Task 1:

Description : Builds linear regression model ;which predicts sales based on the money spent on different platforms for marketing.

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import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import MinMaxScaler
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error, r2_score

data = pd.read_csv("/content/advertising.csv")

data.describe()

data.isnull().sum() #no nulls

#checking for outliers
plt.boxplot(data["TV"])
plt.show()
print("\n")
plt.boxplot(data["Radio"])
print("\n")
plt.boxplot(data["Newspaper"])
print("\n")
plt.boxplot(data["Sales"])
print("\n")
#not much outliers

#plotting heatmap to see corelations of the variables
corelation = data.corr()
plt.figure(figsize=(20,20))
sns.heatmap(corelation , annot=True)
plt.show()
#here we can see that tv and sales are highly coorelated so we will perform linear regression on it with x as tv and y as sales

#splitting data in train and test sets
x = data['TV']
y = data['Sales']
#20% testing and 80% training
X_train , X_test , y_train , y_test = train_test_split(x,y,test_size=0.2)
```

```
#normalising
scaler = MinMaxScaler()
X_train = scaler.fit_transform(np.array(X_train).reshape(-1, 1))
X_test = scaler.transform(np.array(X_test).reshape(-1, 1))
#applying linear regression
lr = LinearRegression()
lr.fit(X_train, y_train)
pred = lr.predict(X_test)
plt.scatter(X_test, y_test, color='blue', label='Actual')

# Line plot of predicted values
plt.plot(X_test, pred, color='red', linewidth=2, label='Predicted')

# Set labels and title
plt.xlabel('TV')
plt.ylabel('Sales')
plt.title('Linear Regression')

# Display legend
plt.legend()

# Show the plot
plt.show()

#Evaluate the model's performance on the testing data using metrics such as mean squared
error (MSE) or R-squared.
mse = mean_squared_error(y_test, pred)
r_square = r2_score(y_test, pred)
print('Mean Squared Error: ', mse)
print('R-square: ', r_square)
#0.854 r square shows that 85.4% of the variability in the dependent variable is explained by the
independent variable.
```

Task 2:
Ejaz Store

1. How many customers visit your business each day?

   Around 70 to 100.

2. What are the peak hours of customer footfall?

In morning around 10am to 12pm and in afternoon around 5pm to 7pm

3. How many repeat customers do you have?

   Almost 80 to 90 percent of customers are repeated as the shop is located in a society so people living within the society are customers

4. What is the average transaction value per customer?

   500-1000 rupees

5. How do you currently attract new customers?

   By keeping variety of the products

6. Are you aware of your customer demographics?

   No not much

7. Do you collect customer feedback or reviews?

   Yes if a customer wants to give any review or feedback we listen to them so we can improve our product and services accordingly because our first priority is our customers

8. How do you currently market your business locally?

   We have the board on main road which store have our store’s name

9. Are you utilizing any loyalty programs or discounts?

   We dont give discounts but we maintain a credit register for our regular customers and sometimes we even give products on credit to trusted regular customers

10. What are the main factors influencing customer buying decisions?

    Quality and the variety of products

11. Do you track customer satisfaction levels?

    We don't

12. Are you aware of your competition in the local market?

    Yes and our goal is to provide a wide range of essential products and everyday items to meet the needs of our customers in a convenient and accessible manner.

13. How do you currently measure the success of your marketing efforts?

By looking at the sales per month

14. Are there any specific challenges you face in the local market?

    Due to inflammation the increase in prices of some items have dropped the customer demand for that product

15. Are you open to exploring new marketing strategies or partnerships to grow your local customer base?

    No

16. What kind of data do you currently collect about your customers?

    Name , contact number and their address

17. How do you store and manage your data?

    We use registers

18. Are you utilizing any data analysis tools or software?

    No

19. How often do you analyze your data to gain insights about your business?

    monthly

20. Do you have a dedicated data team or person responsible for data analysis?

    No

Task 3:

Here is screenshot of the story i posted on my instagram