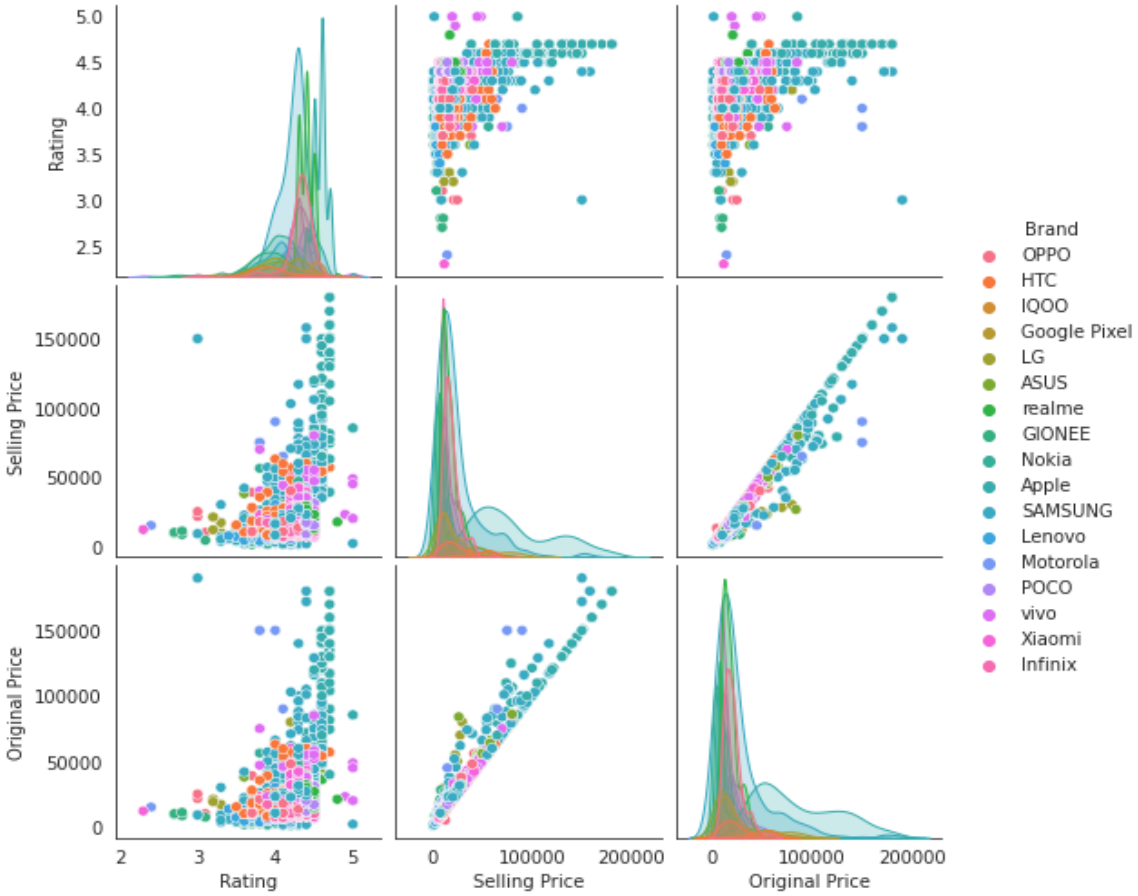
Brand	
SAMSUNG	719
Apple	387
realme	327
OPPO	260
Nokia	213
Xiaomi	198
Infinix	151
GIONEE	129
vivo	124
Lenovo	121
ASUS	118
Motorola	105
LG	99
POCO	74
HTC	55
Google Pixel	29
IQOO	5
Name: Brand, dtype: int64	

7.8 df['Brand'].groupby(df['Brand']).count().sort_values(ascending=lse)

Memory	
4 GB	750
3 GB	498
6 GB	497
2 GB	390
8 GB	345
1 GB	193
4GB	137
12 GB	63
512 MB	46
4 MB	39
1.5 GB	29
16 MB	16
64 MB	15
32 MB	14

8 MB	14
768 MB	6
128 MB	4
10 MB	3
2 MB	2
18 GB	2
46 MB	2
16 GB	2
32 GB	1
153 MB	1
100 MB	1
30 MB	1

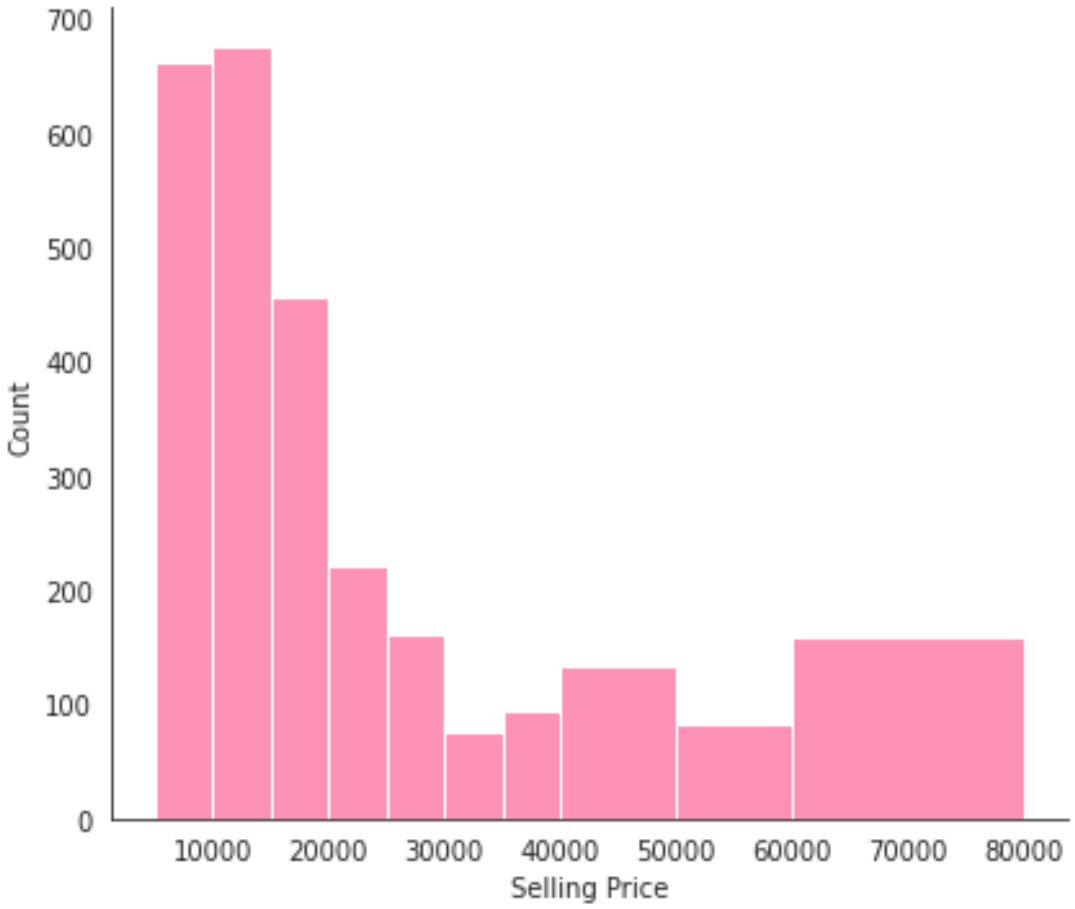
Name: Brand, dtype: int64



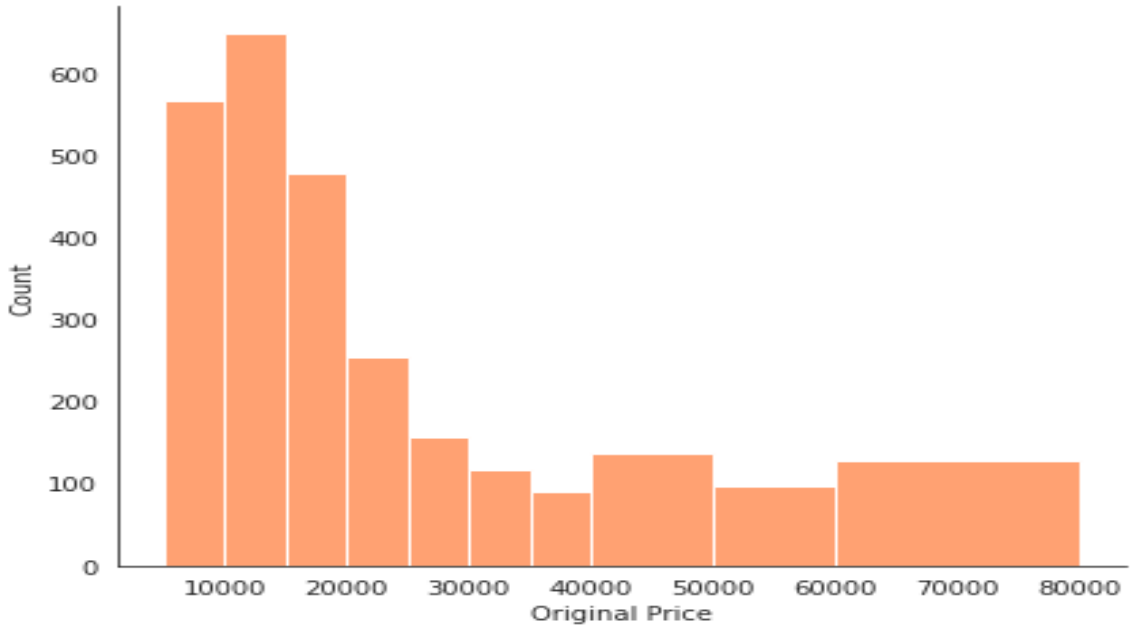
7.9 <seaborn.axisgrid.PairGrid at 0x7fcf3aba8

df.keys()

```
<seaborn.axisgrid.PairGrid at 0x7fcf3aba8f50>
 'Selling Price', 'Original Price'],
  dtype='object')
```

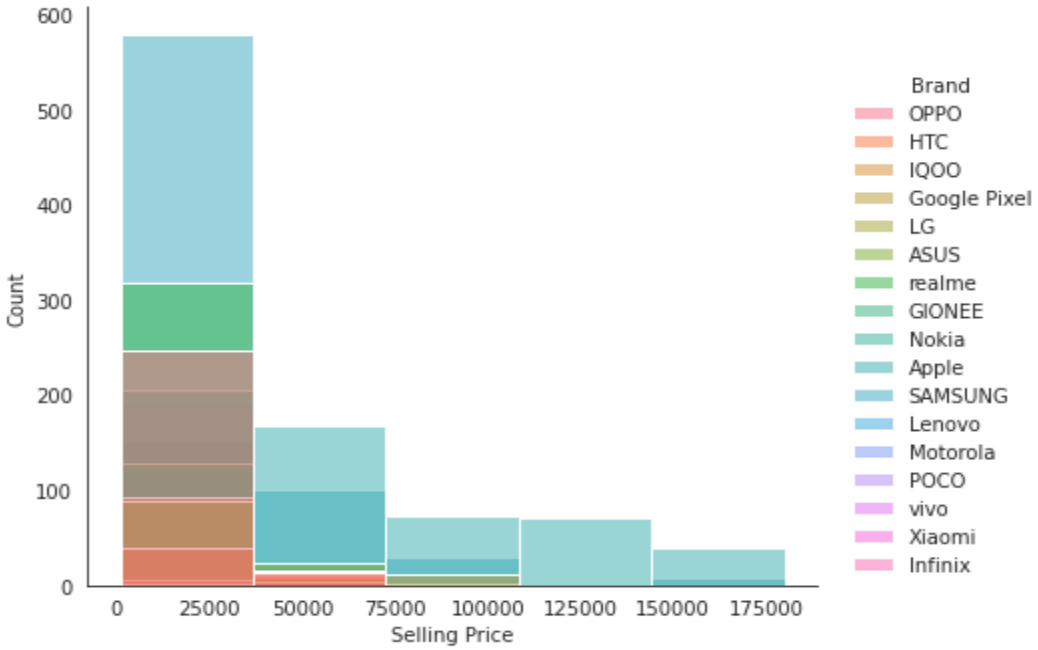


7.10 <seaborn.axisgrid.FacetGrid at 0x7fcf3a5ba090>

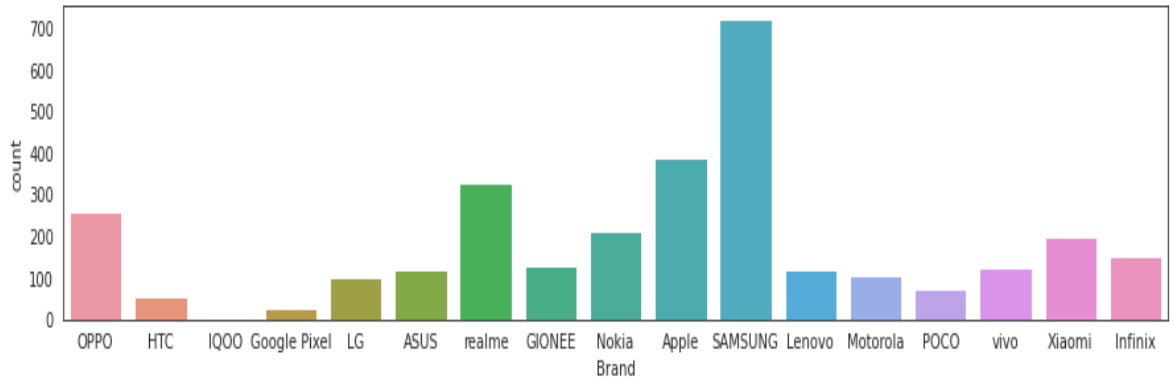


7.11 <seaborn.axisgrid.FacetGrid at 0x7fcf3a841e90>

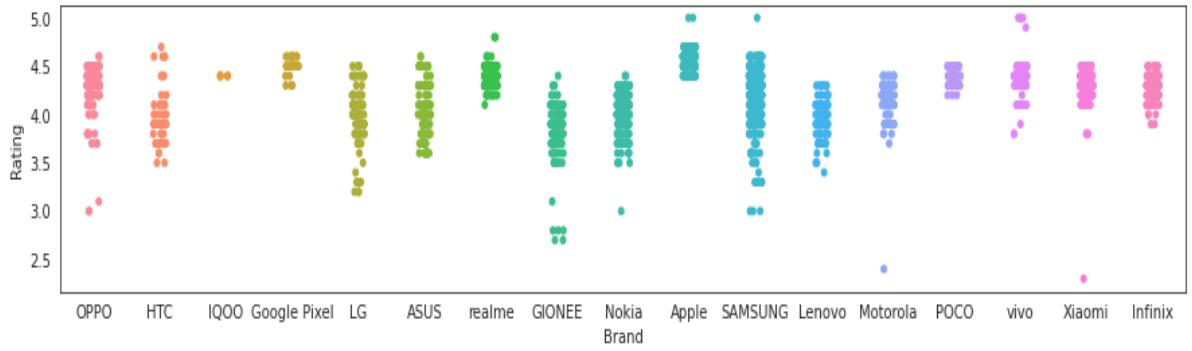
It is quite clear that the market is saturated with lower to mid-range cost phones i.e. <250 00 INR



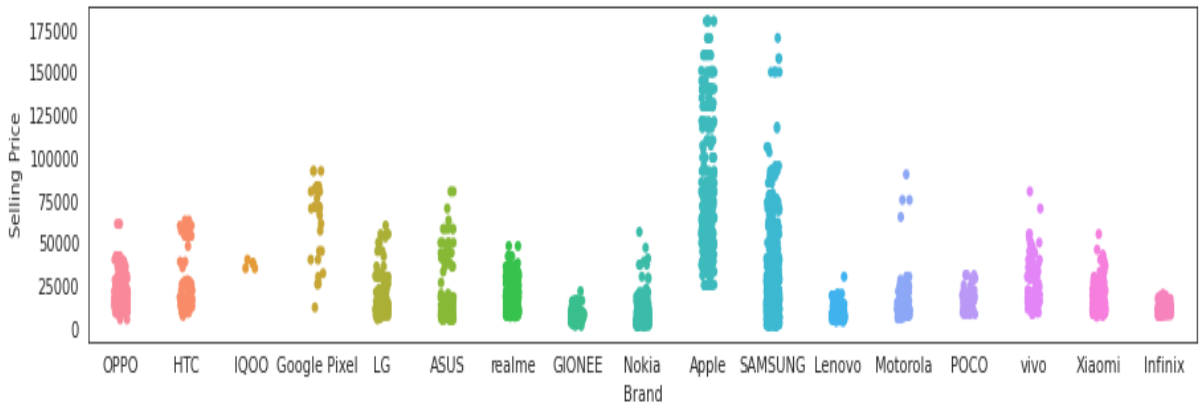
7.12 <seaborn.axisgrid.FacetGrid at 0x7fcf38af0ed0>



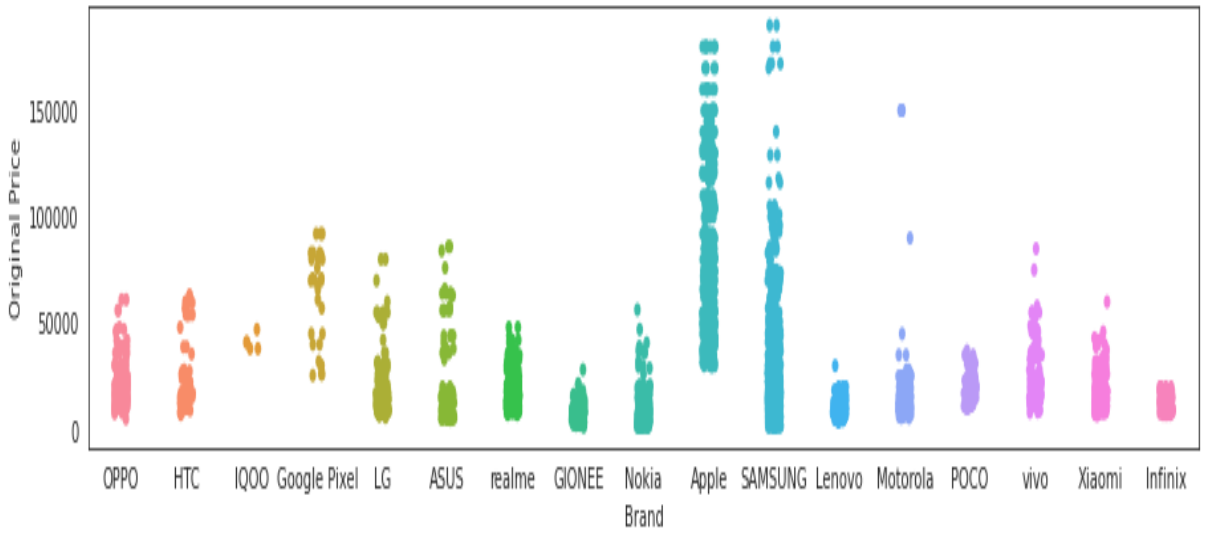
7.13 fig, ax = plt.subplots(figsize=(15,3)), ax=sns.countplot(x="Brand", data=df)



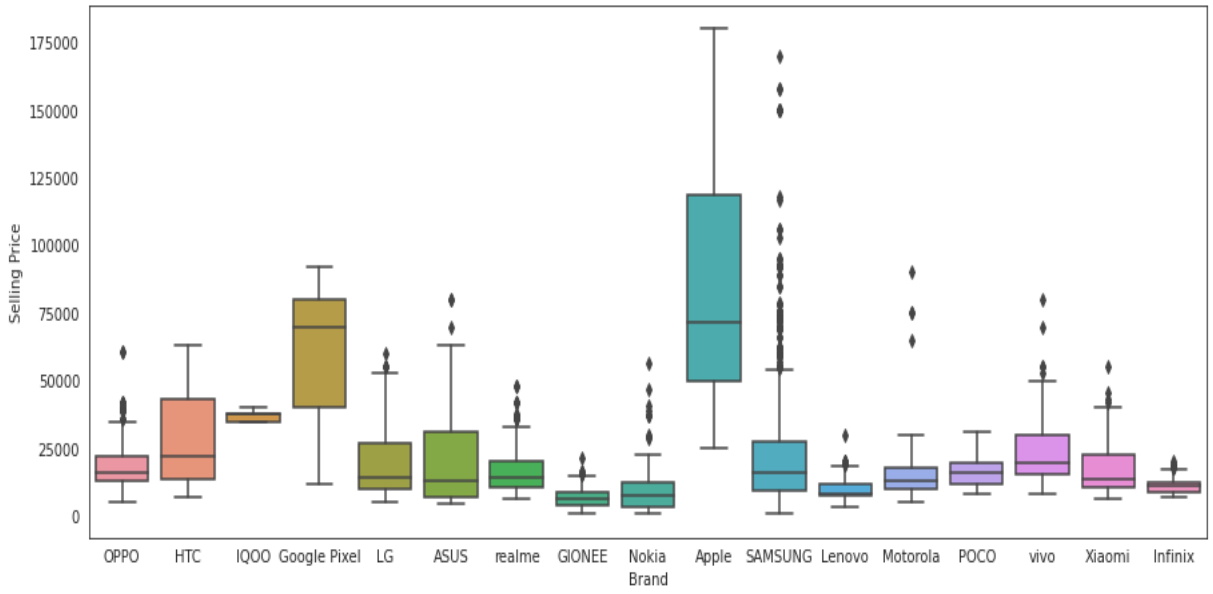
7.14 fig, ax = plt.subplots(figsize=(15,3))
ax = sns.stripplot(y="Rating", x="Brand", data=df)



7.15 fig, ax = plt.subplots(figsize=(15,3))
ax = sns.stripplot(y="Selling Price", x="Brand", data=df)



7.16 fig, ax = plt.subplots(figsize=(15,3))
ax = sns.stripplot(y="Original Price", x="Brand", data=df)



7.17 fig, ax = plt.subplots(figsize=(15,6))
ax = sns.boxplot(x="Brand", y="Selling Price", data=df)

7.18 round(df.groupby('Brand')['Selling Price’].mean(),0).sort_values(ascending)

```
Brand

Apple           81986.0
Google Pixel    61392.0
IQOO            37190.0
HTC             28314.0
SAMSUNG         24296.0
vivo            23866.0
ASUS            20327.0
LG              19323.0
OPPO            18560.0
Xiaomi          16942.0
POCO            16871.0
realme          16397.0
Motorola        16357.0
Infinix         11092.0
Lenovo          10084.0
Nokia            9429.0
GIONEE           7135.0
Name: Selling Price, dtype: float64
```

CHAPTER 8

PROGRAM

Code:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as pltimport
seaborn as sns
import missingno as msno
df = pd.read_csv('')
df.shape()
df.head():
df.tail()
df.fillna(0).iloc[:3]
df.describe().T
df.dtypes
Df.dtypes
msno.bar(df,figsize=(6,3),color='magenta')
df['Brand'].groupby(df['Brand']).count().sort_values(ascending=False)
df['Brand'].groupby(df['Memory']).count().sort_values(ascending=Fals)
sns.set_style("white")
sns.pairplot(df, hue='Brand')
df.keys()
sns.displot(df, x= 'Selling
Price',bins=[5000,10000,15000,20000,25000,30000,35000,40000,5000,
60000,80000],
aspect=1.2,color='#fd6c9e')
sns.displot(df, x='Original
Price',bins=[5000,10000,15000,20000,25000,30000,35000,40000,50000,60000,80000],
```

```
aspect=1.2,color='#ff8243')
sns.displot(df, x='Selling Price',bins=5, hue='Brand',aspect=1.2)
fig, ax = plt.subplots(figsize=(15,3))ax=sns.countplot(x="Brand", data=df)
-
fig, ax = plt.subplots(figsize=(15,3))ax = sns.stripplot(y="Rating", x="Brand",data=df)
fig, ax = plt.subplots(figsize=(15,3))ax = sns.stripplot(y="Selling Price", x="Brand",
data=df)
fig, ax = plt.subplots(figsize=(15,3))ax = sns.stripplot(y="Original Price", x="Brand",
data=df)
fig, ax = plt.subplots(figsize=(15,6))ax = sns.boxplot(x="Brand", y="Selling Price",
data=df)
round(df.groupby('Brand')['Selling Price'].mean(),0).sort_values(ascending=False)
```

CHAPTER 9
CONCLUSION

This exploration into Flipkart's mobile phone sales trends has served as a guiding light, unveiling the intricate details of consumer preferences and the dynamic nature of market dynamics. Using Exploratory Data Analysis (EDA), we dissected a labyrinth of information to reveal the beating heart of what customers desire and how the market shifts.

The conclusions drawn from this deep dive resonate with transformational potential. Data analysis emerges as a compass, guiding companies through the ever-evolving landscape of customer demands and technological advancements. The insights gleaned from deciphering these trends extend beyond merely painting a picture of market behaviors; they offer stakeholders invaluable guidance in adapting and thriving in a world where consumer-driven change is swift and relentless.

CHAPTER 10

REFERENCE

[1] Flipkart Mobiles | EDA, Python Dataset, by DEVASHREE MADHUGIRI(2022)
Flipkart Mobiles | EDA | Kaggle
https://www.kaggle.com/code/devsubhash/flipkart-mobiles-eda

[2] Explaratory Data Analysis (STS-1) by Shubham Bathwal
Flipkart EDA - STATISTICS ASSIGNMENT (STS-I) PRESENTED BY, SHUBHAM BATHWAL EXPLARATORY DATA ANALYSIS - Studocu

https://www.studocu.com/in/document/savitribai-phule-pune-university/mba-credit-pattern/flipkart-eda/51192742

[3] Flipkart product recommendation system
https://jespublication.com/upload/2020-110470.pdf

[4] Graph Neural Network for Smartphone Recommendation System: A Sentiment Analysis Approach for Smartphone Rating, January 2023
(PDF) Graph Neural Network for Smartphone Recommendation System: A Sentiment Analysis Approach for Smartphone Rating (researchgate.net)
https://www.researchgate.net/publication/376365760_Graph_Neural_Network_for_Smartphone_Recommendation_System_A_Sentiment_Analysis_Approach_for_Smartphone_Rating

[5] Mobile Recommendation System Using Mapreduce Publisher: IEEE
Published in: **2021 6th International Conference on Communication and Electronics Systems (ICCES)**

Mobile Recommendation System Using Mapreduce | IEEE Conference Publication | IEEE Xplore

https://ieeexplore.ieee.org/document/9489212

[6] Case Study: Flipkart: Making its Cart Bigger Through Acquisitions(2018) https://www.researchgate.net/publication/343058642_Case_Study_Flipkart_Making_its_Cart_Bigger_Through_Acquisitions

[7] Sentiment Analysis of Amazon Smartphone Reviews Using Machine Learning & Deep leaning (2022
https://ieeexplore.ieee.org/document/9915917)