

# **FUTURE SALES PREDICTION**

**723721243034: MUKILAN M**

## **Phase 4 Submission Document**

**Project:** Future Sales Prediction



### **Introduction:**

"In today's dynamic business landscape, the ability to predict future sales is a critical component of strategic decision-making. Accurate sales forecasts enable organizations to allocate resources, plan inventory, and develop effective marketing strategies. In this report, we will delve into the methods, data analysis, and key factors that contribute to forecasting future sales.

### **Here's an introduction to Future Sales prediction:**

1. Future sales prediction is a vital component of modern business strategy.

2. It involves a blend of data analytics, consumer behavior, and market trends.
3. Technology is rapidly transforming the sales prediction landscape.
4. Artificial intelligence and machine learning play a crucial role in enhancing accuracy.
5. Accurate sales forecasts aid inventory management and resource allocation.
6. Data-driven decision-making is reshaping the future of sales prediction, offering businesses unprecedented precision and strategic advantages.

#### **Content for Project Phase 4:**

Innovating stock price prediction by exploring regression techniques like Linear Regression for improved Prediction accuracy.

1. Fundamental Analysis is the process of forecasting a company's future profitability based on its current business environment and financial performance.
2. Technical analysis, on the other hand, entails reading charts and analyzing statistical data to identify stock market trends. Here we'll concentrate on the technical analysis.

#### **Data Source**

A good data source for prediction using deep learning should be Accurate, Complete, Covering the geographic area of interest, Accessible.

Dataset Link:(<https://www.kaggle.com/datasets/chakradharmattapalli/future-sales-prediction>)

The dataset contains several variables, including Sales, Radio , Tv, Newspaper.

A future sales prediction dataset typically consists of historical sales data, often organized by time periods, product categories, and geographical regions. It may include various relevant features such as pricing information, promotional activities, seasonal trends, and customer demographics. To enhance accuracy, additional data like economic indicators, competitor information, and social media sentiment may be incorporated. With advancements in machine learning and artificial intelligence, these datasets are growing in complexity, allowing

businesses to develop more precise predictive models. They serve as a foundation for training algorithms that forecast future sales, helping organizations optimize inventory, pricing, and marketing strategies.

A	B	C	D
TV	Radio	Newspaper	Sales
230.1	37.8	69.2	22.1
44.5	39.3	45.1	10.4
17.2	45.9	69.3	12
151.5	41.3	58.5	16.5
180.8	10.8	58.4	17.9
8.7	48.9	75	7.2
57.5	32.8	23.5	11.8
120.2	19.6	11.6	13.2
8.6	2.1	1	4.8
199.8	2.6	21.2	15.6
66.1	5.8	24.2	12.6
214.7	24	4	17.4
23.8	35.1	65.9	9.2
97.5	7.6	7.2	13.7
204.1	32.9	46	19
195.4	47.7	52.9	22.4
67.8	36.6	114	12.5
281.4	39.6	55.8	24.4
69.2	20.5	18.3	11.3
147.3	23.9	19.1	14.6
218.4	27.7	53.4	18
237.4	5.1	23.5	17.5
13.2	15.9	49.6	5.6
228.3	16.9	26.2	20.5
62.3	12.6	18.3	9.7
262.9	3.5	19.5	17
142.9	29.3	12.6	15
240.1	16.7	22.9	20.9
248.8	27.1	22.9	18.9
70.6	16	40.8	10.5

### Data Collection and Preprocessing:

- ❑ Importing the dataset: Obtain a comprehensive dataset containing relevant features.
- ❑ Data preprocessing: Clean the data by handling missing values, outliers, and categorical variables. Standardize or normalize numerical features.
- ❑ The date column has been formatted as per the coding requirement.

## **Exploratory Data Analysis (EDA):**

- Visualize and analyze the dataset to gain insights into the relationships between variables.
- Identify correlations and patterns that can inform feature selection and engineering.
- Present various data visualizations to gain insights into the dataset.
- Explore correlations between features and the target variable (Future Sales prediction).

## **Innovation:**

Innovating stock market prediction using linear regression is a challenging endeavour due to the inherent complexity of financial markets. While linear regression is a simple and interpretable method, innovating in this space involves employing it in novel ways and enhancing its capabilities

## **Program:**

```
#Import required packages
import pandas as pd
import numpy as np
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error, r2_score
import matplotlib.pyplot as plt
```

## **DATA LOADING:**

```
#importing required Dataset
data =pd.read_csv("C:/Users/MUKILAN/OneDrive/Documents/Sales.csv")
```

## Data

	TV	Radio	Newspaper	Sales
0	230.1	37.8	69.2	22.1
1	44.5	39.3	45.1	10.4
2	17.2	45.9	69.3	12.0
3	151.5	41.3	58.5	16.5
4	180.8	10.8	58.4	17.9
...	...	...	...	...
195	38.2	3.7	13.8	7.6
196	94.2	4.9	8.1	14.0
197	177.0	9.3	6.4	14.8
198	283.6	42.0	66.2	25.5
199	232.1	8.6	8.7	18.4

200 rows × 4 columns

### #training the model

```
X = data[["TV", 'Radio']]
```

```
y = data['Sales']
```

```
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2,  
random_state=42)
```

### # performing linear regression

```
model = LinearRegression()
```

```
model.fit(X_train, y_train)
```

```
y_pred = model.predict(X_test)
```

```
mse = mean_squared_error(y_test, y_pred)
```

```
r2 = r2_score(y_test, y_pred)
```

```
print(f'Mean Squared Error: {mse}')
```

```
print(f'R-squared: {r2}')
```

```
Mean Squared Error: 2.846616122131541
```

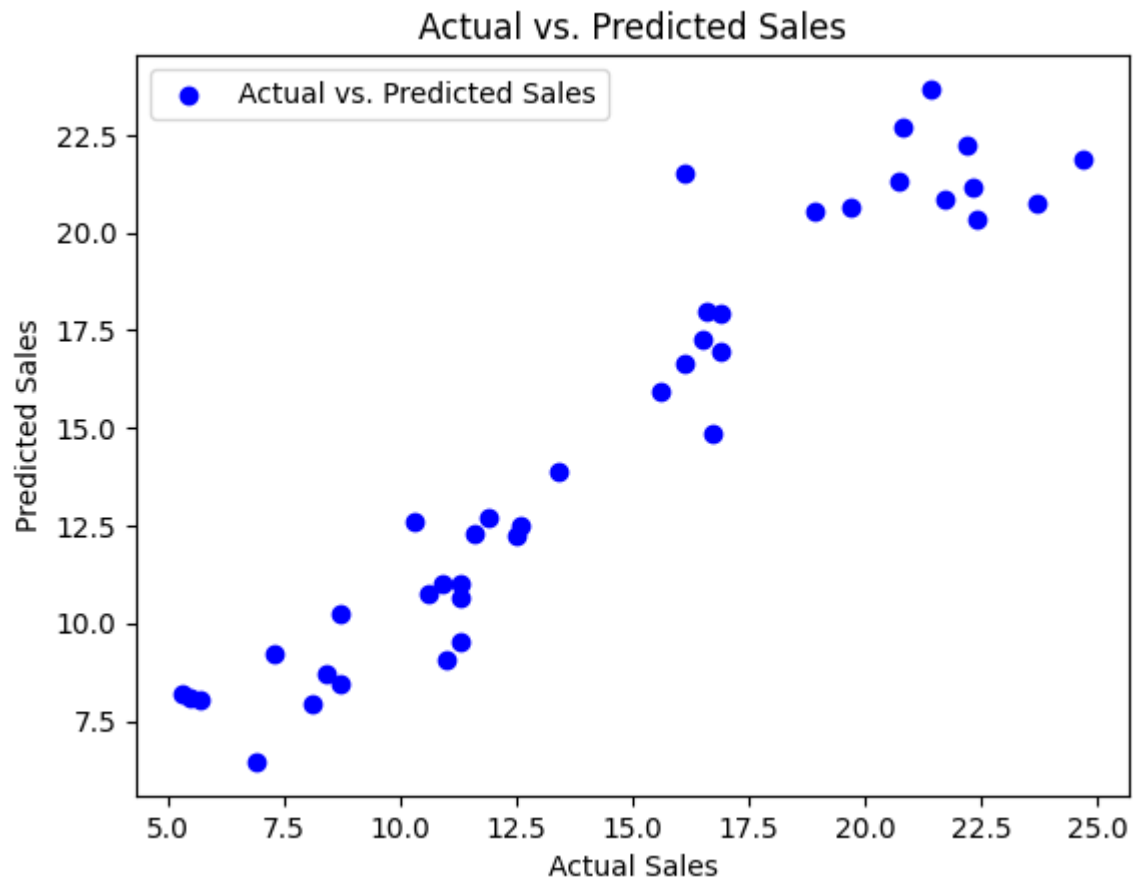
R-squared: 0.907879780262465

```
future_data = pd.DataFrame({'TV': [232.1], 'Radio': [8.6]})
future_sales_prediction = model.predict(future_data)
print(f"Predicted Future Sales: {future_sales_prediction[0]}")
```

Predicted Future Sales: 18.330556007348868

### **Plotting the Data**

```
plt.scatter(y_test, y_pred, color='blue', label='Actual vs. Predicted Sales')
plt.xlabel('Actual Sales')
plt.ylabel('Predicted Sales')
plt.title('Actual vs. Predicted Sales')
plt.legend()
plt.show()
```



### **Conclusion:**

The conclusion for future sales prediction is that accurate and effective sales forecasting is crucial for businesses to make informed decisions, allocate resources efficiently, and achieve their growth objectives. To improve future sales prediction, it's essential to leverage a combination of historical data analysis, market research, and advanced forecasting techniques, including

machine learning and predictive analytics. Furthermore, staying adaptable and continuously refining the forecasting models as new data becomes available is imperative to account for changing market dynamics and consumer behavior. By doing so, organizations can enhance their competitiveness and ensure they are well-prepared to navigate the ever-evolving landscape of sales and customer demand.