Tech Saksham

Case Study Report

Data Analytic with Power BI

“Real-Time Analysis of Bank Customers”

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ABSTRACT

Real time analysis of bank customer data involves continuously monitioring and analyzing various metrics and petterns related to customer behavior, transacations, preference, and demographics. This analysis helps banks make data-driven decisions to improvecustomer experience, detect fraud, optimize marketing strategies, and enhance operational efficient. Key aspects real time analysis include. Transaction monitoring, customer segmentation, predictive Analytics, sentiment Analysis, Risk management, marketing optimization, customer service improvenmet. Real time nalysis relies on advanced analytics tools cloud computing infrastructure, and integration with data souces such ascore banking systems, CRM platforms, and external data providers. By harnessing the power of real time data insights, bank can stay competitive in a rapied evoving financial ianscope and deliver superior value to their customer..

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CHAPTER 1

INTRODUCTION

1.1 Problem Statement

The bank aims to enhance its customer experience, optimize operational efficiency, and mitigate risks effectively. However, it faces challenges in understanding and behavious of its customers. The exisiting customer analysis processes are often slow, fragmented, and fail to provide real time insights. As a result, the bank struggles .To address these challenges, the bank seeks to implement a robuts real time customer analysis system. This system should leverage , advanced analytics, machine learning, and data integration capabilities to enable. A real time customer analysis solution, the bank aims to become more agline, customer centric, and competitive in today dynamic financiak landscape.

1.2 Proposed Solution

To address the bank challenges and achieves its objective for customer analysis a comprehensive real time solution is proposed. This solution integrates advanced analytics, machine learning algorithem, and date management capbailities to devilor actionable insights and ennance decision making processes. Implementing this proposed solution, the bank can unlock the potential of tis customer data, improve operational efficiency, mitigate risks, and deliver superior customer experiences in real time.This includeds gathering feedback from customer, monitoring key performance metrics, and iterating on the solution to enhance its capabilities over time..

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 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.

1.4 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.

1.5 Scope

Records, CRM systems, digital interaction, customer surveys, and external data providers. Examining historical into past behaviours, and transaction patterns. This analysis provides a foundation for understardimg the current customer bases. Analyzing customer feedback, sentiment, and satisfaction levels to identify areas for improvenmnt in products services and processes. Implementing strategies to enhance customer experience and foster loyalty.

CHAPTER 2

SERVICES AND TOOLS REQUIRED

2.1 Services Used

- **Data Collection and Storage Services**: Data collection and storage services encompass a range of solutions for gathering, organizing , and storing data securely. These services can include cloude based storage or Microsoft Azure Blob storage as well as data collection platforms such as data collection.
- **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.

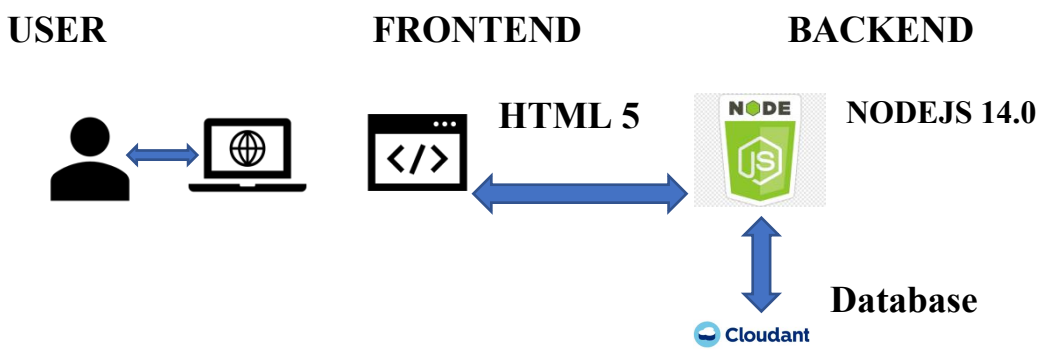
- **PowerBI Service**: This is an online SaaS (Software as a Service) service that you use to publish reports, create new dashboards, and share insights.

- **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



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.

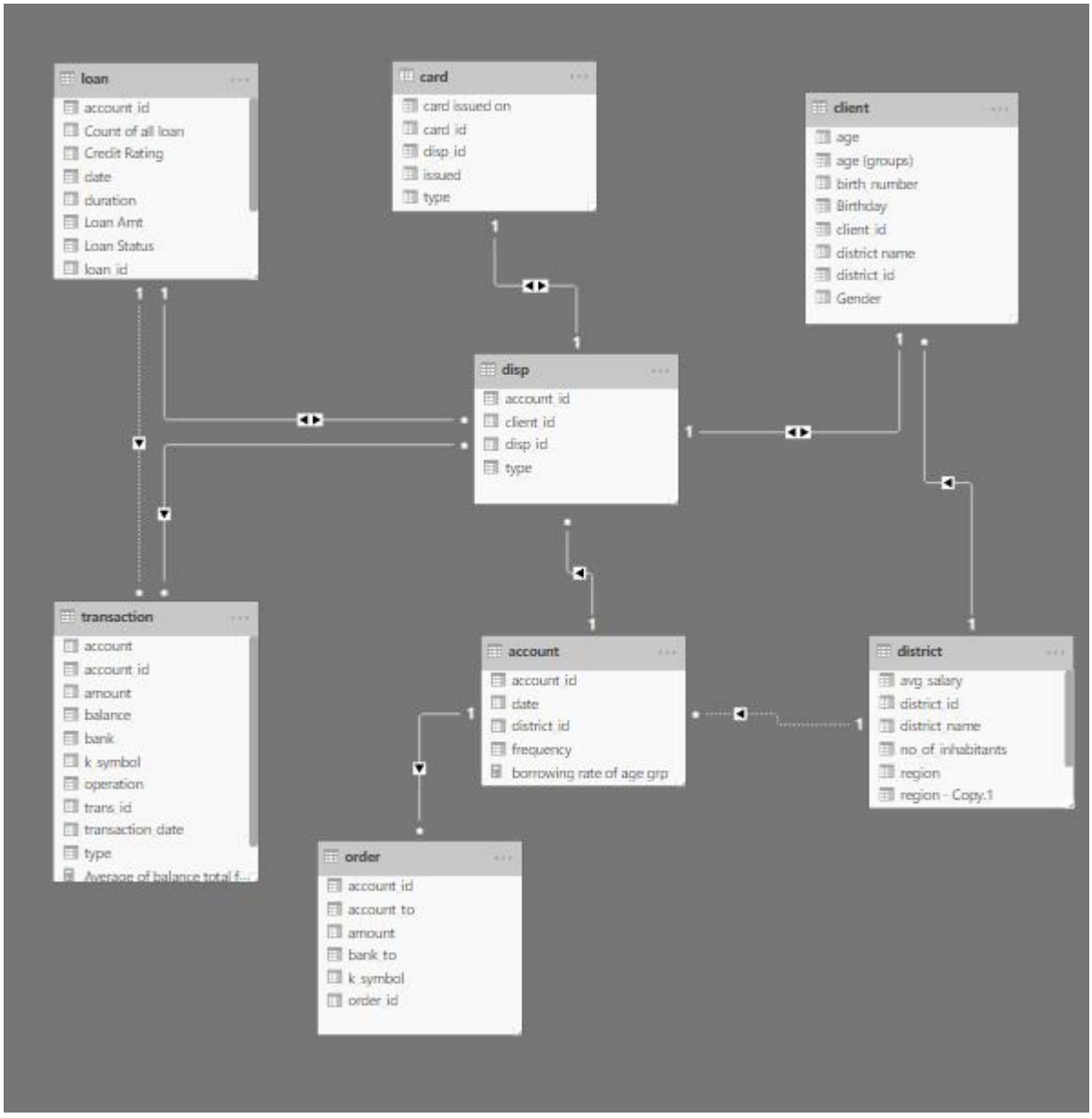
3. **Data Processing**: The stored data is processed in real-time using services like Azure Stream Analytics or AWS Kinesis Data Analytics.
4. **Machine Learning**: Predictive models are built based on processed data using Azure Machine Learning or AWS SageMaker. These models can help in predicting customer 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

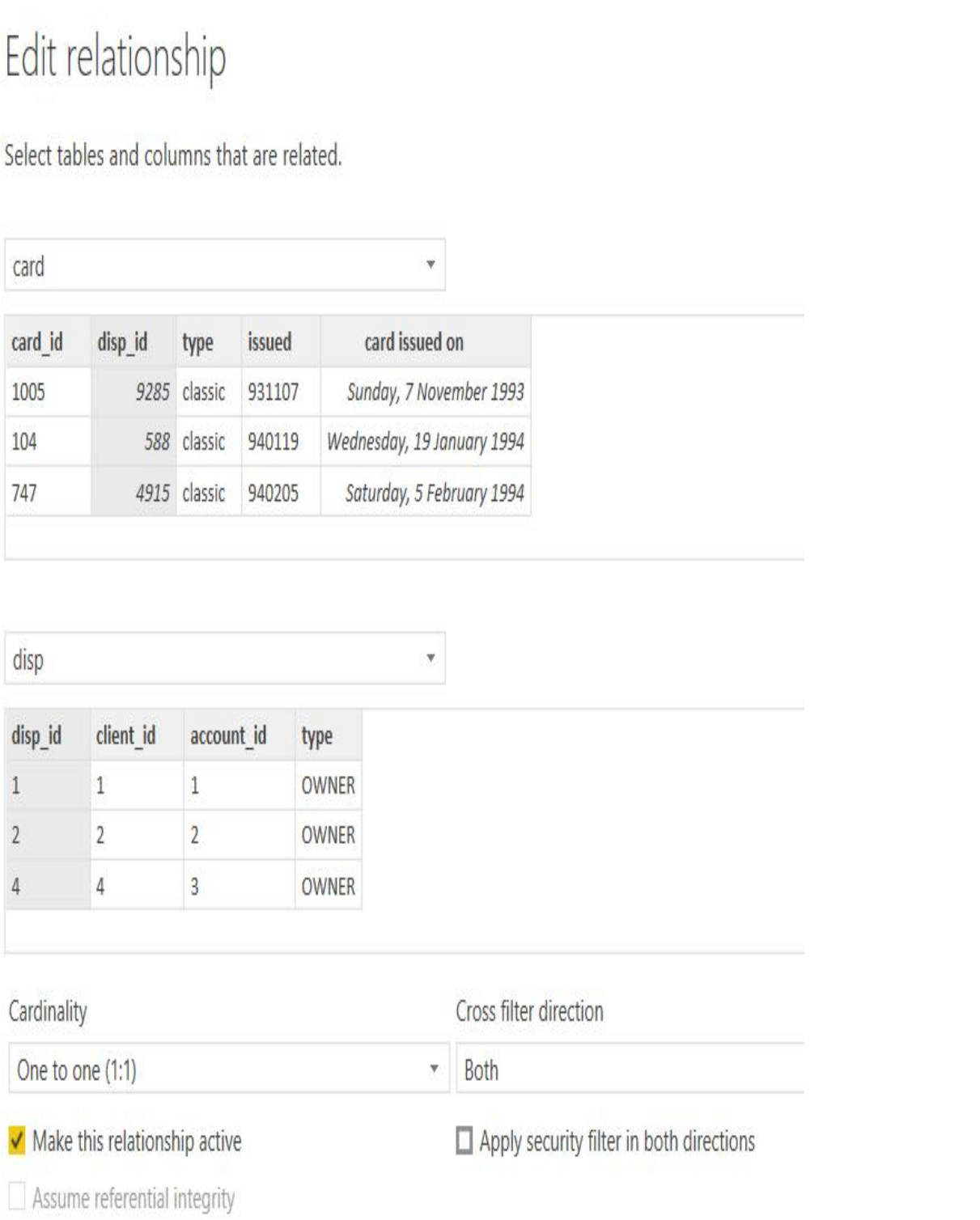
MODELING AND RESULT

Manage relationship



Manage relationships

Active	From: Table (Column)	To: Table (Column)
☑	card (disp_id)	disp (disp_id)
☑	client (district_id)	district (district_id)
☑	disp (account_id)	account (account_id)
☑	disp (account_id)	loan (account_id)
☑	disp (client_id)	client (client_id)
☑	order (account_id)	account (account_id)
☑	transaction (account_id)	disp (account_id)
☐	account (district_id)	district (district_id)
☐	transaction (account_id)	loan (account_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.

```
1 Gender =
2 VAR stringDate = FORMAT(client[birth_number],"General Number")
3 VAR month = VALUE(MID(stringDate,3,2))
4 RETURN IF(month > 50,"F","M")
5
```

client_id	birth_number	district_id	Gender	Birthday	age
3428	875927	42	F	27/09/1987	13
4354	860813	28	M	13/08/1986	14
3417	855318	35	F	18/03/1985	15
10201	851019	13	M	19/10/1985	15

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.

```
1 Birthday =
2 VAR stringDate = FORMAT(client[birth_number],"General Number")
3 VAR stringMonth = VALUE(MID(stringDate,3,2))
4 VAR mth = IF(stringMonth > 50, stringMonth - 50,stringMonth)
5 VAR year = VALUE(MID(stringDate,1,2))
6 VAR day = VALUE(MID(stringDate,5,2))
7 RETURN FORMAT(DATE(year+1900,mth,day),"DD/MM/YYYY")
```

client_id	birth_number	district_id	Gender	Birthday	age
3428	875927	42	F	27/09/1987	13
4354	860813	28	M	13/08/1986	14
3417	855318	35	F	18/03/1985	15
10201	851019	13	M	19/10/1985	15

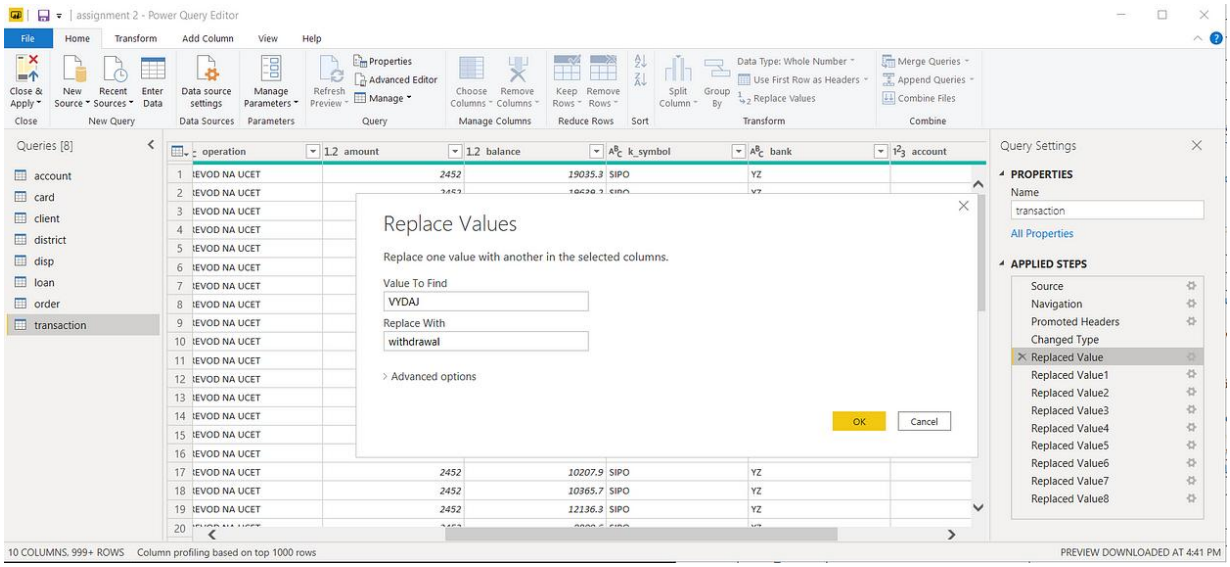
For Age, we shall assume it is year 1999 as explain previously and use it to minus from the birth year.

```
1 age = 1999 -RIGHT(client[Birthday],4)
```

client_id	birth_number	district_id	Gender	Birthday	age	age (groups)
2	450204	1	M	04/02/1945	54	36 -54 Baby Boomers

Replacing values

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

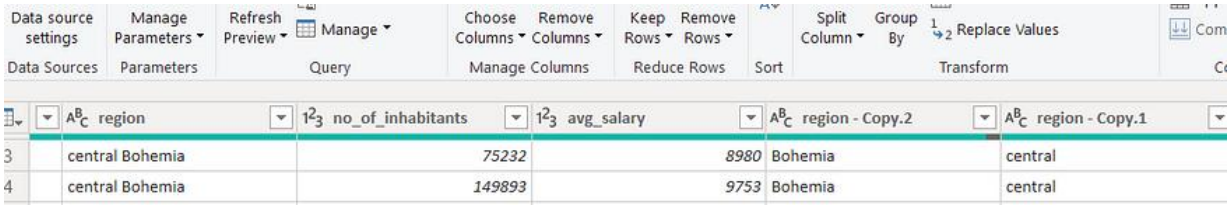


type	+/- transaction	"PRIJEM" stands for credit "VYDAJ" stands for withdrawal

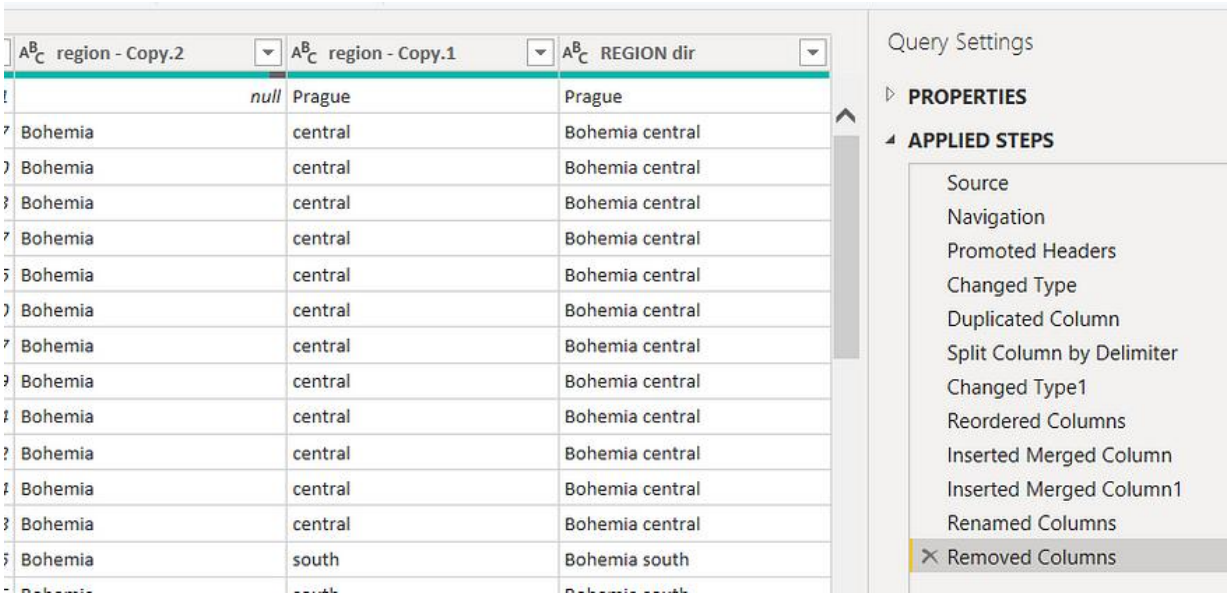
k_symbol	characterization of the transaction	"POJISTNE" stands for insurance payment "SLUZBY" stands for payment for statement "UROK" stands for interest credited "SANKC. UROK" sanction interest if negative balance "SIPO" stands for household "DUCHOD" stands for old-age pension "UVER" stands for loan payment

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.



region - Copy.2	region - Copy.1	REGION dir
null	Prague	Prague
Bohemia	central	Bohemia central
Bohemia	central	Bohemia central
Bohemia	central	Bohemia central
Bohemia	central	Bohemia central
Bohemia	central	Bohemia central
Bohemia	central	Bohemia central
Bohemia	central	Bohemia central
Bohemia	central	Bohemia central
Bohemia	central	Bohemia central
Bohemia	central	Bohemia central
Bohemia	central	Bohemia central
Bohemia	central	Bohemia central
Bohemia	central	Bohemia central
Bohemia	south	Bohemia south

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.

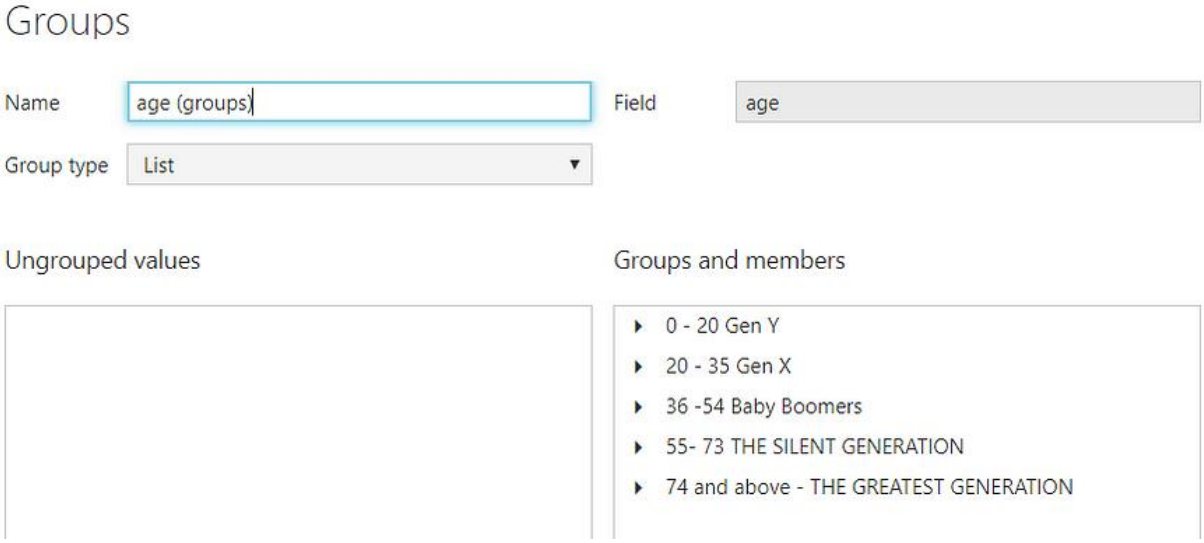
The Gen Y are youths,

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.

Status in "loan" data	New column "loan status"	New column "credit rating"
'A' stands for contract finished no problems	Fully Repaid	Good
'B' stands for contract finished loan not payed	Default	Bad
'C' stands for running contract OK so far	Timely Payment	Good
'D' stands for running contract client in debt	Late payment	Bad

```
1 Loan Status =
2 IF(loan[status]="A","Repaid Full",
3 IF(loan[status]="B","Default",IF (loan[status]="c","Timely payment","Late payment" )))
```

loan_id	account_id	date	Loan Amt	duration	payments	status	Credit Rating	Loan Status
6059	5196	971228	79,824 Kč	12	6652	A	GOOD	Repaid Full
6727	8505	971210	42,840 Kč	12	3570	A	GOOD	Repaid Full

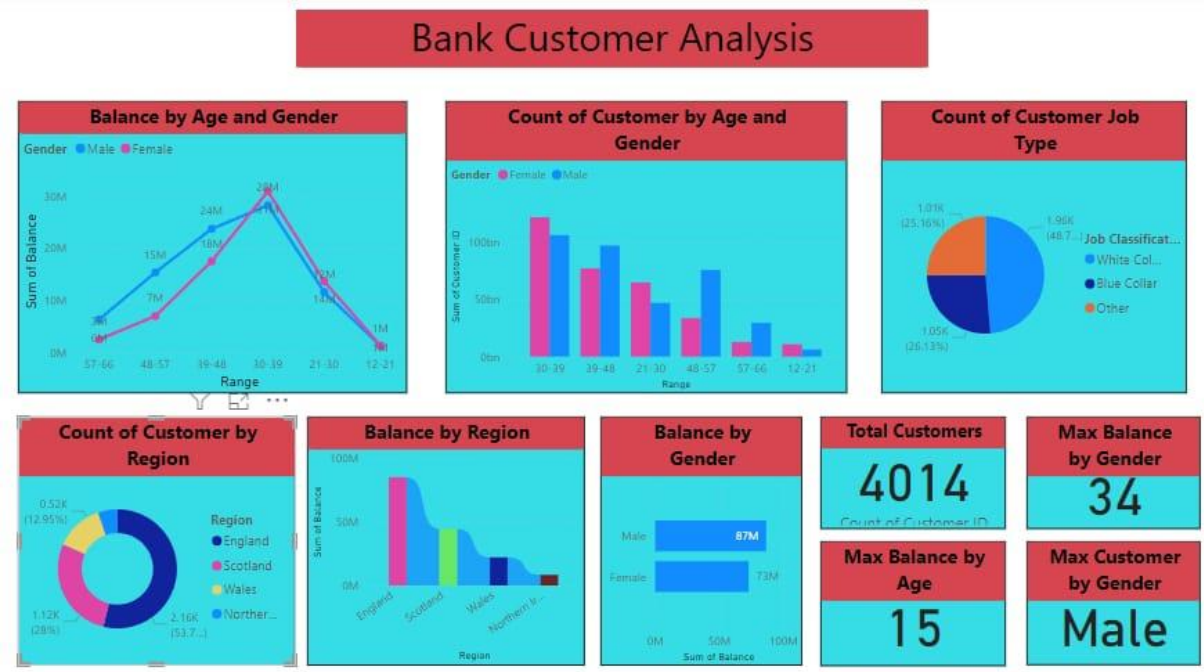
```
1 Credit Rating =
2 IF(loan[status]="A","GOOD",
3 IF(loan[status]="B","BAD",IF (loan[status]="c","GOOD","BAD" )))
```

loan_id	account_id	date	Loan Amt	duration	payments	status	Credit Rating	Loan Status
5221	1284	981205	52,512 Kč	12	4376	C	GOOD	Timely payment
5841	4268	981104	41,988 Kč	12	3499	C	GOOD	Timely payment

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



CONCLUSION

In conclusion, bank customer analysis is imperative for financial institutions to understand and cater to the diverse needs of their clientage effectively. By leveraging data driven insghts advanced analisis techniquies , banks can enhance customer satisfaction, identify trends, mitighthgs risks, and delevope trends, mitigate risks strategies. Through comprehence analysis banks can cultivies stronger customer relationships, improve operational efficiency and ultimately drive sustainable growth in a highly competitive market landscape..

FUTURE SCOPE

The future scope in bank customer analysis is promising with advancement in technology and data analysistics potised to revolutionize the way financial institutions understanded and engage with theur customers. Some key areas of future development include.

1.Predictive Analytics

2.Big data integration

3.Al powered customer service.

4.Fraud detection and prevention

5.Omni channel nalysis

6.Ethical data usage.

7.Blockhain technology.

REFERENCES

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

