Tech Saksham

Case Study Report

Data Analytics with Power BI

"Analysis of Commercial Electricity Consumption in Indian State"

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ABSTRACT

The demand for energy has been increasing over the years in inia, which may be the result of its rapid economic growth trajectory. In this context, this study examines the direction of the Granger-caual relationship between electricity consumption and economic growth at the state and seectoral levels in India. In doing so, the panel cointegration tests with the structural break, the heterogeneous panel causality test, and the panel VAR based impulse-response model are employed. The study covers overall economic growth and growth agricultural and industrial sectors for eighteen major Indian states for the period 1960-61 to 2014-15. The resultss provide evidence in support of a long-term relationship between economic growth and electricity consumption only in the agriculture sector.

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CHAPTER 1

INTRODUCTION

1.1 Problem Statement

Almost all households have access to electricity. However, most households find the electricity supply intermittent and unreliable. At the same time, many power stations are idling for lack of electricity demand and the idling generation capacity is sufficient to supply the needs of households lacking electricity three times over.

1.2 Proposed Solution

Consumption trends of natural gas shows from 2008 onwards flucture status but 2011th result brought high 51.25 consumption ratia the reason for to petroleum and coal price. While these price increase demand for natural gas also will be increased because country India has lack of sources to produce for fullfill its demestic needs. For decline its consumption only because of necassities of alternative energy like coal, LPG and kerosene.

1.3 Feature

- **Real-Time Analysis:** The dashboard will provide real-time analysis of customer data.
- **Customer Segmentation:** It will segment customers based on various parameters like , states, regions, latitude,etc.
- **Trend Analysis:** The dashboard will identify and display trends in customer behavior.
- **Predictive Analysis:** It will use historical data to predict future customer behavior.

1.3 Advantages

Data-Driven Decisions: Electricity Departments can make informal decisions based on real-time data analysis.

Improved Customer Engagement: Understanding customer behaviour and trends can help Electricity Departments engage with their customers more effectively.

Increased Revenge: By identifying opportunities for cross-selling and up-selling and up-selling, electricity departments can increase their revenue.

1.4 Scope

India seeks greater energy efficiency and there is a growing market for technology and services that can help deliver it. Energy is one India's most dynamic consumptions and opportunities will evolve rapidly in renewables, energy technologies and power infrastructure. Energy conversation can be achieved in two different ways that include reducing the amount of primary energy consumed to supply the useful energy requrement (energy efficiency), and Reducing the end point use of nonessential energy.

CHAPTER 2

SERVICES AND TOOLS REQUIRED

2.1 Services Used

- **Data Collection and Storage Services: Electricity need to collect and store customer data in real-time. This could be achieved through services like Azure Data Factory, Azure Event Hubs, or AWS Kinesis for real-time data collection, and Azure SQL Database or AWS RDS for data storage.**

- **Data Processing Services: Services like Azure Stream Analytics or AWS Kinesis Data Analytics can be used to process the real-time data.**

- **Machine Learning Services: Azure Machine Learning or AWS SageMaker can be used to build predictive models based on historical data.**

2.2 Tools and Software used

Tools:

- **PowerBI: The main tool for this project is PowerBI, which will be used to create interactive dashboards for real-time data visualization.**
- **Power Query: This is a data connection technology that enables you to discover, connect, combine, and refine data across a wide variety of sources.**

Software Requirements:

- **PowerBI Desktop: This is a Windows application that you can use to create reports and publish them to PowerBI.**
- **PowerBI Service: This is an online SaaS (Software as a Service) service that you use to publish reports, create new dashboards, and share   insights.**
- **PowerBI Mobile: This is a mobile application that you can use to access your reports and dashboards on the go.**

CHAPTER 3

PROJECT ARCHITECTURE

3.1 Architecture

USER   **FRONTENED**   **BACKENED**

HTML 5

NODEJS
14.0

DATABASE

Cloudant
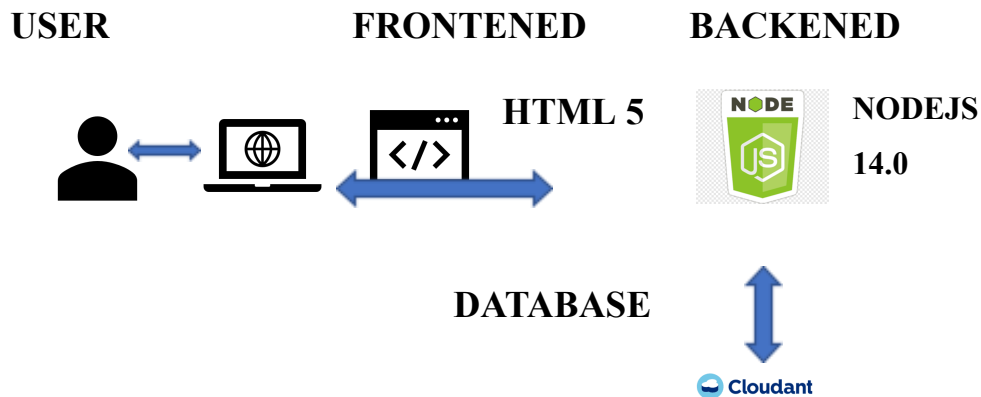
Here's a high-level architecture for the project:

1. **Data Collection: Real-time customer data is collected from various sources like bank transactions, customer interactions, etc. This could be achieved using services like Azure Event Hubs or AWS Kinesis.**

2. **Data Storage: The collected data is stored in a database for processing. Azure SQL Database or AWS RDS can be used for this purpose.**

3. **Data Processing: The stored data is processed in real-time using services like Azure Stream Analytics or AWS Kinesis Data Analytics.**

4. **Machine Learning: Predictive models are built based on processed data using Azure Machine Learning or AWS SageMaker. These models can help in predicting customer behavior, detecting fraud, etc.**

5. **Data Visualization: The processed data and the results from the predictive models are visualized in real-time using PowerBI. PowerBI allows you to create interactive dashboards that can provide valuable insights into the data.**

6. **Data Access: The dashboards created in PowerBI can be accessed through PowerBI Desktop, PowerBI Service (online), and PowerBI Mobile.**

This architecture provides a comprehensive solution for real-time analysis of bank customers. However, it's important to note that the specific architecture may vary depending on the bank's existing infrastructure, specific requirements, and budget. It's also important to ensure that all tools and services comply with relevant data privacy and security regulations.

CHAPTER 4

MODELING AND RESULT

Manage relationship

The "long data" file will be used as the main connector as it contains most key identifier (states, regions) which can be use to relates the 2 data files together. The State data file is use to link the client profile geographically with **states.**
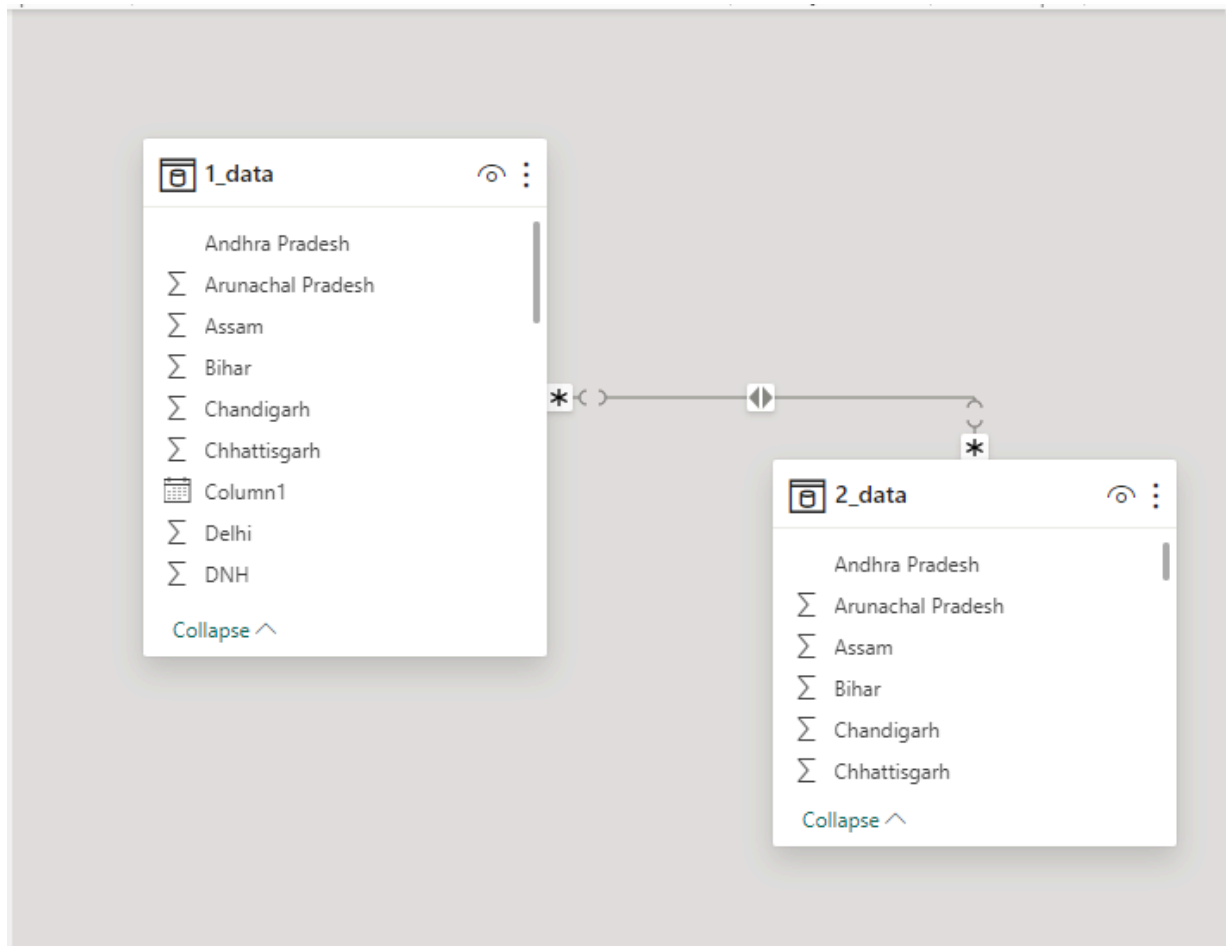
In the above map there is a relationship between the states like Arunachal Pradesh and Bihar,etc.

Adding a new column by the state Pondy and for that giving the formula as


```
1 Column = If('1_data'[Pondy]=7, "Average", IF('1_data'[Pondy]<7,"Minimum", IF('1_data'[Pondy]>7, "Maximum")))
```

then we get a new column with the new values.

Next, we have to change the column with dates and time to dates only in the power query editor. Then we have to extract the date as date and year in the last column.
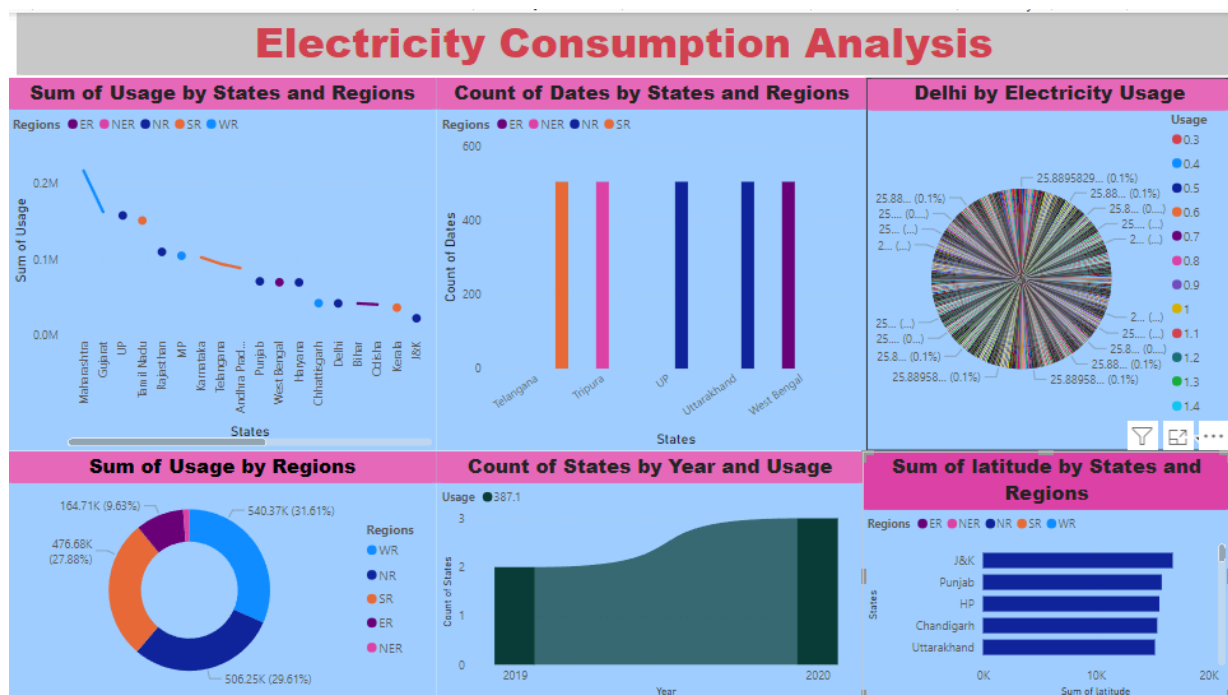
and the formula for the extraction of the table is given by

Modeling for Sum of Usage data:

For the sum of usage by states graph, we have to drag the sum of usage data in the x-axis and dragging the states data in the y-axis.

Applying the filter to the sum of usage for the graph we get the top ten states which has been using most of the electricity.

Dashboard

CONCLUSION

The present study has described pertaining to energy consumption in the aspect of classified commercial type energy with the reference of India different sectorial energy consumption. Energy conditions of the country with past data promoted us to analysis present and future requires of energy also used. Examines of commercial energies and its affections among the people entitled here specifically and subsequently, consumption and demand pattern of energy with the causes of variations also included. Mainly, the causes fr dynamic changes on energy consumption from non-commercial to commercial energy also engraved for the findings of present existing scarce in renewable sources for resolve it.

FUTURE SCOPE

Utilities in india have a mandate to supply power which becomes increasingly difficult through the centralised grid and is technically and economically challenging for more remote places. Utilities India have a mandate to supply power. Despite the union governments electrification spree, the availability of quality electricity is a far-fetched dream in rural areas. Supply of electricity through centrailised grid becomes increasingly difficult and technically and economically. Challenging for more remote places. Local, self-controlled electric systems capable of producing power are, thus, a way out. Electricity is one of the greatest gifts to mankind. But the supply in India has its shortcomings in terms of equity-economic, ecological, qualitative and quantitative which are much desired, said pavan publish reports, create new dashboards, and share insights.

REFERENCES

https://www.researchgate.net/publication/354401757_A_Study_on_Major_Commercial_Energy_Consumption_in_India

LINKS