



<b>Course Name:</b>	<b>Data Analysis Laboratory (216H03L501 )</b>	<b>Semester:</b>	<b>V</b>
<b>Date of Performance:</b>	<b>19 / 10 / 25</b>	<b>DIV/ Batch No:</b>	<b>D-2</b>
<b>Student Name:</b>	<b>Shreyans Tatiya</b>	<b>Roll No:</b>	<b>16010123325</b>

**TITLE: Perform a time series analysis on health care (AR/MA/ARIMA)**

**AIM:** To perform forecasting using time series analysis

**Expected OUTCOME of Experiment:**

CO4: Perform Time series Analytics and forecasting

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**Books/ Journals/ Websites referred:**

Students have to list.

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**Pre Lab/ Prior Concepts:**

Students should have a basic understanding of: Time series Analytics and forecasting

**Procedure:**

**Data set Used: Hospital\_patients\_datasets**

**Step1: Select and Load the dataset**

**Step2: Convert 'ScheduledDay' and 'AppointmentDay' to datetime format**

**Step 3: Forecasting Daily Attendance**

**Step4: Initialize Prophet model for forecasting**

**Step 5: Fit the model**

**Step 6: Predict future attendance**

**Step 7: Plot the forecast**

**Step 8: Exploratory Data Analysis Functions**

**Step 9: Running the analysis functions**

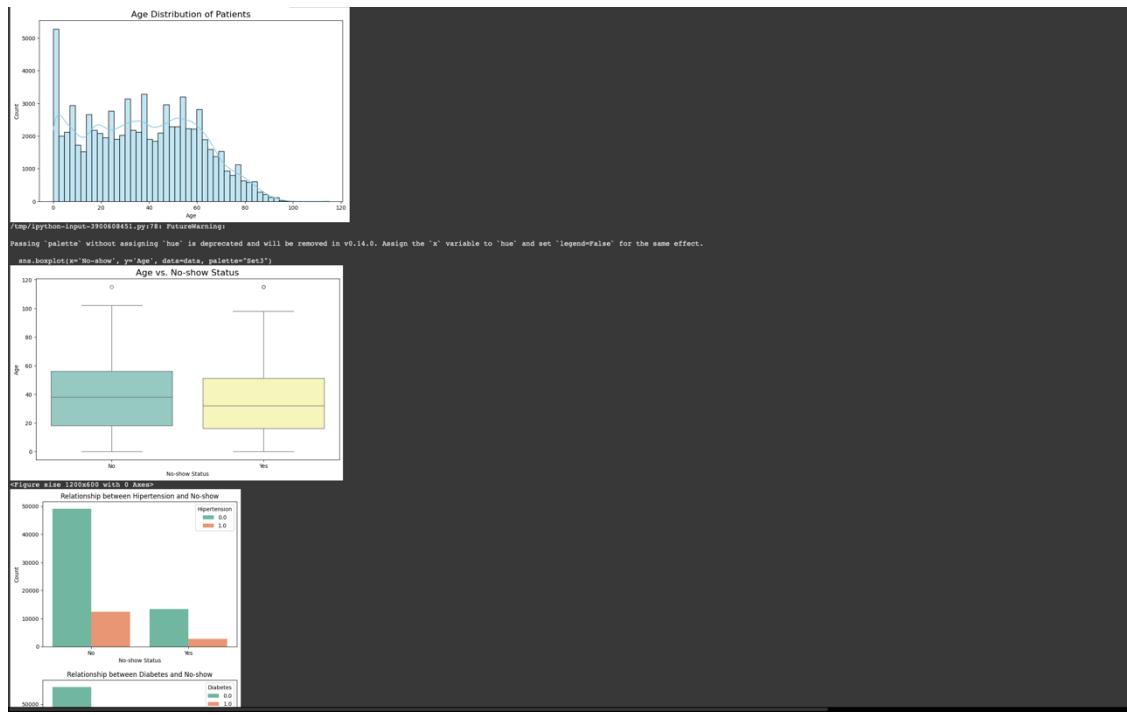
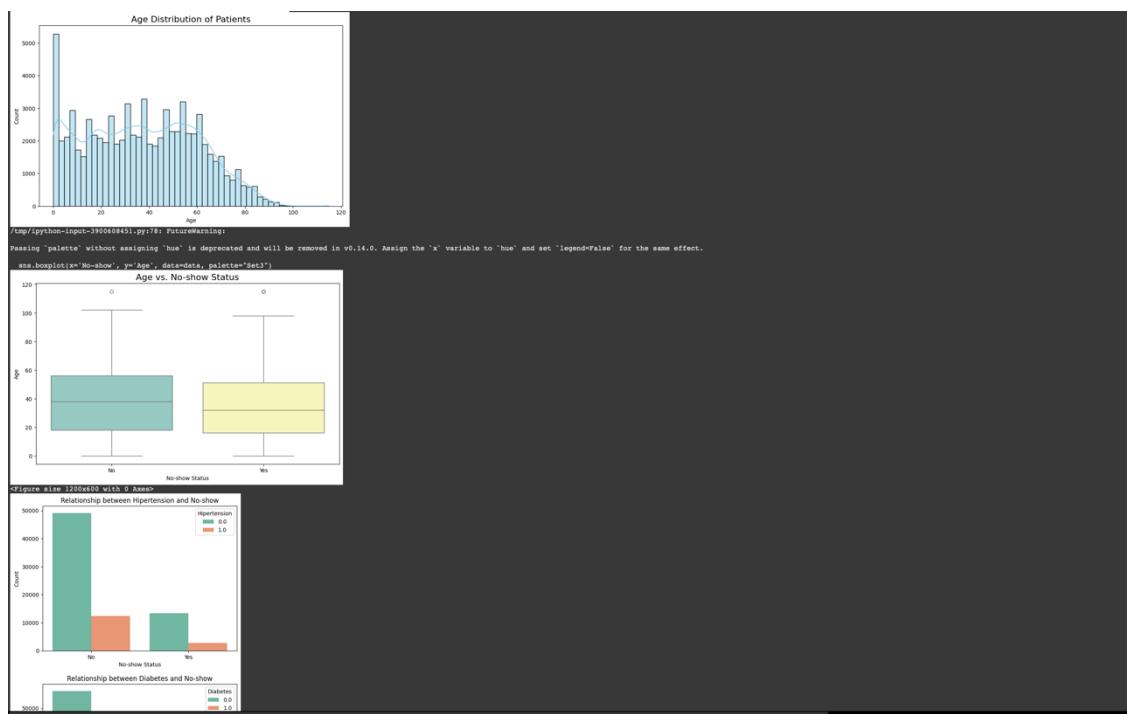
<https://colab.research.google.com/drive/1pyUm4DQcKGOb2a3ghCsnVBUjieMt71j?usp=sharing>



**SOMAIYA**  
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K J Somaiya School of Engineering  
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**K. J. Somaiya School of Engineering, Mumbai-77**  
(Somaiya Vidyavihar University)  
**Department of Computer Engineering**



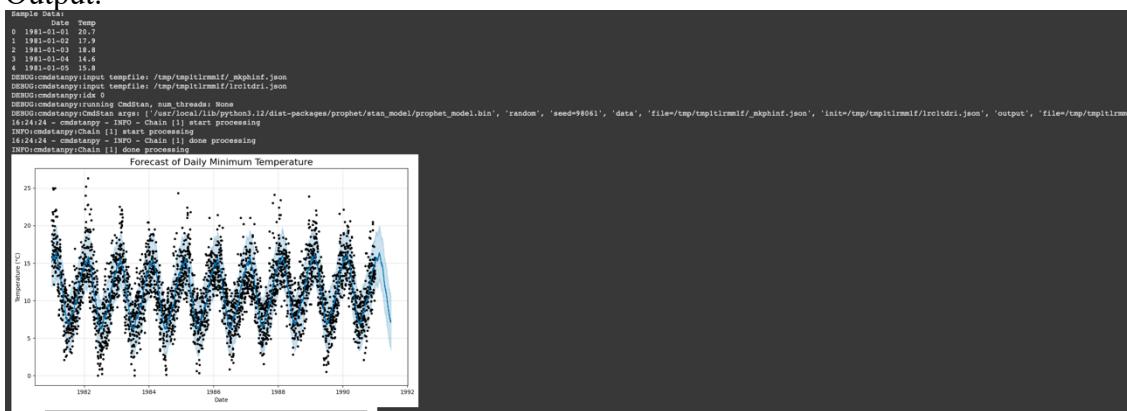


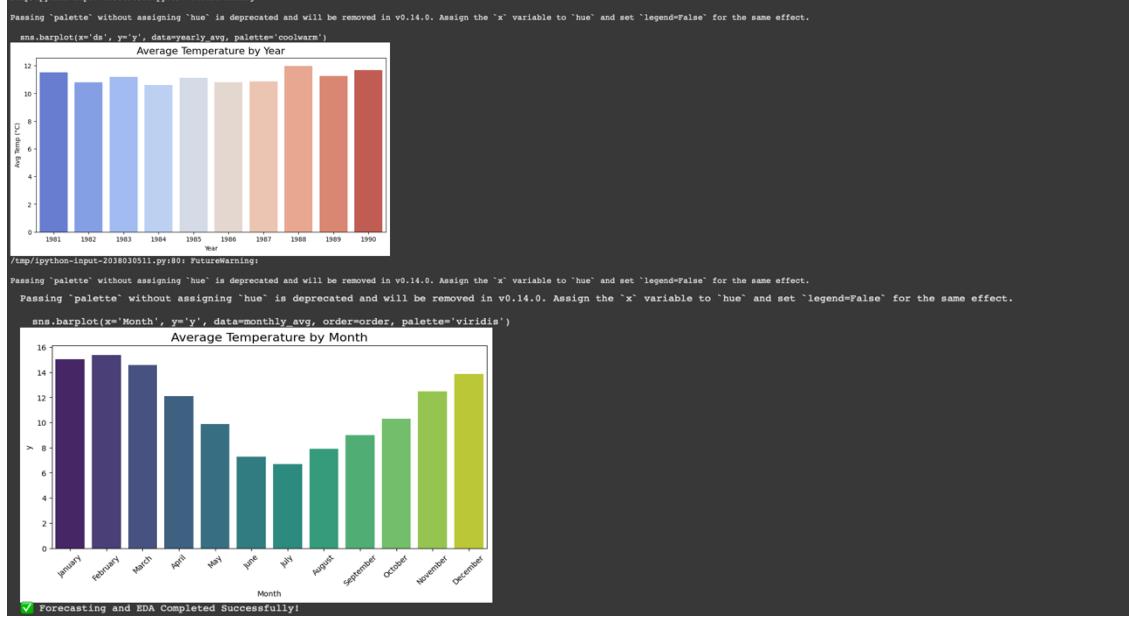
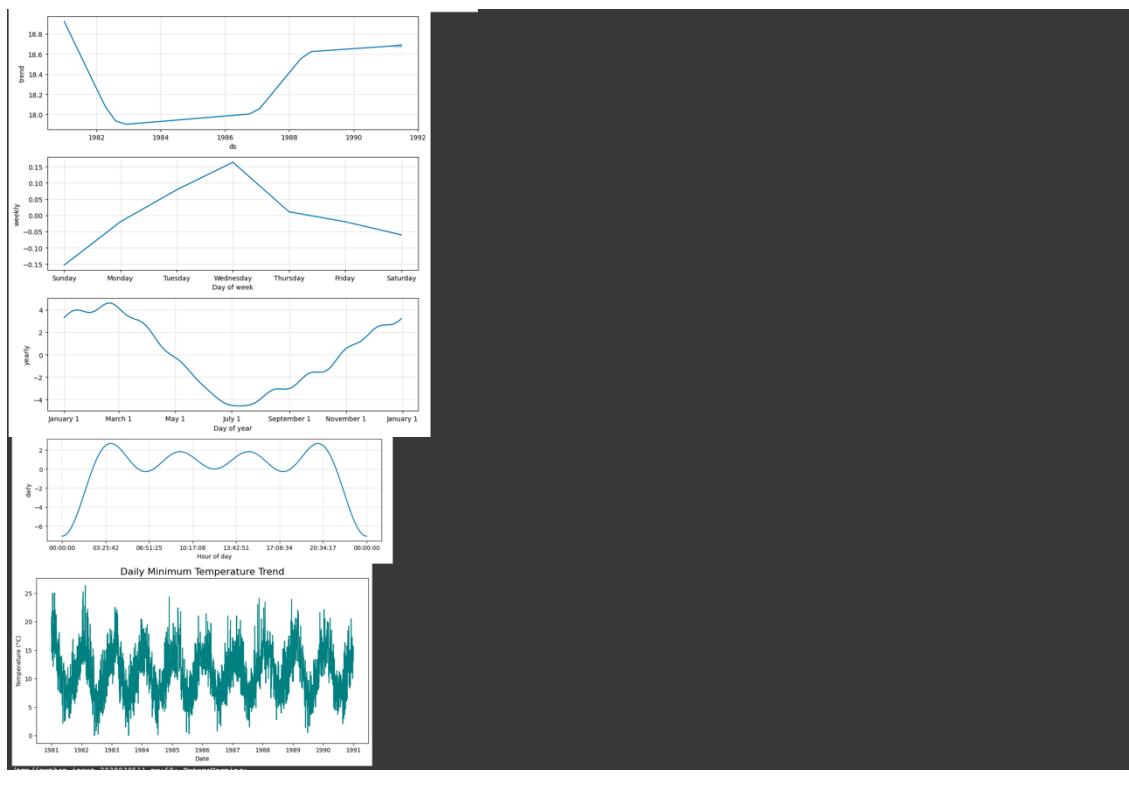
Implementation details:

### Daily Minimum Temperatures (Melbourne, Australia)

[https://colab.research.google.com/drive/138KXR-7wHEct-VEKyS\\_jFoTN35ITc4r?usp=sharing](https://colab.research.google.com/drive/138KXR-7wHEct-VEKyS_jFoTN35ITc4r?usp=sharing)

Output:





Date: \_\_\_\_\_

Signature of faculty in-charge



### **Post Lab Descriptive Questions:**

1. Explain the components of time series?

A time series has four main components:

- **Trend:** The long-term direction of data (upward, downward, or constant).
- **Seasonality:** Regular repeating patterns over fixed periods (e.g., daily, monthly, yearly).
- **Cyclic Variation:** Irregular rises and falls over longer, non-fixed periods (e.g., business cycles).
- **Irregular/Noise:** Random fluctuations or unexpected variations in data.

2. How do you handle seasonality in time series data? What methods or transformations can you apply?

To handle seasonality, you can:

- **Decompose** the series into trend, seasonality, and residuals.
- **Seasonal differencing** (subtract current value from previous season's value).
- **Use seasonal models like SARIMA or Prophet**, which automatically capture seasonality.
- **Apply transformations** (e.g., log, square root) to stabilize seasonal variation.

3. What are some common metrics for evaluating forecasting models (e.g., MAE, RMSE, MAPE)?

- **MAE (Mean Absolute Error):** Average of absolute errors; easy to interpret.
- **RMSE (Root Mean Square Error):** Penalizes larger errors more than MAE.
- **MAPE (Mean Absolute Percentage Error):** Shows average percentage error; scale-independent.