Case Study Report



**Tech Saksham**

Data Analytics with Power BI

**“Analysis Of Commercial Electricity Consumption In Indian State”**

**“Pioneer Kumaraswamy College”**

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**ABSTRACT**

***The “Analysis of Commercial Electricity Consumption in Indian States” leverages Power BI to explore and interpret patterns in electricity usage across different states in India. By integrating data visualization, analytics, and interactive dashboards, this study provides insights into commercial energy consumption trends, peak demand periods, and regional variations. The Power BI platform enables stakeholders to dynamically explore data, identify inefficiencies, and make informed decisions related to energy management and policy formulation. The report contributes to enhancing energy efficiency and sustainability in the commercial sector, ultimately driving economic growth and environmental conservation aims to provide insights into energy usage patterns within the commercial sector across various states in India. Leveraging Power BI, this study combines data visualization, statistical analysis, and predictive modeling to inform energy policies and promote sustainability.***

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**CHAPTER 1**

**INTRODUCTION**

* 1. **Problem Statement**

**In nowadays electricity plays crucial role in our life .But in some ruler areas there were no electricity supply. They are difficult to survival. We get electricity through renewable energy resources and non-renewable energy resources. Nuclear power plant is the one of main sources. Issues with Electricity Generation in the Power Sector  coal extraction from state-run Coal India has been hindered by delays in environmental clearances, land acquisition issues, and inadequate investment in advanced technologies Power companies often have to rely on costly coal imports despite having abundant coal reserves. Around 80% of India’s power generation relies on thermal power derived from fossil fuels like coal, natural gas, and diesel. Many power plants in India are old and inefficient leading to inefficiencies**

**Proposed Solution**

The proposed solution is to develop a PowerBI dashboard that can analyze and visualize the electricity Consuming in India .The dashboard will integrate data from various sources such as region wise, State from all region .The project describes the consumption of energy resources of all states of India in the last few years with respect to the population of India state-wise and predicts the future energy requirements for every state. The dashboard will be interactive, user-friendly, and easy to know the high electricity Consuming area,and knowing which area is low electricity Consuming region .By seeing the dashboard we implement new power sector in high usage area.

* 1. **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 age, income, transaction behavior, 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. **Advantages**
* **Data-Driven Decisions**: Banks can make informed decisions based on real-time data analysis.
* **Improved Customer Engagement**: Understanding customer behavior and trends can help banks engage with their customers more effectively.
* **Increased Revenue**: By identifying opportunities for cross-selling and up-selling, banks can increase their revenue.
  1. **Scope**

The scope of this project extends to all banking institutions that aim to leverage data for decision-making and customer engagement. The project can be further extended to incorporate more data sources and advanced analytics techniques, such as machine learning and artificial intelligence, to provide more sophisticated insights into customer behavior. The project also has the potential to be adapted for other sectors, such as retail, healthcare, and telecommunications, where understanding customer behavior is crucial. Furthermore, the project contributes to the broader goal of digital transformation in the banking sector, promoting efficiency, innovation, and customer-centricity.

**CHAPTER 2**

**SERVICES AND TOOLS REQUIRED**

**2.1 Services Used**

* **Data Collection and Storage Services**: Banks 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 FRONTEND BACKEND**

|  |  |  |
| --- | --- | --- |
|  | **HTML 5** | **NODEJS 14.0**  **Database** |

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 “disp” file will be used as the main connector as it contains most key identifier (account id, client id and disp id) which can be use to relates the 8 data files together. The “district” file is use to link the client profile geographically with “district id”







**Modelling for Gender and Age data**

Notice that the Gender and age of the client are missing from the data. These can be formulated from the birth number YYMMDD where at months (the 3rd and 4th digits) greater than 50 means that client is a Female. We can create a column for Gender.



For birthday, we need to reduce the birth month of the female by 50 and then change the date format to DD/MM/YYYY adding 1900 to the year.



For Age, we shall assume it is year 1999 as explain previously and use it to minus from the birth year.



**Replacing values**

Set some fields to English for easy understanding, we replace values to English with the Power Query Editor.







Changing the order of Region name at Power Query

Duplicate the “district /region” then split column using space as delimiter.



Then merge column by Region and direction. Refer to applied steps for details.



**Grouping of age by ranges**

As the customers’ age ranges from 12 to 88, we shall group them into different generation age range for easier profiling, we will group the ages into 5 groups.

The Gen Y are youths,

Gen X are young working adults, some starting their families

Baby Boomer are working adults with families.

The silent Generations some are working and retired, living on pensions.

The greatest Generation, retired elderly living on pensions.



**Credit Rating and Loan Status**

As the Loan status uses A, B, C, D which are not reader friendly. We can add a column to represent what it stands for, we also simplify the classification of those with late or default on payment as bad credit, refer to the table below for details on the new columns added.



Values of such as “account Id” have also been set as Text.

And District name have been categorized as place to be use for the map to show the sum of the inhabitants in each region.

**Dashboard**

A screenshot of a credit card

Description automatically generated

A screenshot of a computer

Description automatically generated

A screenshot of a credit card

Description automatically generated

**CONCLUSION**

The project “Real-Time Analysis of Bank Customers” using PowerBI has successfully demonstrated the potential of data analytics in the banking sector. The real-time analysis of customer data has provided valuable insights into customer behavior, preferences, and trends, thereby facilitating informed decision-making. The interactive dashboards and reports have offered a comprehensive view of customer data, enabling the identification of patterns and correlations. This has not only improved the efficiency of data analysis but also enhanced the bank’s ability to provide personalized services to its customers. The project has also highlighted the importance of data visualization in making complex data more understandable and accessible. The use of PowerBI has made it possible to present data in a visually appealing and easy-to-understand format, thereby aiding in better decision-making.

**FUTURE SCOPE**

The future scope of this project is vast. With the advent of advanced analytics and machine learning, PowerBI can be leveraged to predict future trends based on historical data. Integrating these predictive analytics into the project could enable the bank to anticipate customer needs and proactively offer solutions. Furthermore, PowerBI’s capability to integrate with various data sources opens up the possibility of incorporating more diverse datasets for a more holistic view of customers. As data privacy and security become increasingly important, future iterations of this project should focus on implementing robust data governance strategies. This would ensure the secure handling of sensitive customer data while complying with data protection regulations. Additionally, the project could explore the integration of real-time data streams to provide even more timely and relevant insights. This could potentially transform the way banks interact with their customers, leading to improved customer satisfaction and loyalty.

**REFERENCES**

<https://medium.com/analytics-vidhya/analysis-of-bank-customers-using-dashboard-in-power-bi-a366f2b3e563>

**LINK**

<https://github.com/githubtraining/hellogitworld.git>