SALES FORECAST, PURCHASE FORECAST

MARKETING FORCAST

MINI PROJECT REPORT

Submitted by

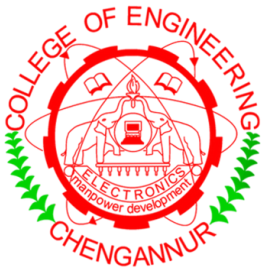
FATHIMATHU ALEESHSHA
CHN23MCA2032

to

APJ Abdul Kalam Technological University

in partial fulfillment of the requirements for the award of Degree in

Master of Computer Application



DEPARTMENT OF COMPUTER ENGINEERING

COLLEGE OF ENGINEERING CHENGANNUR, ALAPPUZHA

NOVEMBER 2024

DEPARTMENT OF COMPUTER ENGINEERING

COLLEGE OF ENGINEERING CHENGANNUR

ALAPPUZHA

CERTIFICATE

This is to certify that the project report titled ***Sales , Purchase, Market forecasting*** *is a Bonafide record of the* ***CHN23MCA MINI PROJECT*** *presented by (CHN23MCA2032), Fourth Semester* ***FATHIMATHU ALEESHA*** *OF Master of Computer Application student, under my guidance and supervision. This mini project is submitted in partial fulfillment of the requirements for the award of the degree* ***Master of Computer Application*** *of* ***APJ Abdul Kalam Technological University****.*

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DECLARATION

I undersigned hereby declare that the project report "**Sales, Purchase, Market forecasting"-** , submitted for partial fulfillment of the requirements for the award of degree of Master of Computer Application of the APJ Abdul Kalam Technological University, Kerala is a Bonafide work done by us under the supervision of **Smt. Angel Thankam Thomas** ,Assistant Professor, Department of Computer Engineering as project Guide , **Ameena A** Project Coordinator and **Gopakumar G** Head of the department. This submission represents my ideas in my own words, and where ideas or words of others have been included, I have adequately and accurately cited and referenced the original sources. I also declare that I have adhered to the ethics of academic honesty and integrity and have not misrepresented or fabricated any data or idea or fact or source in our submission.

I understand that any violation of the above will be a cause for disciplinary action by the institute and/or the University and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been obtained. This report has not been previously formed the basis for the award of any degree, diploma, or similar title of any other University.

Place: Chengannur **FATHIMATHU AEESHA**

Date : 08/11/2024 **CHN23MCA2032**

ACKNOWLEDGEMENT

This work would not have been possible without the support of many people. First and foremost, I give thanks to Almighty God who gave me the inner strength, resources, and ability to complete my project successfully.

I would like to thank **Dr. Smitha Dharan**, The Principal College of Engineering Chengannur, for providing the best facilities and atmosphere for the project completion and presentation. Special thanks also go to HOD **Gopakumar G**, Associate Professor, Department of Computer Engineering, for her exceptional support, guidance, and encouragement throughout the project. I would also like to thank our project coordinator, **Smt. Angel Thankam Thomas**, Assistant Professor, Department of Computer Engineering who also took on the role of my project guide, for their extended help and support during the project.

I would like to thank my dear friends and faculties for extending their cooperation and encouragement throughout the project work, without which I would never have completed the project this well. Thank you all for your love and for being very understanding.

FATHIMATHU ALEESHA

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ABSTRACT

Machine learning (ML) can greatly enhance the analysis of sales, purchases, and marketing by extracting meaningful patterns from data, predicting trends, and optimizing decision-making processes.

Sales Analysis to predict future sales based on historical data and external factors, in sales identify distinct customer segments based on purchasing behavior, demographics, and preferences.

Purchases analysis used for demand Forecasting Similar to sales forecasting, Machine learning models predict demand for inventory management to avoid overstocking or stockouts. Supplier Risk Analysis: Using Machine learning algorithms to evaluate supplier performance by analyzing data points related to delivery times, product quality, and reliability Analyzing purchasing patterns to identify cost-saving opportunities, such as bulk purchasing or alternative suppliers.

Marketing Analysis Targeted Marketing Campaigns: Using Machine Learning models to personalize marketing efforts by predicting which customers are most likely to respond to certain campaigns.

Machine learning can be used to analyze customer feedback, reviews, and social media posts to understand customer sentiment toward products or services. Machine leatning helps predict the long-term value of a customer using models that analyze purchasing history, frequency, and other key metrics.

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INTRODUCTION

Project Area

The main project area to cover Analyzing Sales, Purchase and Marketing using machine leaning language.

Objectives

1. **Implementation of ML Technology:** Sales tracking by Machine language
2. **Development of Advertiser Dashboard:** Developed dash board to display Sales, Purchasing , marketing data.
3. **Enhancement of Stakeholders Engagement:** To create immersive and interactive Machine learning experiences that enhance stake holders engagement and understanding of Sales, Purchase and Marketing products .
4. **Disruption of Traditional Marketing Methods:** To disrupt traditional marketing methods by offering innovative solutions that transform sales, purchase and marketing practices.

Problem Definition and Motivations

Existing System.

Defining a problem in machine learning is one of the most crucial steps in developing a successful model. This step sets the scope, approach, and metrics for evaluating solutions. Here's a breakdown of key aspects to consider in problem definition for machine learning.

The existing system for traditional sales that primarily relies on traditional methods.

The existing system uses traditional purchasing practices.

These static marketing techniques are limited in their ability to engage audiences and provide interactive experiences.

Define the data requirements for the model, including feature selection, data quality, and quantity.

Consider if the data is already available or if it needs to be collected or synthesized. Address data privacy and security concerns as necessary

Limitations

- Limited interactivity: Traditional sales offer limited opportunities for interaction with consumers, resulting in passive advertising experiences.
- Limited stock due to traditional purchasing practices.
- Ineffective measurement: Measuring the effectiveness of traditional marketing advertisements can be challenging, as it relies on indirect methods such as surveys and sales data, which may not provide accurate or real-time insights.

LITERATURE REVIEW

1. General Machine Learning

"Pattern Recognition and Machine Learning" by Christopher Bishop

- A comprehensive introduction to probabilistic graphical models and foundational ML techniques. Recommended for readers who want a solid theoretical understanding.

"Machine Learning: A Probabilistic Perspective" by Kevin P. Murphy

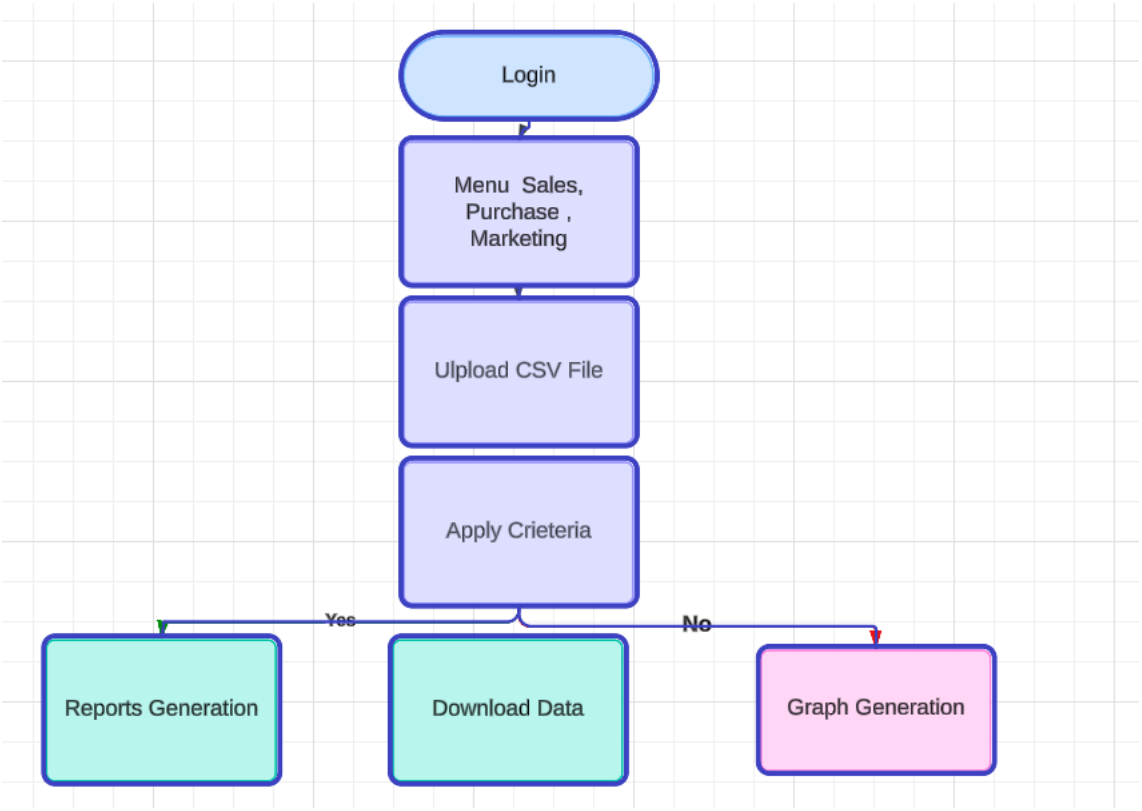
- Covers ML methods through the lens of probability and statistics, with a strong emphasis on Bayesian approaches. It's more math-intensive but widely regarded as a core text.

2."Understanding Machine Learning: From Theory to Algorithms" by Shai Shalev-Shwartz and Shai Ben-David

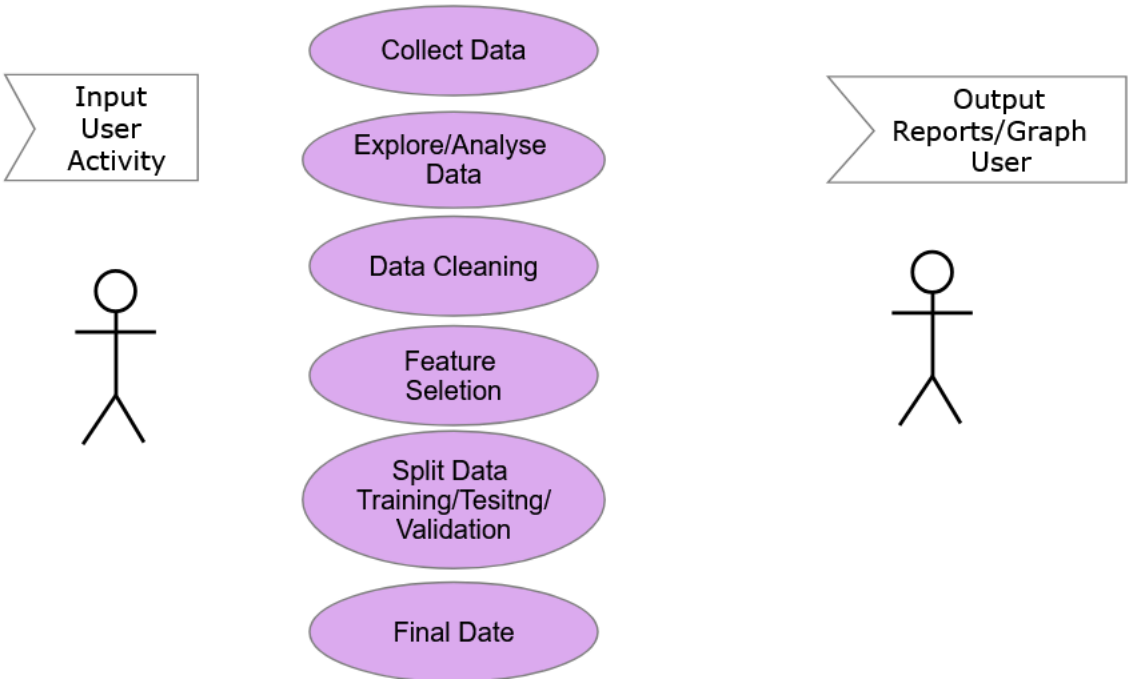
4."Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow" by Aurélien Géron

5. "Machine Learning Yearning" by Andrew Ng

DATA FLOW DIAGRAM



User Case Diagram



Problem Statement

To design and implement a solution that maximizes management interactions.

Proposed System

Aims to revolutionize traditional sales, purchase and marketing practices,. Key features of the proposed model include:

Hardware Requirements

- **Processor:** Octa-core (or higher) processor with support for ARM64 architecture.
- **Memory (RAM):** At least 8 GB RAM or higher.
- **Storage:** Minimum 200 GB internal storage.

Software Requirements

- **Pycham.**
- **Chrome Browser**
- **Python Library pandas,matplotlib,numphy,streamlit**

Source Code

Main.py

```
import streamlit as st
        ### Page Setup
        admim_page = st.Page(
            page="admin.py",
            title= "Admin Page",
            default=True,
        )
        sales_page = st.Page(
```

```
    page="exceldataset.py",
    title="Sales Page",
)
purchase_page = st.Page(
    page="purchase.py",
    title="Purchase Page",
)
marketing_page = st.Page(
    page="marketing.py",
    title="Marketing Page",
)

about_page = st.Page(
    page="about.py",
    title = "About Project",
)
##pg=st.navigation(pages=[admim_page,sales_page,purchase_p
age,marketing_page,about_page])
##pg.run()
pg=st.navigation(
    {
        "info":[admim_page],

"Projects":[sales_page,purchase_page,marketing_page,about_pa
ge],
    }
)
pg.run()
```

sales.py

```
import time
    import concurrent.futures
    import streamlit as st
    from streamlit.runtime.scriptrunner import add_script_run_ctx
    import flet as ft
    import plotly.express as px
```

```
import pandas as pd
import os
import warnings
import sys
warnings.filterwarnings('ignore')
st.set_page_config(page_title="Super Market Project ",
page_icon=":bar_chart:",layout="wide")
st.title(" :bar_chart:  Super Market Project by Fathimathu
Aleesha")
st.markdown('<style> div.block.container {padding-top:1rem;}
</style>',unsafe_allow_html=True)
fl = st.file_uploader("file_folder: Upload a
File",type=(["csv","txt","xlsx","xls"]))
if fl is not None:
    filename = fl.name
    st.write(filename)
    df = pd.read_csv(filename,encoding="ANSI")
else:
    os.chdir(r"C:\My Laptop\Munna Notes\MCA\Sem 3\Study
Materials\Mini
Project\SalesPurchaseMarketing\pythonProject1")
    df = pd.read_csv("Superstore1.csv",encoding="ANSI")
    # "ISO-8859-1"
    col1, col2 = st.columns((2))
    df["Order Date"] = pd.to_datetime(df["Order Date"])
    # Getting the MIn and Max Date
    startDate = pd.to_datetime(df["Order Date"]).min()
    endDate   = pd.to_datetime(df["Order Date"]).max()
    with col1:
        date1 = pd.to_datetime(st.date_input("Start Date
",startDate))
    with col2:
        date2 = pd.to_datetime(st.date_input("End Date",endDate))
    df = df[(df["Order Date"] >= date1) & (df["Order Date"] <=
date2)].copy()
    # Side bar filter
```

```
    st.sidebar.header("Choose your filter:")
    region= st.sidebar.multiselect("Pick Your Region",
df["Region"].unique())
    ##  create for region
    if not region:
        df2=df.copy()
    else:
        df2=df[df["Region"].isin(region)]
    ## create for State
    state=st.sidebar.multiselect("Pick the
State",df2["State"].unique())
    if not state:
        df3=df2.copy()
    else:
        df3=df2[df2["State"].isin(state)]
    ## create for city
    city = st.sidebar.multiselect("Pick the City",
df3["City"].unique())
    ## Filter based on Region , state and city
    if not region and not state and not city:
        filtered_df = df
    elif not state and not city:
        filtered_df = df[df["Region"].isin(region)]
    elif not region and not city:
        filtered_df = df[df["State"].isin(state)]
    elif state and city:
        filtered_df = df3[df["State"].isin(state) &
df3["City"].isin(city)]
    elif region and city:
        filtered_df= df3[df3[df["Region"].isin(region) &
df3["City"].isin(city)]]
    elif region and state:
        filtered_df = df3[df["Region"].isin (region) &
df3["State"].isin(state)]
    elif city:
        filtered_df = df3[df3["City"].isin(city)]
```

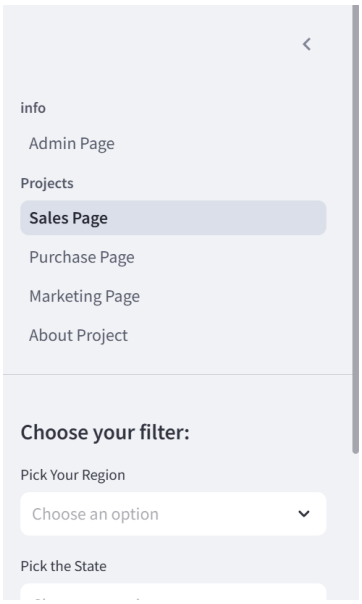
```
    else:
        filtered_df = df3[df3["Region"].isin(region) &
df3["state"],isin(state) & df3["City"].isin(city)]

        #  ok 08-10-2024
    category_df = filtered_df.groupby (by=["Category"],
as_index = False )["Sales"].sum()
    with col1:
        st.subheader("Category Wise Sales")
        fig=px.bar(category_df,x="Category",y="Sales", text=
['${:,.2f}'.format(x) for x in category_df["Sales"]],template=
"seaborn")
        st.plotly_chart(fig,use_container_width=True,height =200)
        with col2:
         st.subheader("Category wise Sales")
         fig=px.pie(filtered_df , values= "Sales" , names =
"Region", hole =0.5)
         fig.update_traces(text = filtered_df
["Region"],textposition="outside")
         st.plotly_chart(fig,use_container_width=True)
         # Download data Codet
         cl1,cl2 = st.columns(2)
    with cl1:
        with st.expander("Category_View Data"):

st.write(category_df.style.background_gradient(cmap="Blues"))
            csv = category_df.to_csv(index=False).encode('utf-8')
            st.download_button("Download Data",data= csv,
file_name = "Category.csv",mime="text/csv",
                               help="Click Here to Download the data as a
CSV file")
    with cl2:
        with st.expander("Region_View Data"):
           region = filtered_df.groupby (by="Region",as_index=
False)["Sales"].sum()
```

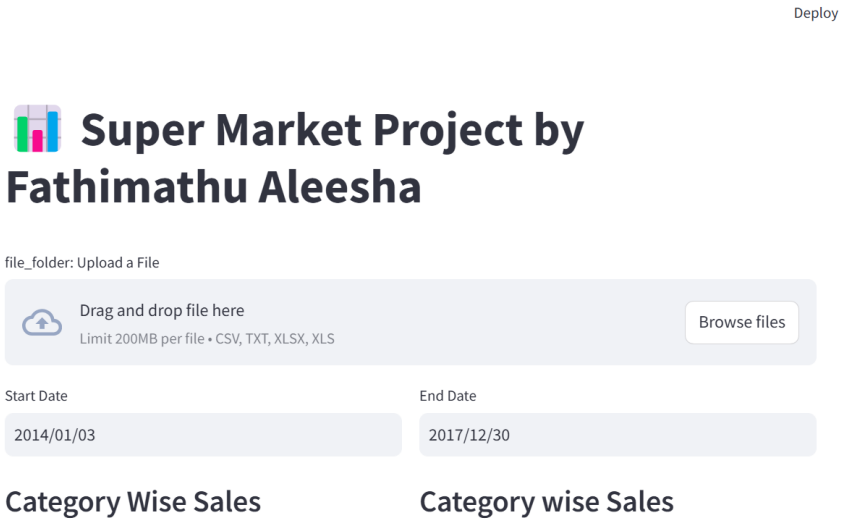
```
st.write(region.style.background_gradient(cmap="Oranges"))
        csv = region.to_csv(index=False).encode('utf-8')
        st.download_button("Download Data", data=csv,
file_name="Region.csv", mime="text/csv",
                    help="Click Here to Download the data as a
CSV file")
### Time series analysis
   filtered_df["month_year"]=filtered_df["Order
Date"].dt.to_period("M")
   st.subheader('Time Series Analysis')
   linechart =
pd.DataFrame(filtered_df.groupby(filtered_df["month_year"].dt
.strftime("%Y : %b"))["Sales"].sum()).reset_index()
   fig2=px.line(linechart, x="month_year",y="Sales",labels=
{"Sales": "Amount"},height=500,width
=1000,template="gridon")
   st.plotly_chart(fig2,use_container_width=True)
   ### Download time series data
   with st.expander("View Data of Time Series"):

st.write(linechart.T.style.background_gradient(cmap="Blues"))
      csv=linechart.to_csv(index=False).encode("utf=8")
      st.download_button('Download
Data',data=csv,file_name="TimeSeries.csv")
#### Create a tree based on Region , Category,sub-cateogory
   st.subheader("Hierarchical view of Sales using tree map")
   fig3 = px.treemap(filtered_df,path
=["Region","Category","Sub-Category"],values= "Sales",
                  hover_data=["Sales"],color= "Sub-Category")
   fig3.update_layout(width = 800, height = 650)
   st.plotly_chart(fig3,use_container_width= True)

 ##  Segment wise Sales
   chart1, chart2  = st.columns((2))
   with chart1:
      st.subheader("Segment WIse Sales")
```

```
        fig = px.pie(filtered_df, values="Sales",
names="Segment", template="plotly_dark")

fig.update_traces(text=filtered_df["Segment"],textposition="insi
de")
        st.plotly_chart(fig,use_container_width=True)
    ##  Category wise Sales
    with chart2:
        st.subheader("Category Wise Sales")
        fig = px.pie(filtered_df, values="Sales",
names="Category", template="gridon")
        fig.update_traces(text=filtered_df["Category"],
textposition="inside")
        st.plotly_chart(fig, use_container_width=True)
    ### Show table data in month wise Sales Sammary
    import plotly.figure_factory as ff
    st.subheader(":point_right: Month wise Sub-Category Sales
Summary")
    with st.expander("Summary Table"):
        df_sample = df[0:5]
[["Region","State","City","Category","Sales","Profit","Quantity
"]]
        fig = ff.create_table(df_sample,colorscale="Cividis")
        st.plotly_chart(fig, use_container_width=True)
###  SHow hcategory wise sales
        st.markdown("Month wise sub-Category Table")
        filtered_df["month"]=filtered_df["Order
Date"].dt.month_name()
        sub_category_Year =
pd.pivot_table(data=filtered_df,values="Sales",index=["Sub-
Category"],columns="month")

st.write(sub_category_Year.style.background_gradient(cmap="
Blues"))

## Scatter polotter SHow the relatioship between Sales and
```

```
Profit
data1 =
px.scatter(filtered_df,x="Sales",y="Profit",size="Quantity")
data1['layout'].update(title="Relationship between Sales and
Profit using Scatter Plot.",
                    titlefont= dict(size=20),xaxis =
dict(title="Sales",titlefont=dict(size=19)),
                    yaxis=dict(title= "Profit",titlefont=
dict(size=19)))
st.plotly_chart(data1,use_container_width=True)
## View Sacattered Plet Data in Table
with  st.expander("View Data"):

st.write(filtered_df.iloc[:500,1:20:2].style.background_gradient(
cmap="Oranges"))
## Download the data set
csv= df.to_csv(index=False).encode('utf-8')
st.download_button('Download Data',data =
csv,file_name="Data.csv")
```

Screen shorts

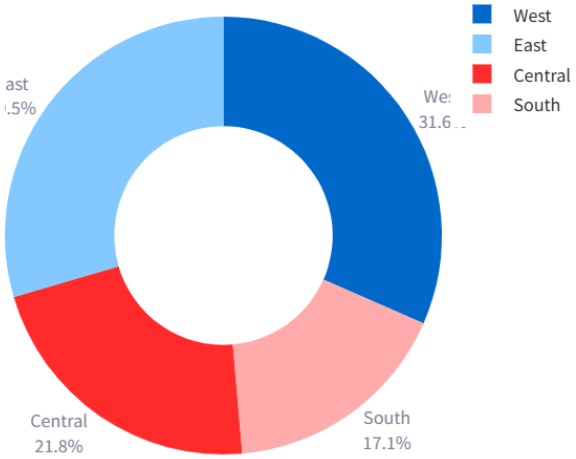


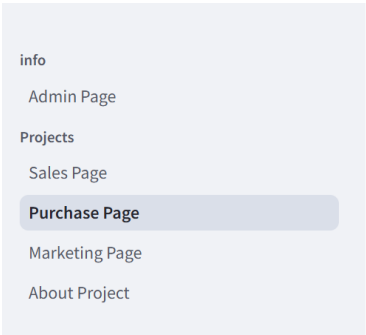


Deploy

Category Wise Sales

Category wise Sales



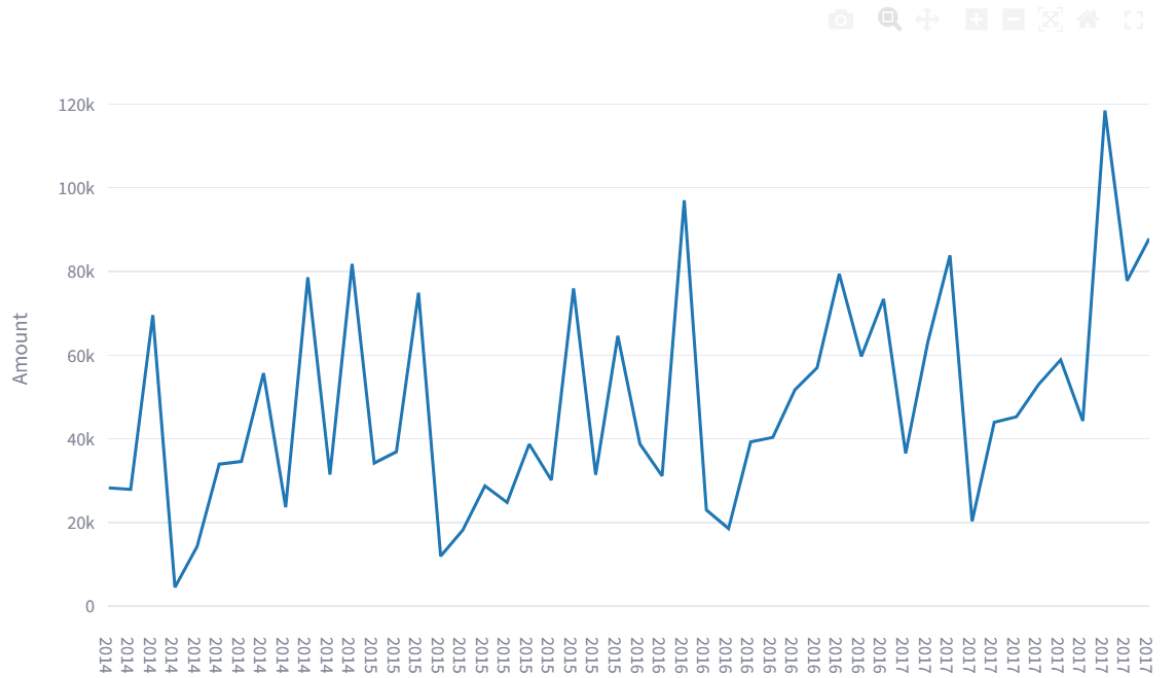


Super Market Project by Purchase Fathimathu Aleesha

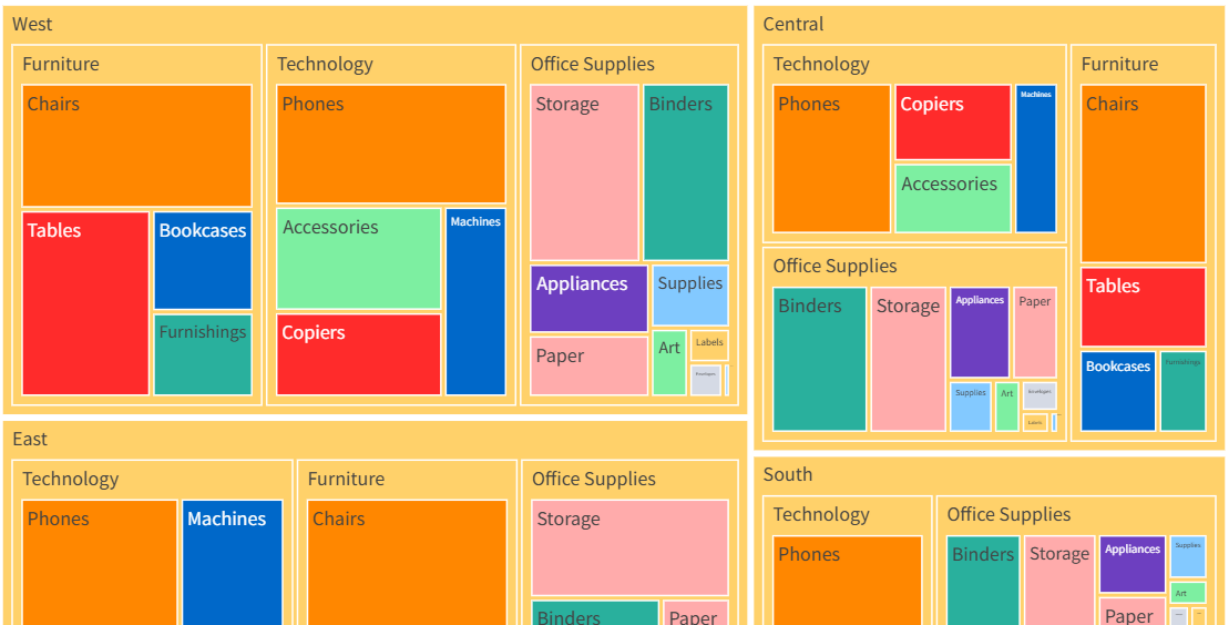
file_folder: Upload a File

Drag and drop file here
Limit 200MB per file • CSV, TXT, XLSX, XLS
Browse files

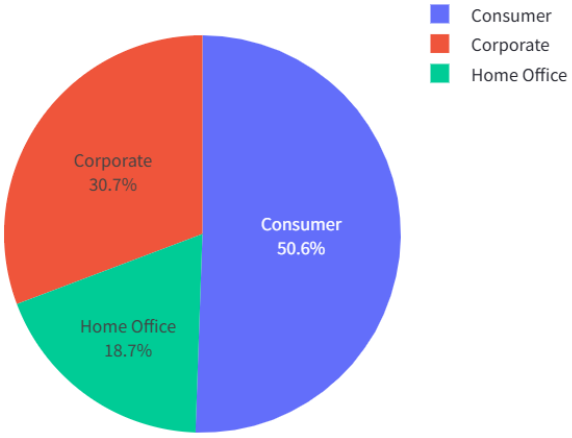
Time Series Analysis



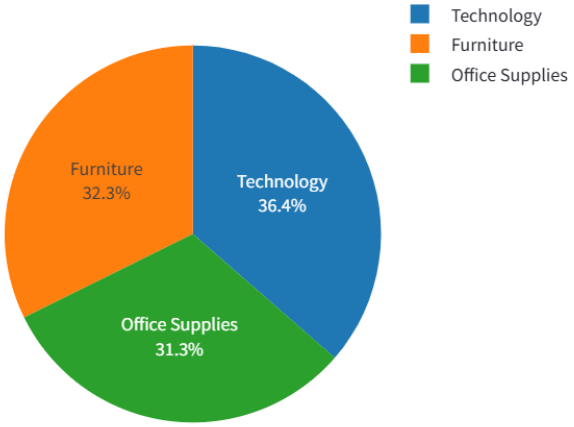
Hierarchical view of Sales using tree map



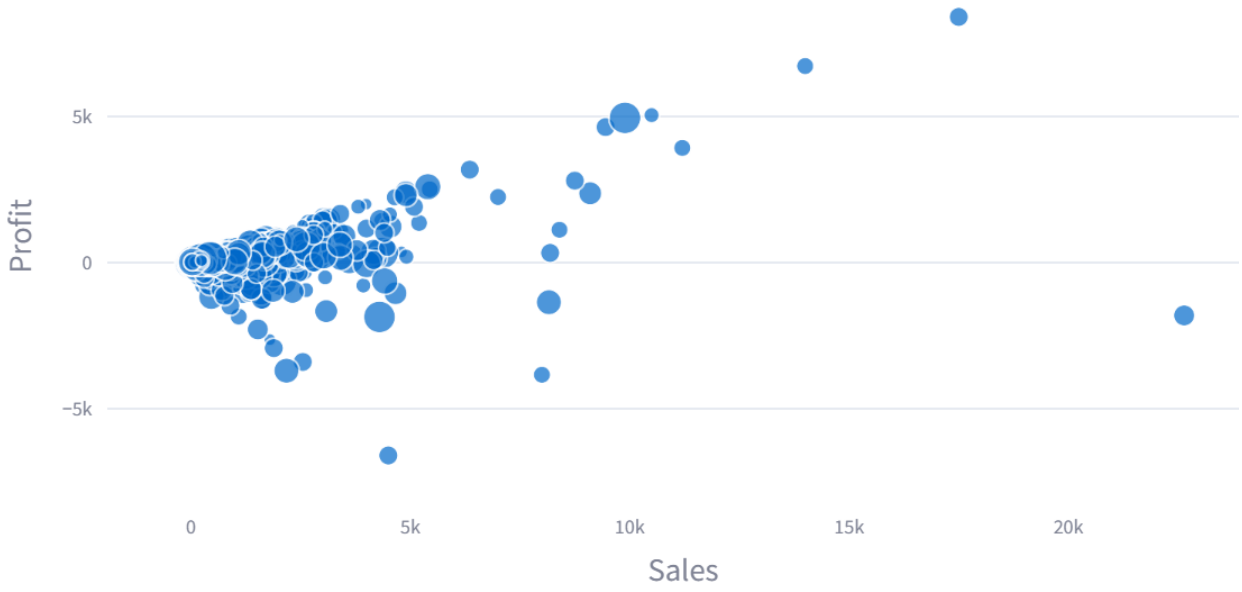
Segment WIse Sales

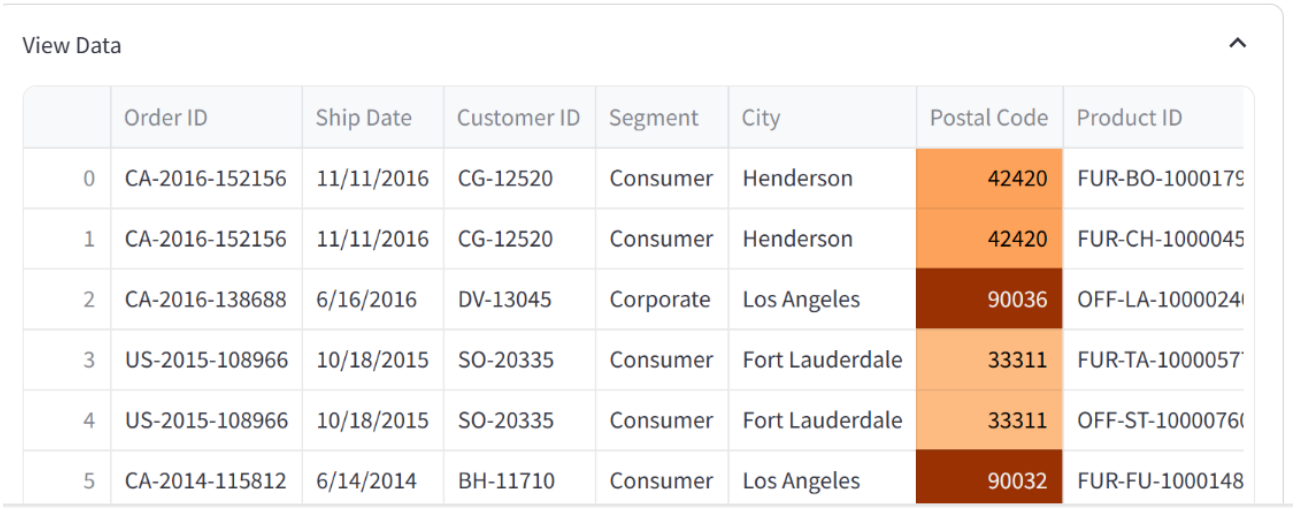


Category Wise Sales



Relationship between Sales and Profit using Scatter Plot.




View Data

	Order ID	Ship Date	Customer ID	Segment	City	Postal Code	Product ID
0	CA-2016-152156	11/11/2016	CG-12520	Consumer	Henderson	42420	FUR-BO-1000179
1	CA-2016-152156	11/11/2016	CG-12520	Consumer	Henderson	42420	FUR-CH-1000045
2	CA-2016-138688	6/16/2016	DV-13045	Corporate	Los Angeles	90036	OFF-LA-1000024
3	US-2015-108966	10/18/2015	SO-20335	Consumer	Fort Lauderdale	33311	FUR-TA-1000057
4	US-2015-108966	10/18/2015	SO-20335	Consumer	Fort Lauderdale	33311	OFF-ST-1000076
5	CA-2014-115812	6/14/2014	BH-11710	Consumer	Los Angeles	90032	FUR-FU-1000148

Testing

Unit Testing

Unit testing includes collecting data, explore and analyzing data, data cleaning.

Test Case ID	Test Case	Test Case Name	Steps	Pass/Fail
1	Collect Data	Pre-processing	No Problem in Data	Pass
2	Explore and Analyze Data	Pre-Processing	No Duplication Data	Pass
3	Data Cleaning	Pre-processing	Remove all glitches in Data	Pass
4	Data Transformation	Data transform into CSV file	Converted from XLS to CSV	Pass
4	Feature Selection	Filter/Wrapper/Embedded	Filter Completed	Pass
5	Split Data into Training Set	60-70% of the data for training	Split the data for Model	Pass
6	Split data Validation Set	15-20% of the data for Validation	Split the data for Validation	Pass
7	Split Data Test Sets	15-20% of thefor Test Data Set	Split the data for Testing	Pass

System Testing

System testing includes uploading data, view data, download, reports, graph etc. System testing helps identify any inconsistencies or deviations from expected behavior and ensures that the platform functions reliably across different types of dates

System Test Case Result

Test Case ID	Test Case Name	Description	Expected Result	Pass/Fail
1	Uploading Data Set	Upload CSV file	Visualize the data in Browser	Pass
2	View Data of Sales	Upload CSV file	Data Viewed in Browser	Pass
3	Download Data	Download Data	Download Data to Local folder	Pass
4	Reports Generation	Report Generation on Crieteria	Report Viewed in Broser	Pass
4	Graph generated	Scatter /Heirachichial View graph	Graph Viwed in Browser	Pass
5	Time Series Analysis	Time Sereis Graph	Graph Viwed in Browser	Pass
6	Purchase data	Viwed the the data	Data and Graph viewed in Browser	Pass
7	Marketing Data	Viwed the the data	Data and Grpah viewed in Browser	Pass

CONCLUSION AND FUTURE SCOPE

The development of the Sales, Purchasing and marketing in machine learning platform represents a significant advancement in SALES. By seamlessly integrating digital content with enhancing the sales there by increase the market share of products. The platform enhances user engagement and provides a more immersive experience for both customers and suppliers.

The implementation of Reports and Graph generation and features enhance sakes and costing materials in real-time.

Moving forward, this reporting system platform has the potential to revolutionize traditional marketing methods by offering innovative solutions for sales and purchase.

This Machine learning platform represents a significant step forward in the convergence of digital and physical for supermarkets realms, providing a glimpse into the future of in the digital age.

REFERENCES

1. **"Machine Learning: A Probabilistic Perspective" by Kevin P. Murphy**
   This book gives a comprehensive view of machine learning, emphasizing a probabilistic approach.
2. **"Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow" by Aurélien Géron**
   A practical, beginner-friendly guide with a focus on Python and popular libraries for hands-on implementation.
3. **"A Few Useful Things to Know About Machine Learning" by Pedro Domingos**
   An excellent overview of core machine learning concepts and practical insights.
4. **Scikit-Learn**: Scikit-Learn documentation is a go-to resource for understanding machine learning algorithms in Python.