BANK LOAN PERFORMANCE ANALYSIS

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1. Introduction

In the modern banking landscape, understanding the factors that influence loan performance is crucial. This project analyzes a dataset to explore the relationship between borrower details (such as employment length, income, and debt-to-income ratio) and loan characteristics (including loan amount, term, and interest rate). The goal is to identify patterns in loan statuses—such as fully paid, charged off, or late payments—to provide actionable insights for banking institutions. These insights aim to help optimize loan lending strategies, mitigate credit risk, and improve overall portfolio performance.

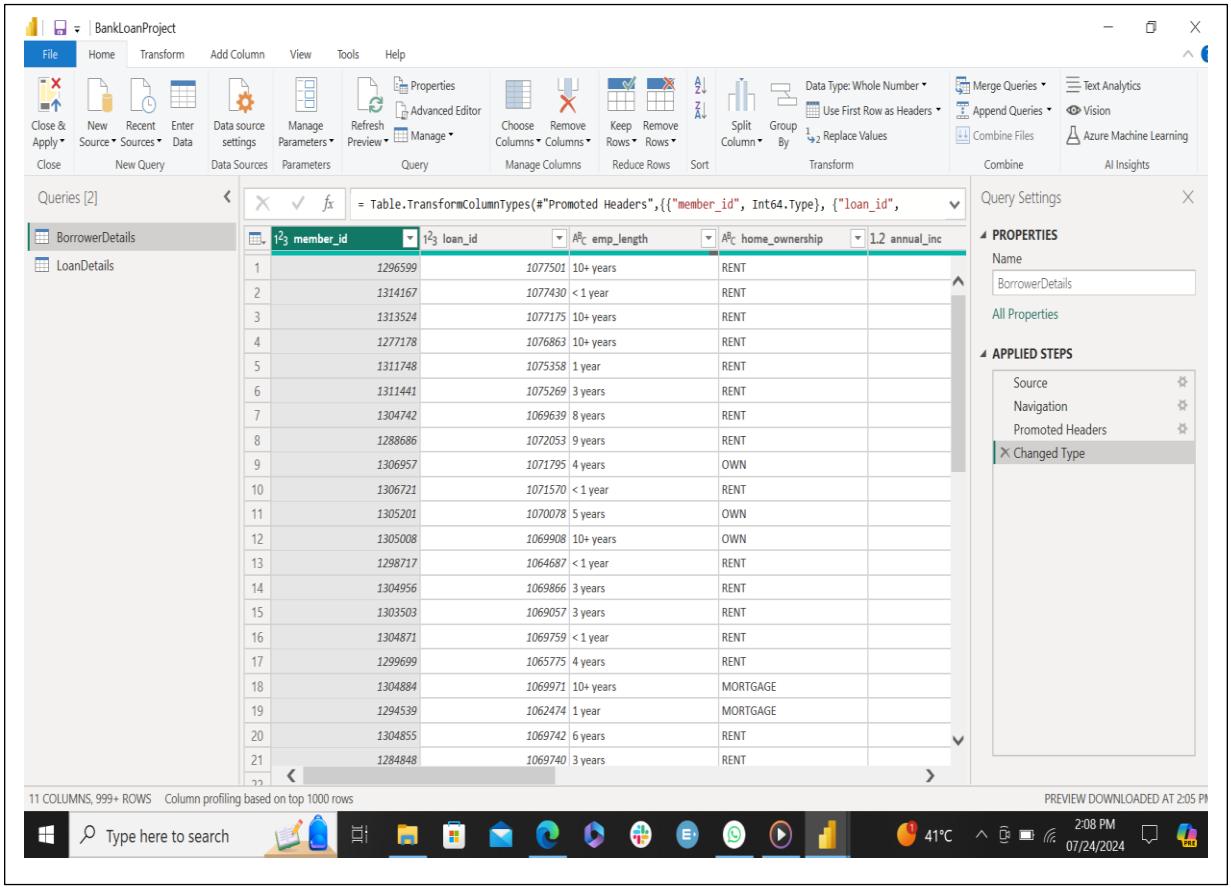
2. Dataset Overview

2.1 Dataset Dictionary

Field Name	**Description**
Id	Unique identifier for each loan
loan_amnt	The amount of money requested by the borrower
funded_amnt	The actual amount of money funded for the loan
term	The duration of the loan in months
int_rate	The interest rate of the loan
installment	The monthly payment owed by the borrower
grade	The loan grade assigned by the lending company
sub_grade	The loan subgrade assigned by the lending company
issue_date	The month in which the loan was funded
purpose	The reason provided by the borrower for the loan

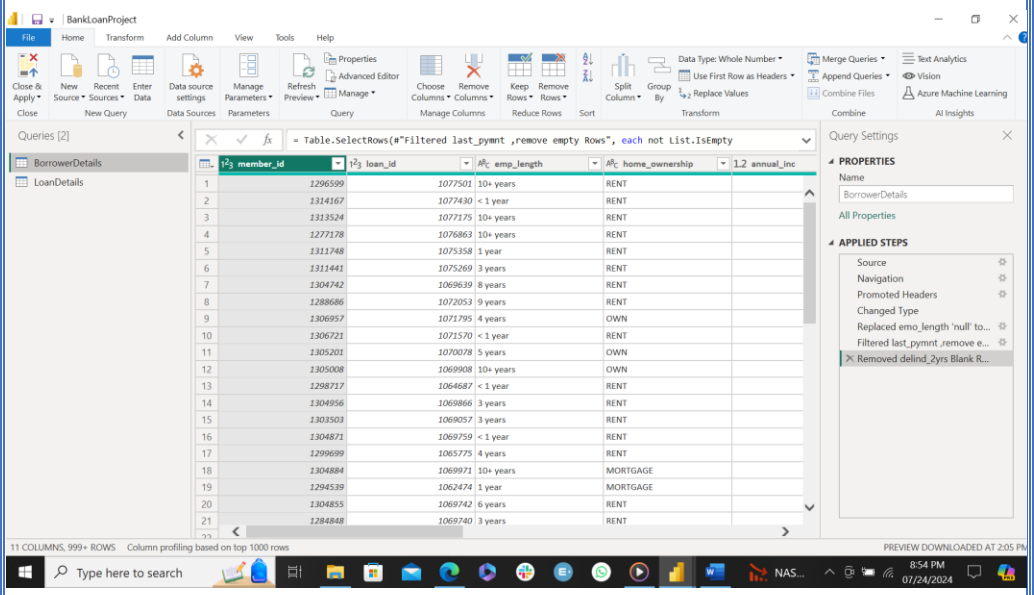
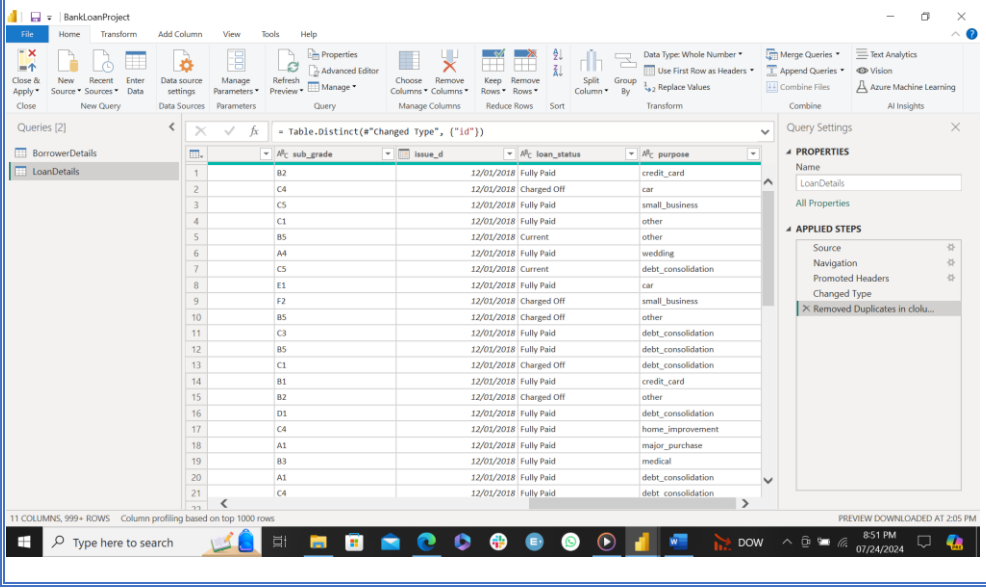
Field Name	Description
Id	Unique identifier for each loan
member_id	Unique identifier for each borrower
emp_length	Employment length in years
home_ownership	Home ownership status reported by the borrower
annual_inc	Annual income reported by the borrower
verification_status	Indicates if the borrower's income was verified
Dti	Debt-to-income ratio of the borrower
delinq_2yrs	Number of past-due incidences in the borrower's credit file
last_pymnt_date	Month of the last payment received
total_pymnt	Total amount received in payments
out_prncp	Remaining outstanding principal amount of the loan

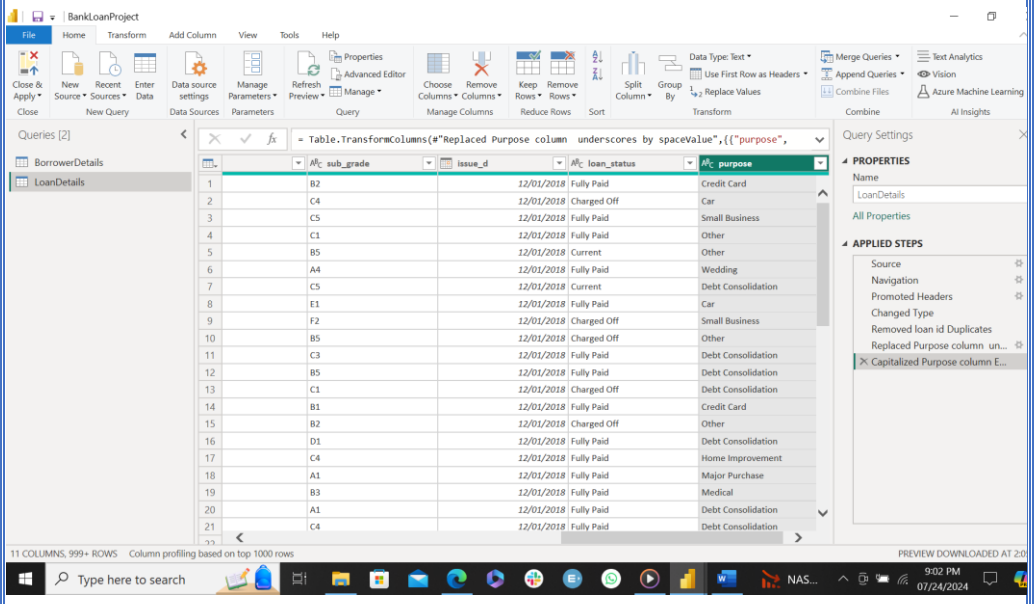
3. Importing Data



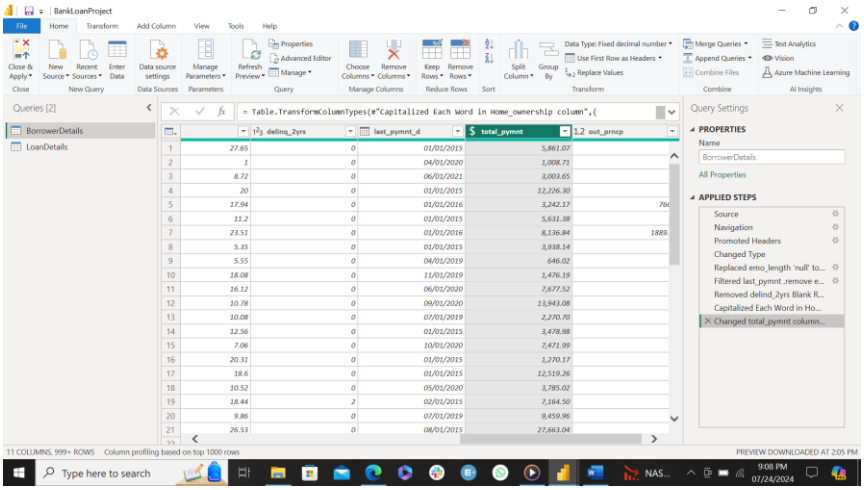
4. Data Preprocessing

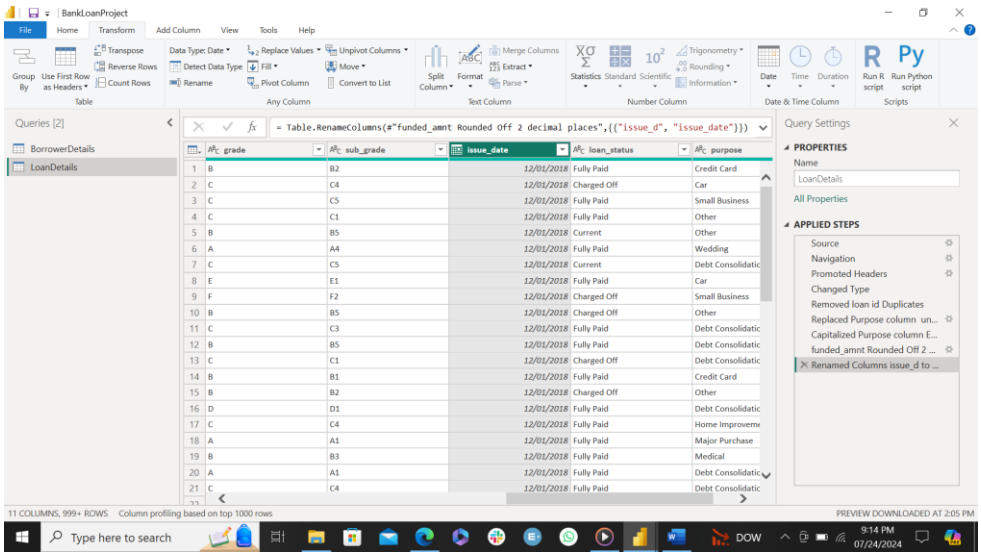
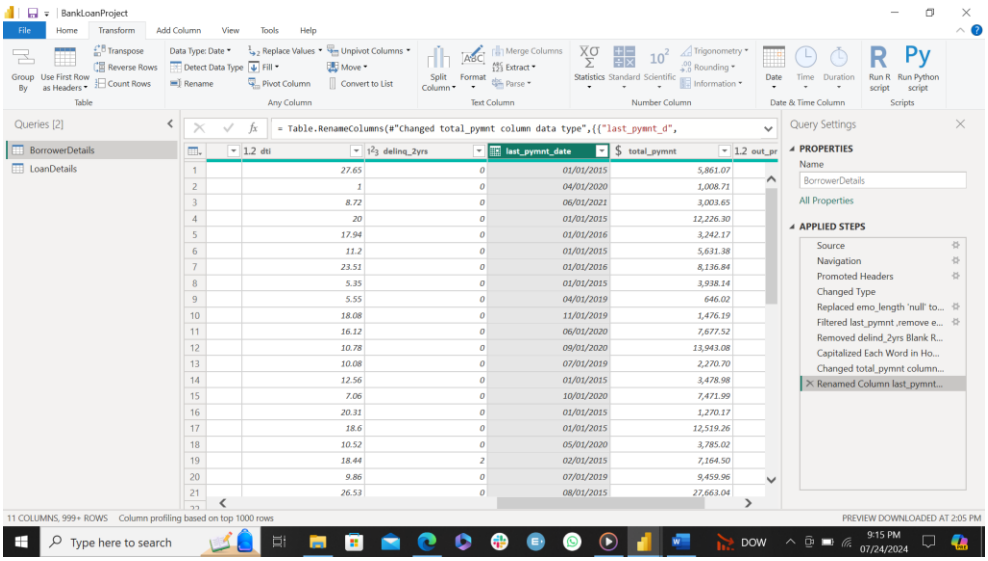
4.1 Data Cleaning

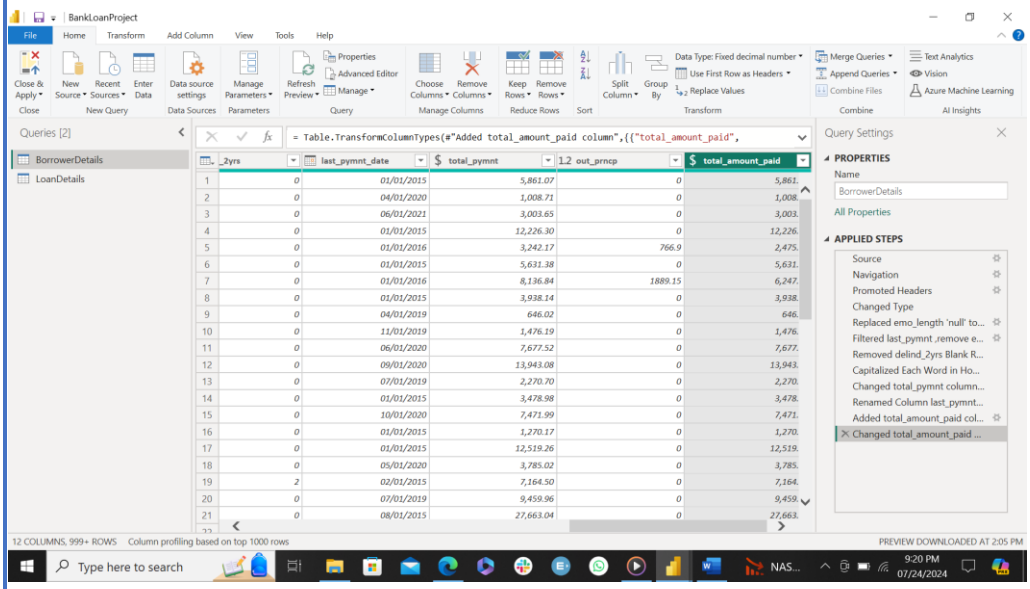
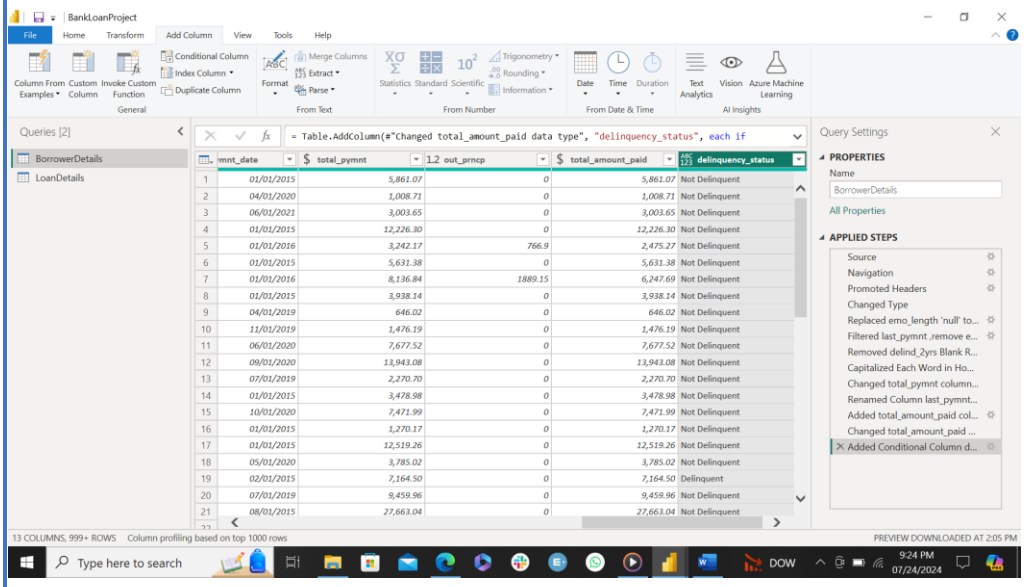
Task	Description
Handling Missing Values	Replaced missing values in emp_length with '0 year'. Removed rows with missing values in last_pymnt_d and delinq_2yrs. 
Removing Duplicates	Removed duplicate rows based on id in LoanDetails. 

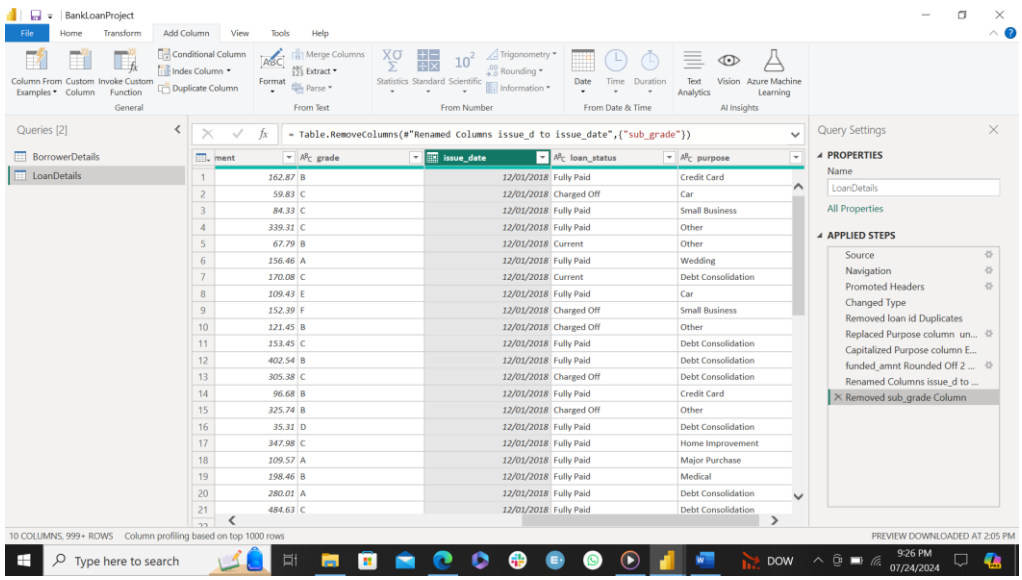
Task	Description
Dealing with Inconsistencies	Replaced underscores with spaces in purpose. Formatted purpose and home_ownership to proper case. 

4.2 Data Transformation

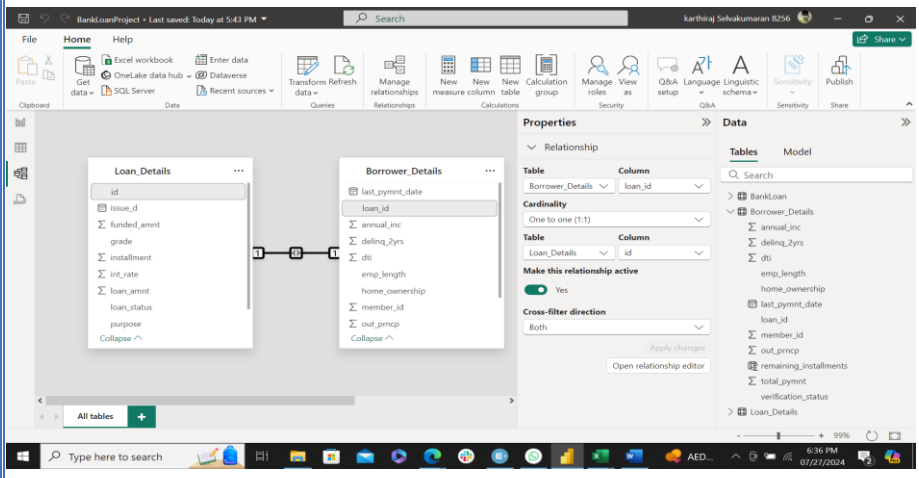
Task	Description
Column Transformation	Changed total_pymnt to 'Fixed decimal number'. Rounded funded_amnt to two decimal places. 

Task	Description
Column Renaming	Renamed issue_d to issue_date.  Renamed last_pymnt_d to last_pymnt_date. 

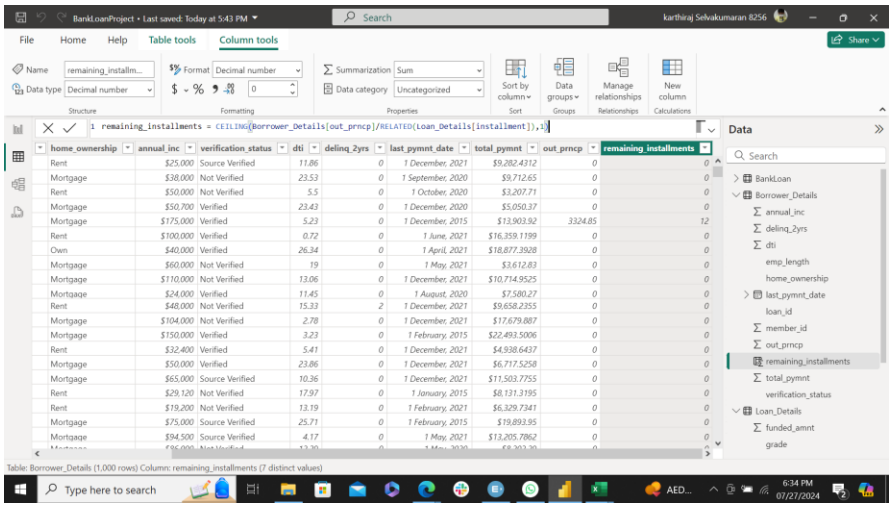
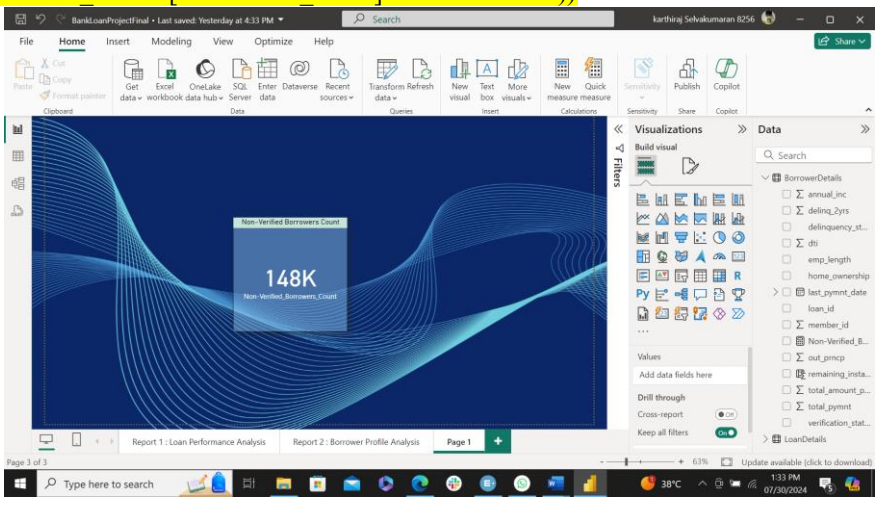
Task	Description
Creating New Columns	Create a new custom column named 'total_amount_paid'  Add a new conditional column named 'delinquency_status' 

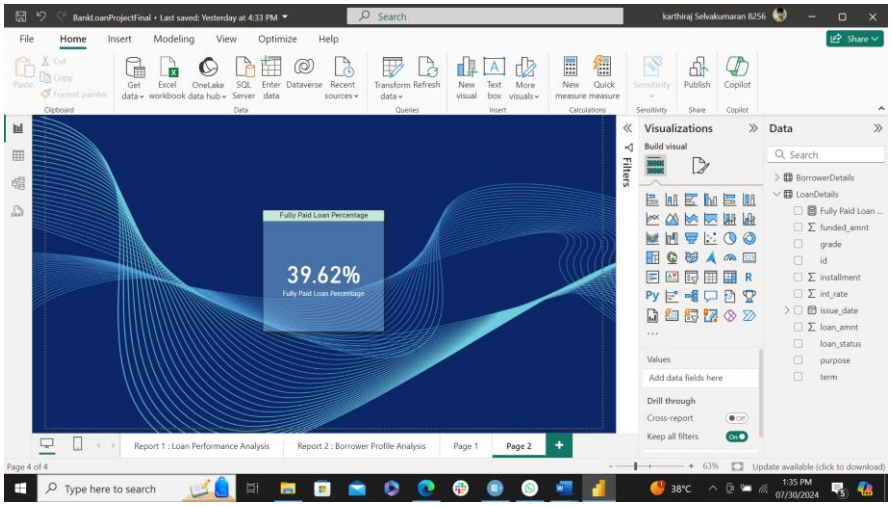
Task	Description
Column Dropping	Removed sub_grade column as it did not contribute significantly to the analysis. 

5. Data Modeling

Task	Description
Establishing Relationships	Linked LoanDetails and BorrowerDetails on id. Set cross-filter direction to "Both". 

6. Creating Measures and Calculated Columns using DAX

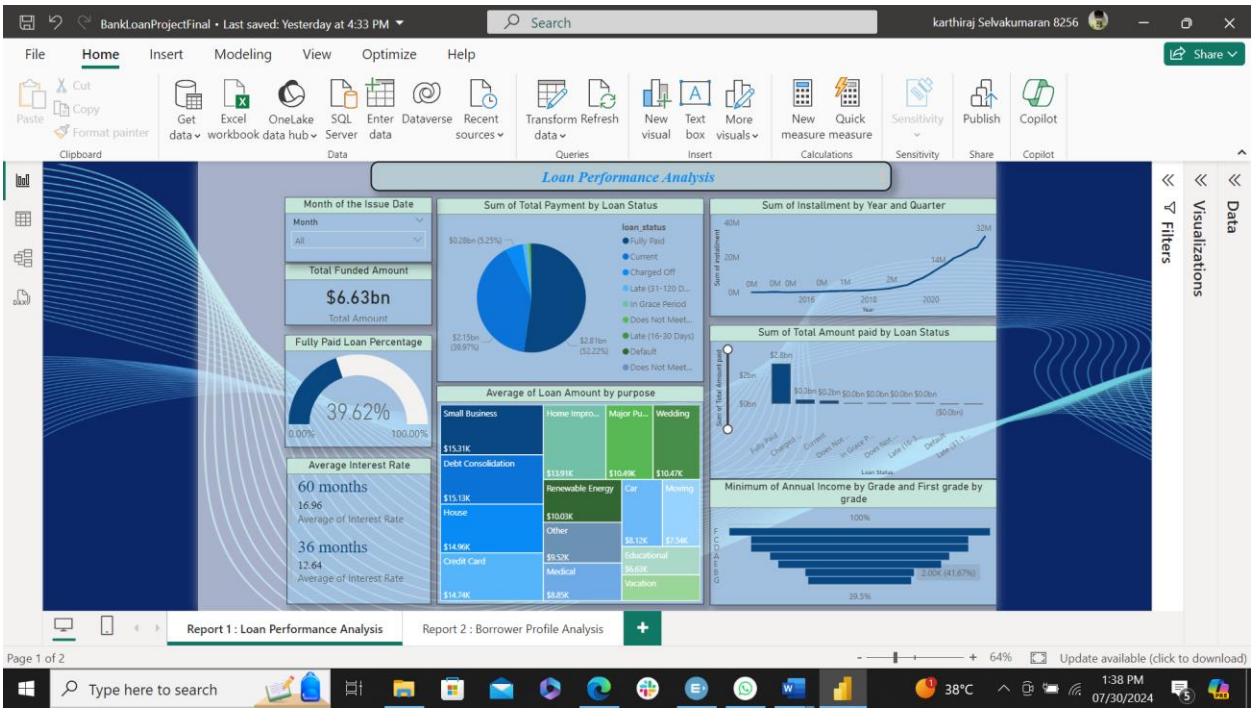
Measure/Column	Description
remaining_installments	Calculates remaining installments using out_prncp / installment, rounded up using CEILING(). remaining installments = CEILING(Borrower_Details[out_prncp]/RELATED(Loan_Details[installment]),1) 
Non-Verified Borrowers Count	Counts loans with 'Not Verified' status in verification_status. Non-Verified_Borrowers_Count = COUNTROWS (FILTER (Borrower_Details, Borrower_Details[verification_status] ="Not Verified")) 

Measure/Column	Description
Fully Paid Loan Percentage	Percentage of loans with "Fully Paid" status. Fully Paid Loan Percentage = DIVIDE (COUNTROWS (FILTER (Loan_Details, Loan_Details[loan_status] ="Fully Paid")), OUNTA(Loan_Details[loan_status]),0) 

7. Creating Comprehensive Reports

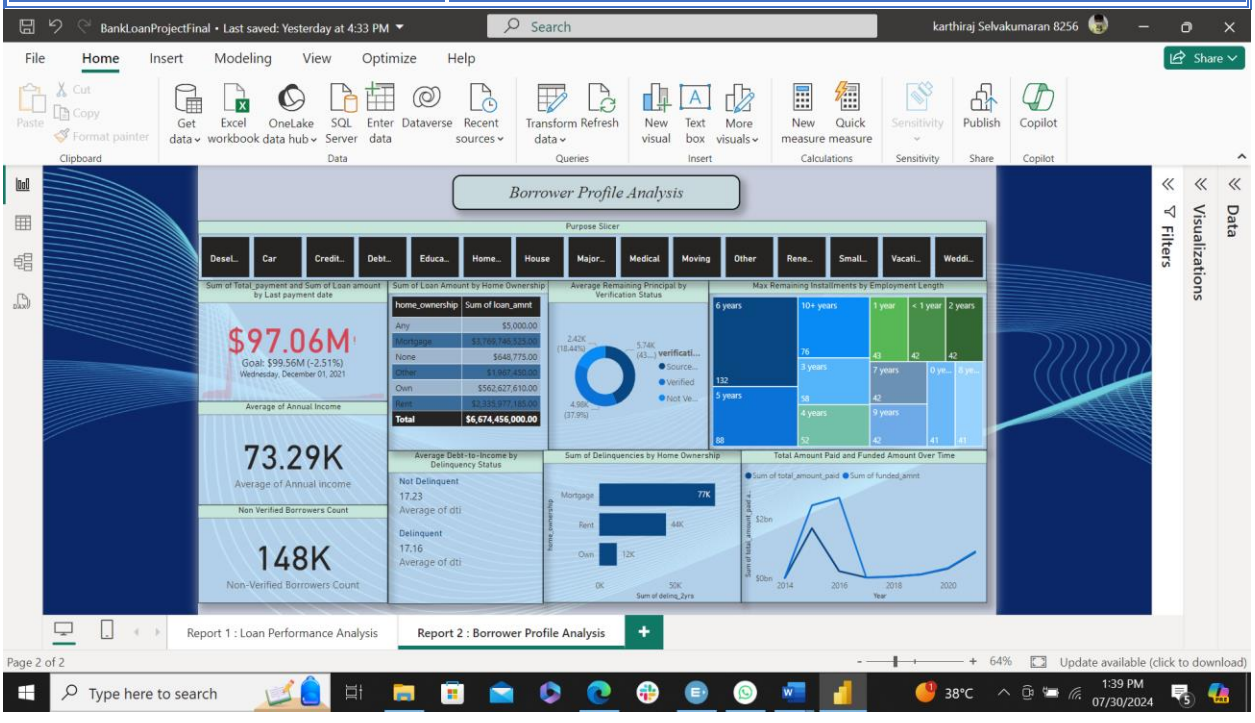
7.1 Report 1: Loan Performance Analysis

Visual	Purpose
Card Visual	Displays total funded amount.
Gauge Chart	Shows 'Fully Paid Loan Percentage'.
Multi-row Card	Shows average interest rate by loan term.
Pie Chart	Visualizes loan status distribution by total payments.
Treemap	Displays average loan amount by purpose.
Line Chart	Visualizes installments over time by year and quarter.
Column Chart	Shows maximum total amount paid by loan status.
Funnel Chart	Displays minimum annual income by grade.
Slicer	Allows filtering by the issue date.



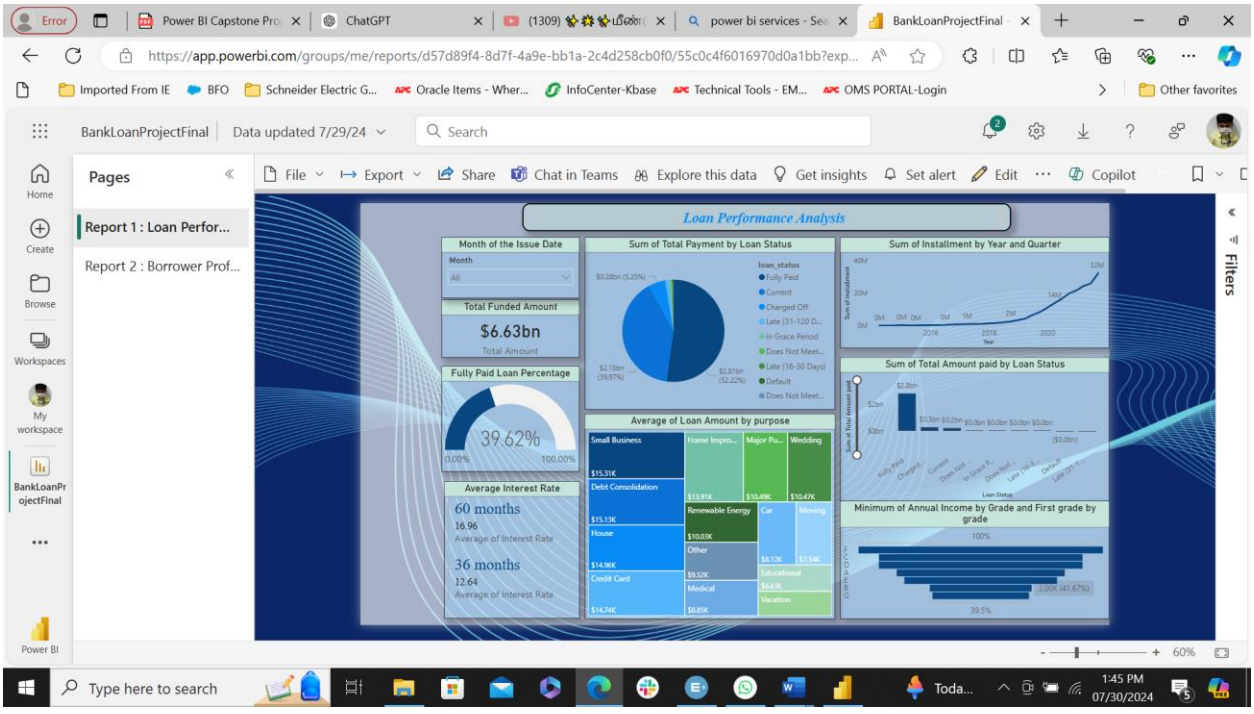
7.2 Report 2: Borrower Profile Analysis

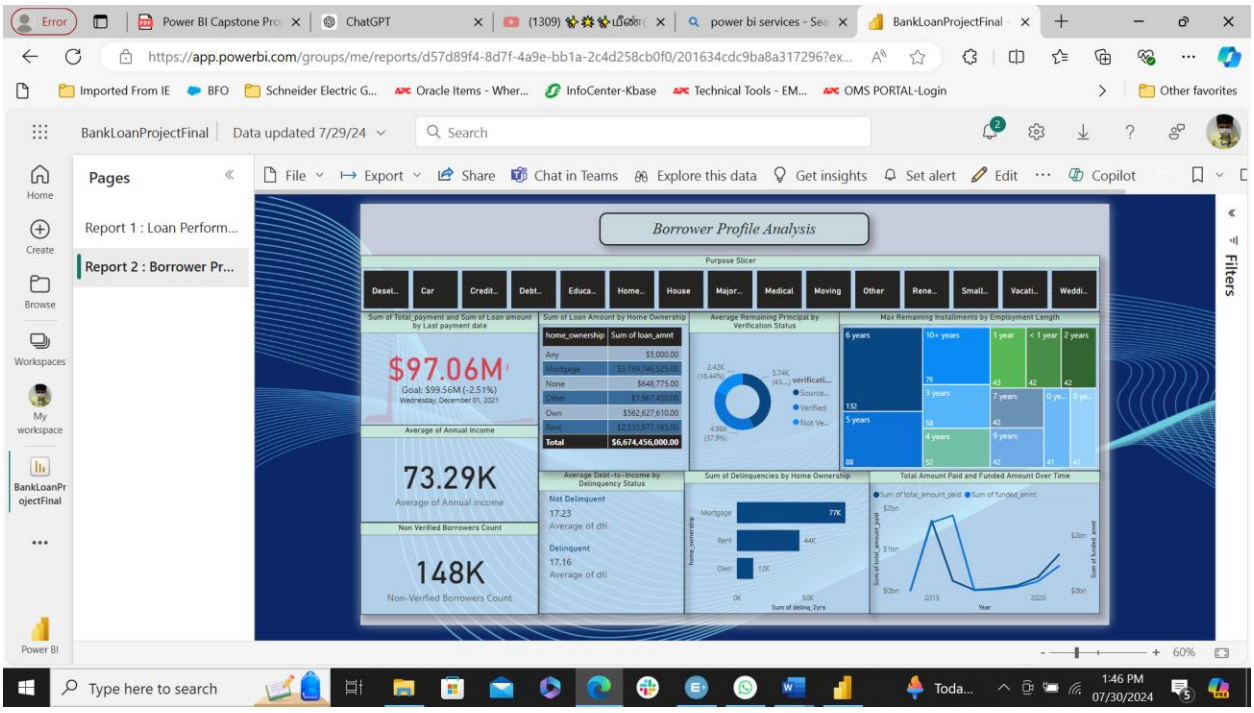
Visual	Purpose
KPI Visual	Shows the sum of total payment, trends, and loan amounts.
Card Visual	Displays average annual income.
Card Visual	Counts non-verified borrowers.
Multi-row Card	Shows average debt-to-income by delinquency status.
Table	Displays total loan amount by home ownership.
Donut Chart	Visualizes average remaining principal by verification status.
Bar Chart	Shows delinquencies by home ownership, filtered to show Mortgage, Rent, Own.
Treemap	Shows max remaining installments by employment length.
Line Chart	Visualizes total amount paid and funded amount over time.
Slicer	Allows filtering by loan purpose.



8. Publishing the Dashboard

1. Sign in to Power BI Service:
    - Make sure you're signed into your Power BI account.
2. Publish the Report:
    - Go to the Home tab and click Publish.
    - Choose the workspace where you want to publish the report. If you don't have a specific workspace, you can publish it to "My Workspace".
3. Access the Dashboard Online:
    - After publishing, go to the Power BI Service (app.powerbi.com) and navigate to the chosen workspace to view your report.





9. Conclusion

This comprehensive analysis of loan performance and borrower profiles provides valuable insights for banking institutions. The findings highlight key factors that influence loan outcomes, enabling banks to refine their lending strategies, improve risk management, and enhance overall portfolio performance.