

Traffic Light Control System Report

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Subject:- Artificial Intelligence

1. Introduction

This report presents the development and implementation of a Traffic Light Control System using Python. The system simulates a traffic signal transitioning between red, yellow, and green states. Additionally, the project incorporates data processing using pandas to analyze and visualize trends from the given dataset.

2. Methodology

The Traffic Light Control System uses the Tkinter library for visualization and follows a state-

machine approach for handling light transitions. The system uses Python's `after()` function to manage delays between light changes. Additionally, a dataset containing date-wise values has been analyzed using Pandas and plotted using Matplotlib.

3. Code Implementation

```
import pandas as pd
import matplotlib.pyplot as plt

# Creating the structured data
data = {
    "Date": pd.date_range(start="2024-01-01", periods=20, freq="D"),
    "Value1": [828, 7065, 5861, 7163, 9432, 7330, 5434, 6858, 4418,
2689,
                9115, 7803, 2670, 7275, 3395, 1456, 7458, 1604, 6094, 6716],
    "Value2": [1261, 4225, 3286, 651, 548, 3922, 3681, 4139, 2495, 518,
2029, 2281, 3542, 2438, 2627, 682, 1143, 1032, 4459, 3742],
    "Metric": [54.42, 31.58, 68.28, 60.20, 37.96, 51.87, 46.59, 63.94, 79.98,
51.52,
                29.40, 60.15, 74.21, 39.83, 41.59, 53.66, 36.54, 28.58, 42.91,
29.73]
```

```
}
```

```
# Creating a DataFrame
```

```
df = pd.DataFrame(data)
```

```
# Display the first few rows
```

```
print(df.head())
```

```
# Plot the data
```

```
plt.figure(figsize=(10, 5))
```

```
plt.plot(df["Date"], df["Metric"], marker='o', linestyle='-', color='b',  
label='Metric')
```

```
plt.xlabel("Date")
```

```
plt.ylabel("Metric Value")
```

```
plt.title("Metric Trend Over Time")
```

```
plt.legend()
```

```
plt.xticks(rotation=45)
```

```
plt.grid()
```

```
plt.show()
```

4. Screenshots / Output

Below are screenshots of the implemented traffic light control system and data visualization:

