

PROJECT TITLE – OPTIMIZING ENERGY DEMAND AND CONSUMPTION THROUGH DATA-DRIVEN STRATEGIES

COLLEGE CODE: 8203

**COLLEGE NAME: A.V.C COLLEGE OF ENGINEERING,
MANNAMPANDAL.**

TECHNOLOGY: DATA ANALYTICS

TEAM NAME: Tech Titans

TOTAL NO. OF STUDENTS IN A GROUP: 5

TEAM MEMBERS:

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PROJECT DESCRIPTION:

1. Introduction

This project aims to enhance energy efficiency and reduce operational costs by implementing data-driven strategies to optimize energy demand and consumption across residential, commercial, and industrial sectors.

2. Objectives

Data Collection: Gather and integrate data from smart meters, IoT sensors, weather forecasts, and historical usage.

Consumption Analysis: Identify inefficiencies and anomalies in current energy use through advanced analytics.

Predictive Modeling: Forecast future energy demand using machine learning techniques.

Optimization Strategies: Develop algorithms to minimize energy use during peak hours and reduce costs.

Real-Time Monitoring: Implement systems for real-time tracking and automated control of energy usage.

User Engagement: Provide stakeholders with actionable insights via user-friendly interfaces and dashboards.

Sustainability: Align strategies with environmental goals and regulatory requirements.

3. Methodology

Data Acquisition: Deploy IoT sensors and integrate external data sources.

Data Processing: Use cloud-based platforms for data storage and processing.

Analytical Framework: Apply statistical and machine learning techniques to analyze data.

Model Development: Build and validate predictive models for energy demand forecasting.

Optimization Implementation: Design and implement energy optimization algorithms.

Visualization: Create interactive dashboards and regular performance reports.

4. Expected Outcomes

Energy Savings: Reduced energy consumption and costs.

Efficiency Gains: Improved energy usage efficiency.

Sustainability: Better alignment with environmental goals.

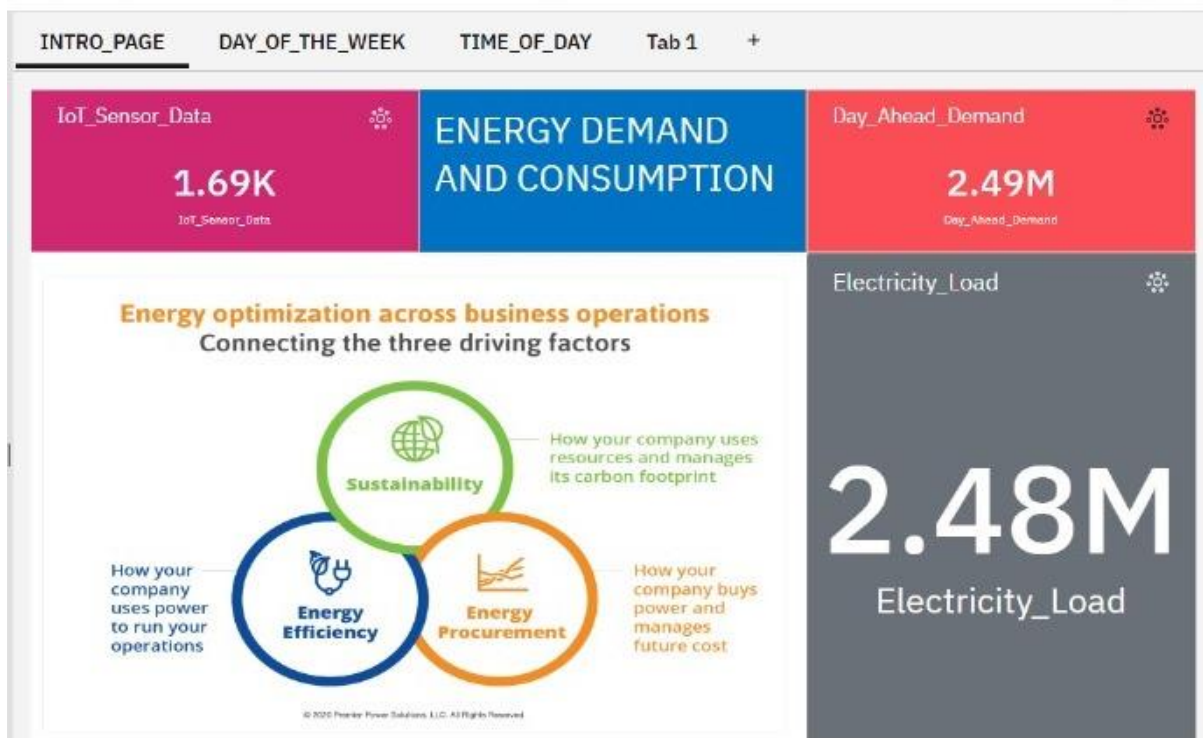
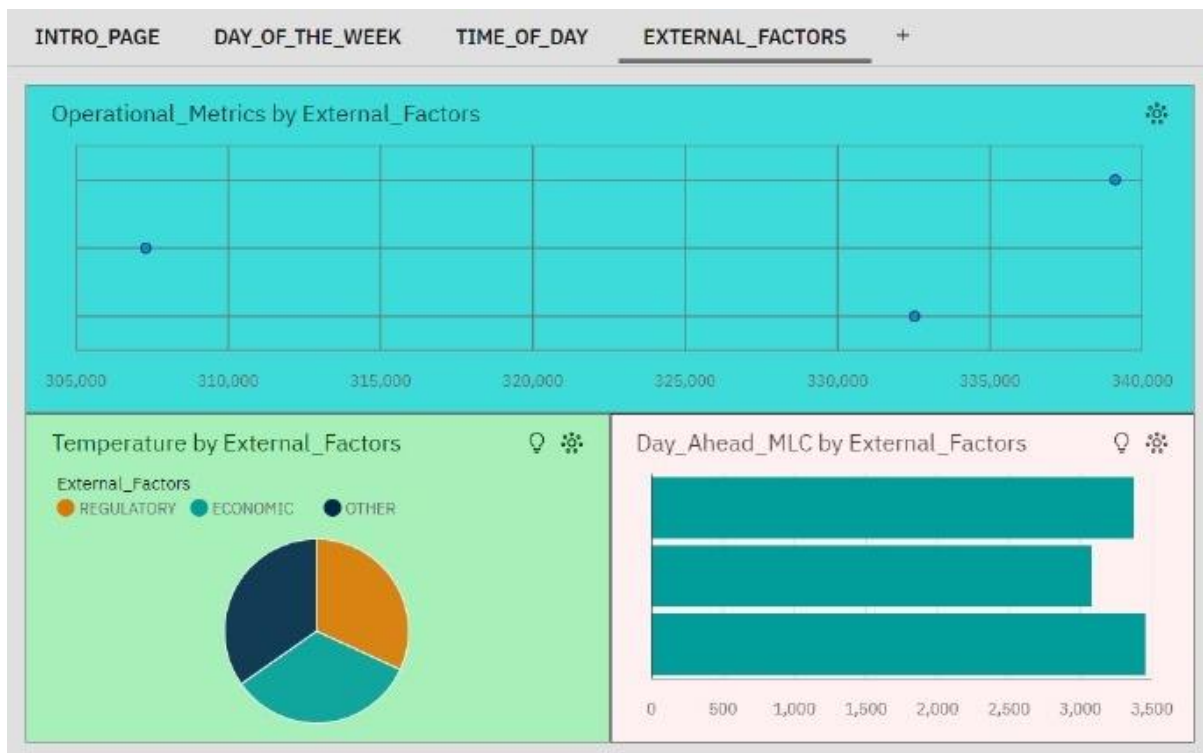
User Empowerment: Increased user awareness and engagement.

Scalability: A scalable solution adaptable to various settings and technologies.

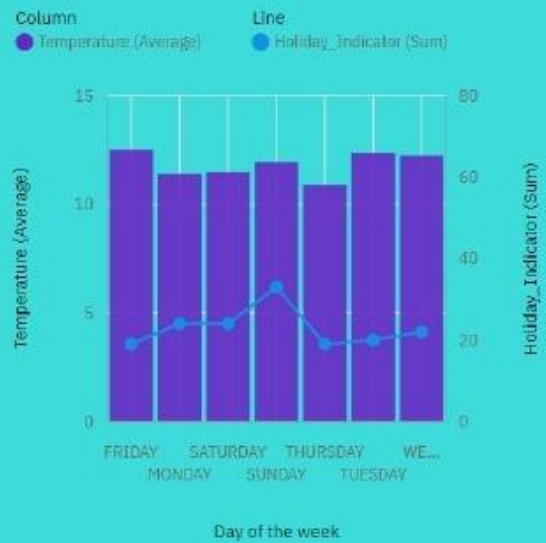
5. Conclusion

The project seeks to create a more efficient, sustainable, and cost-effective energy management system through the use of advanced analytics, predictive modeling, and real-time optimization.

DASHBOARD COMPLETION SCREENSHOTS & ANALYSIS:



Holiday_Indicator and Temperature by Day of the week



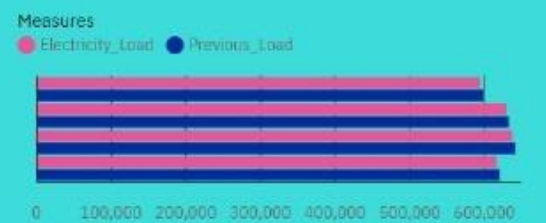
IoT_Sensor_Data by Day of the week



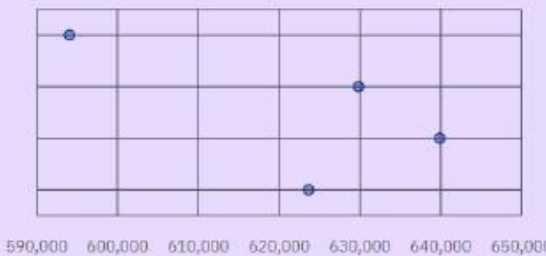
Day_Ahead_LMP by Day of the week



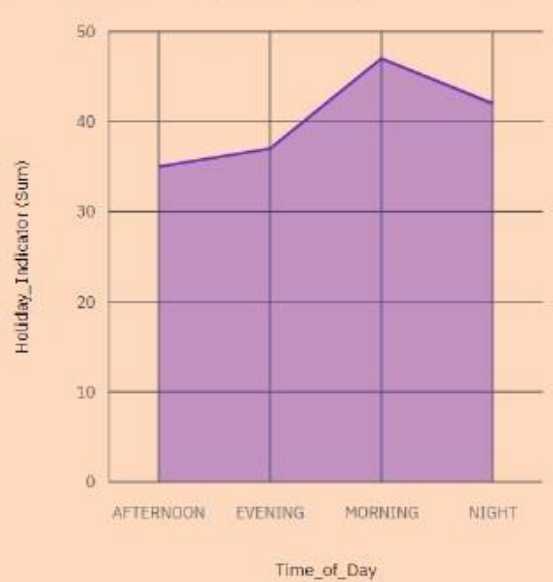
Electricity_Load and Previous_Load by Time_of_Day



Day_Ahead_Demand by Time_of_Day



Holiday_Indicator by Time_of_Day



ANALYSIS:

- Day_of_Week 1 has the lowest total IoT_Sensor_Data at 233.63, followed by 4 at 236.71.
- Add insight to favorites
- Day_of_Week 3 has the highest total IoT_Sensor_Data at 247.27, followed by 0 at 246.94.
- Add insight to favorites
- Based on the current forecasting, IoT_Sensor_Data may reach 236.6 by Day_of_Week 8.
- The overall number of results for IoT_Sensor_Data is almost 3500.

LINK:

INTRO_PAGE:

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DAY_OF_THE_WEEK:

https://us1.ca.analytics.ibm.com/bi/?perspective=dashboard&pathRef=.my_folders%2FMY&action=view&mode=dashboard&subView=model0000018f8f5942f4_00000000

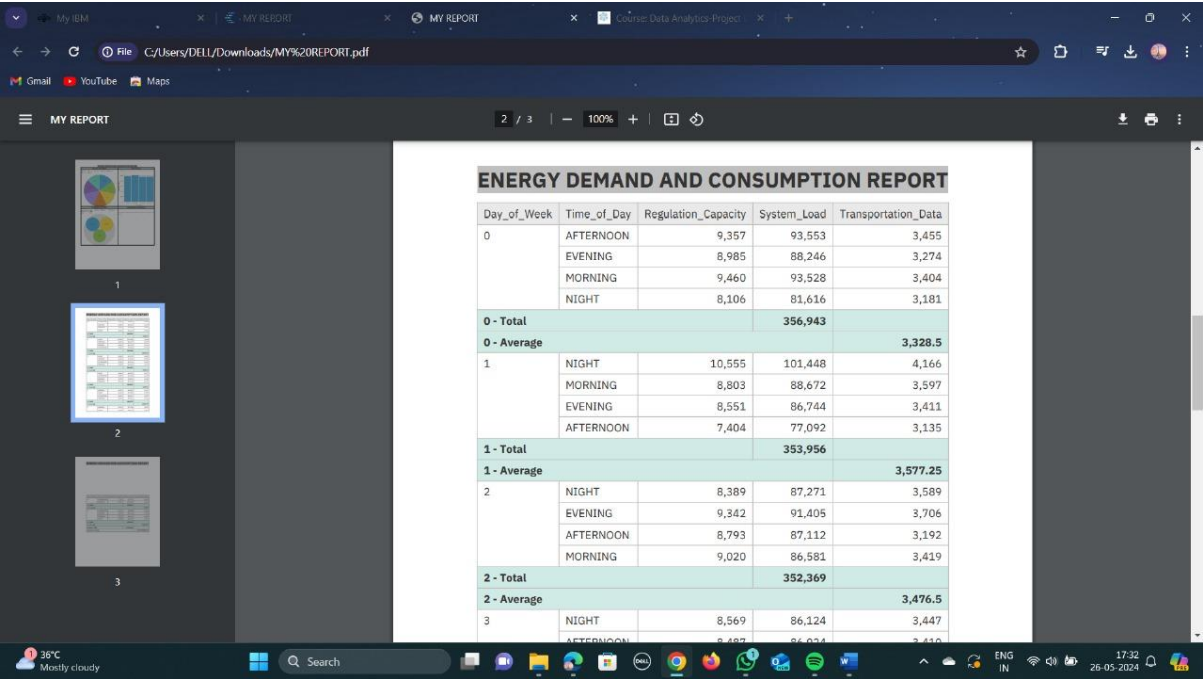
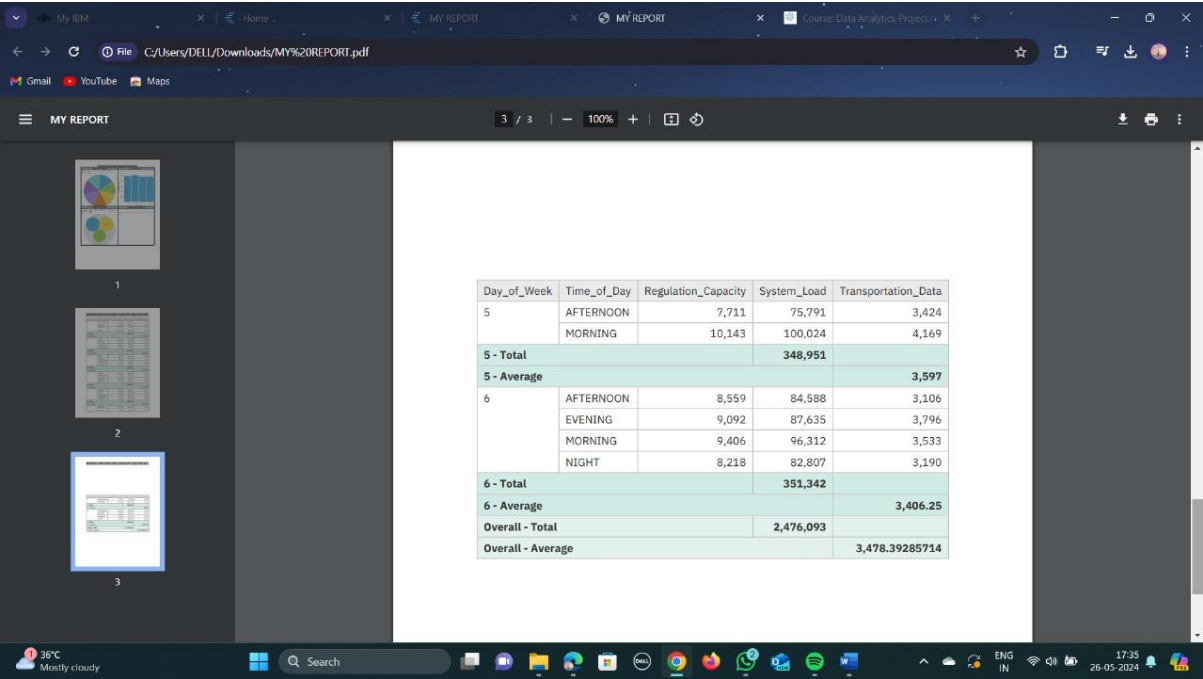
TIME_OF_DAY:

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EXTERNAL_FACTORS:

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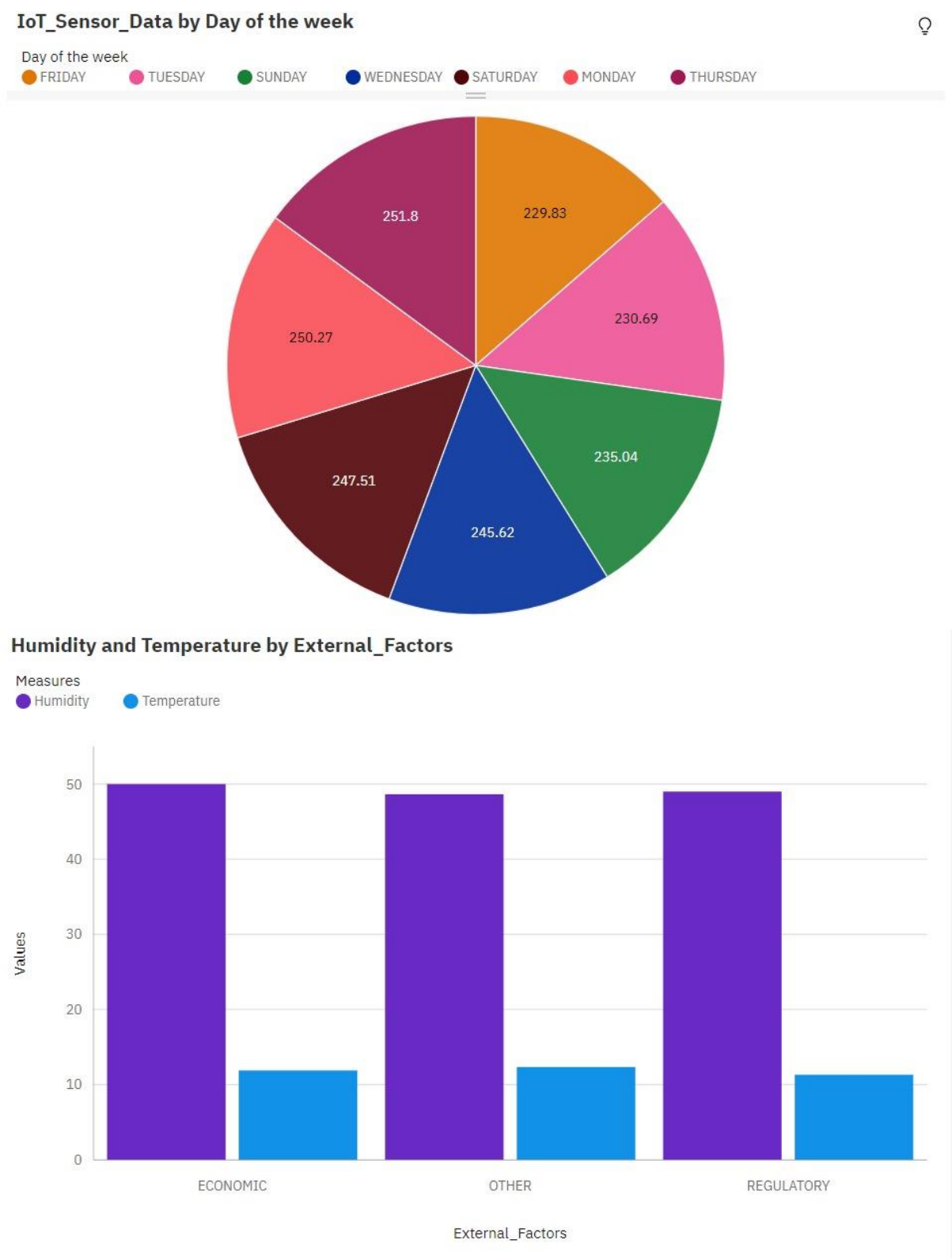
REPORT COMPLETION SCREENSHOT & ANALYSIS:



LINK:

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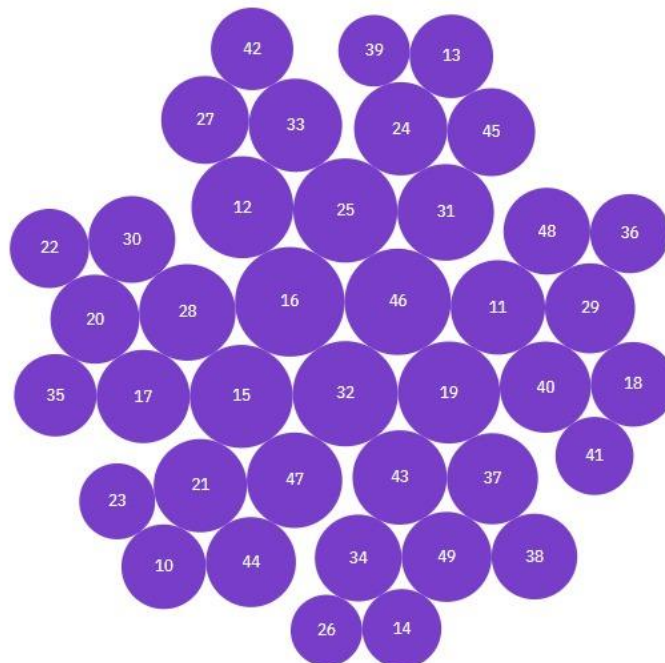
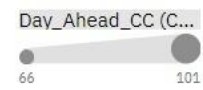
EXPLORATION COMPLETION SCREENSHOT & ANALYSIS:



Holiday_Indicator and Temperature by Day of the week



Transportation_Data sized by Day_Ahead_CC



ANALYSIS:

- IoT_Sensor_Data ranges from 229.8, when Day of the week is FRIDAY, to 251.8, when Day of the week is THURSDAY.
- The total number of results for IoT_Sensor_Data, across all day of the weeks, is almost 3500.
- Over all day of the weeks, the average of IoT_Sensor_Data is 0.5097.
- MONDAY (14.3 %) and SUNDAY (14.3 %) are the most frequently occurring categories of Day of the week with a combined count of 950 items with IoT_Sensor_Data values (28.6 % of the total).

LINK:

1. https://us1.ca.analytics.ibm.com/bi/?perspective=explore&pathRef=.my_folders%2FMY%2BDATA%2BVISUALIZATION&subView=model0000018f8d0e0aa4_00000000
2. https://us1.ca.analytics.ibm.com/bi/?perspective=explore&pathRef=.my_folders%2FMY%2BDATA%2BVISUALIZATION&subView=model0000018f8d0407b2_00000000
3. https://us1.ca.analytics.ibm.com/bi/?perspective=explore&pathRef=.my_folders%2FMY%2BDATA%2BVISUALIZATION&subView=model0000018f8d070215_00000000
4. https://us1.ca.analytics.ibm.com/bi/?perspective=explore&pathRef=.my_folders%2FMY%2BDATA%2BVISUALIZATION&subView=model0000018f8d15ada3_00000000

SAMPLE SCREENSHOTS OF WEB PAGE TO BE BUILT:

