APPENDIX 1

(SAMPLE CODE)

WEB INTERFACE CODE:

HTML:

```
<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="UTF-8" />
<meta name–"viewport" content–"width–device-width, initial-scale–1.0" />
<title>CLV PULSE</title>
<link rel="stylesheet" href="./style.css" />
</head>
<body>
<header>
<h1 id="name">CLV PULSE - A DYNAMIC CUSTOMER LIFETIME VALUE
PREDICTOR</h1>
<h3><a href="https://5f53ec90ac242.site123.me/"
target="_blank">developedbyJOGLE</a></h3>
</header>
<main>
<section id="home">
<h1>
Dynamic Data
Processing(CDN:https://cloud.google.com/products/databases)
```

```
</h1>
<div id="plot-container">
<canvas id="plot1" width="300" height="200"></canvas>
</div>
<h1>Polar Area of Each segmentations</h1>
<div id="plot-container">
<canvas id="plot2" width="300" height="200"></canvas>
</div>
<h1>Analysis via Radar Data</h1>
<div id="plot-container">
<canvas id="plot3" width="300" height="200"></canvas>
</div>
<div id="analysis"></div>
</main>
<footer>
<ul class="social-links">
<li>
<a href="https://github.com/ARUNJOGLE"
><br />All Rights Reserved.</a
>
</footer>
<script
src="https://cdnjs.cloudflare.com/ajax/libs/PapaParse/5.3.0/papaparse.min.js"></script>
```

```
<script src="https://cdnjs.cloudflare.com/ajax/libs/Chart.js/3.7.0/chart.min.js"></script>
<script
src="https://cdnjs.cloudflare.com/ajax/libs/jspdf/2.5.3/jspdf.umd.min.js"></script>
<script
src="https://cdnjs.cloudflare.com/ajax/libs/jspdf/2.4.0/jspdf.umd.min.js"></script>
<script src="./script.js"></script>
</body>
</html>
```

ML Model Code:

```
import re
import matplotlib.pyplot as plt
import pandas as pd
import numpy as np
import seaborn as sns
import altair as alt
import plotly.express as px
import xlrd
import pandas as pd
import warnings
warnings.filterwarnings("ignore")
import datetime
np.random.seed(42)
df = pd.read_excel("online_retail_data.xlsx", sheet_name = ["Year 2009-2010", "Year
2010-2011"])
fig, ax = plt.subplots(11, 4, figsize=(18,20))
```

```
axes_ = [axes_row for axes in ax for axes_row in axes]

for i, c in enumerate(countries):
    sns.violinplot(x = "Price", data = data[data["Country"] == c], ax = axes_[i], inner =
"point", palette = "pastel")
    axes_[i].set_title(c + ' ' + "Price Distribution")
    plt.tight_layout()
#Total Number of Unique Invoices
len(data["Invoice"].unique())
import lifetimes
rfm_summary = lifetimes.utils.summary_data_from_transaction_data(data, "Customer
ID", "InvoiceDate", "Total Amount")
rfm_summary.reset_index(inplace = True)
from lifetimes.plotting import plot_frequency_recency_matrix
from lifetimes.plotting import plot_probability_alive_matrix
from lifetimes.plotting import plot_period_transactions
from lifetimes.utils import calibration_and_holdout_data
from lifetimes import ParetoNBDFitter
from lifetimes.plotting import plot_history_alive
from sklearn.metrics import mean_squared_error, r2_score
import math
from math import sqrt
import re
temp_data = data.copy()
#Date Time Analysis
temp_data.loc[:, "Month"] = data.InvoiceDate.dt.month
temp_data.loc[:, "Time"] = data.InvoiceDate.dt.time
```

```
temp_data.loc[:, "Year"] = data.InvoiceDate.dt.year
temp_data.loc[:, "Day"] = data.InvoiceDate.dt.day
temp_data.loc[:, "Quarter"] = data.InvoiceDate.dt.quarter
temp_data.loc[:, "Day of Week"] = data.InvoiceDate.dt.dayofweek
#Mapping day of week
dayofweek_mapping = dict({0: "Monday",
                          1: "Tuesday",
                          2: "Wednesday" ,
                          3: "Thursday",
                          4: "Friday",
                          5: "Saturday",
                          6: "Sunday"})

temp_data["Day of Week"] = temp_data["Day of Week"].map(dayofweek_mapping)
plt.figure(figsize=(5,5))
plt.pie(ggf_filter["Labels"].value_counts(), labels = ggf_filter["Labels"].unique(),
startangle = 180, explode = [0.0,1.5,1.5,0.0], autopct = "%1.2f%%")
plt.title("Label Percentage")

plt.legend()

ggf_filter.to_csv("customer_segmentation_result.csv")
```

APPENDIX 2

(SCREENSHOTS)

Customer Pulse Analysis

Total Customers Frequency:

4

Total Purchases Frequency:

2.88

Overall Frequency Cheat-Sheet:

{"CID359":0.9534401827608971,"CID855":0.9204230052683484,"CID645":0.36270177089153255,"CID546":0.8401338269874473}

High Frequent Customer:

CID359

Low Frequent Customer:

CID645

Average RFM Value:

0.72

Nominated Customer:

CID359