DA Bank Loan Analysis

A Project Report by Dipal Paneri

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Hi!

My name is Dipal Paneri, I am an aspiring Data Analyst, This Project is one of my Portfolio Project.
As a part of the Project I researched about The Banking Domain through the material provided by Mr. Swapnjeet S., The Bankrate.com and the Nerdwallet.com for the information stated in the presentation.

Bank loans are a crucial financial tool that enables individuals and businesses to achieve their goals and manage financial needs. However, it's essential for borrowers to understand the terms, costs, and responsibilities associated with loans to make informed financial decisions.
As a Data Analyst, It is extremely important to verify the quality of Data as poor quality data can lead to many wrong decision-making actions.

01

Summery

Data Manipulation

Utilizing SQL for querying, processing, and organizing loan data from databases

Visualization

Employing tools like Tableau to create dynamic and interactive dashboards that effectively present key Performance findings.

Trend Analysis

Evaluates an organization's financial information over a period of time, monthly trend, regional distribution, loan term, employment length, loan purpose and home ownership.

Key Metrics

Analyzing important metrics such as total loan applications, funded amounts, received amounts, average interest rates, and debt-to-income ratios over time.

Loan Quality Assesment

Sorting and Differentiating between 'Good Loans' and 'Bad Loans' to assess the quality of the loan Applicant's portfolio.

Detailed Reporting

Offering a detailed view of loan data, borrower profiles, and performance data for in-depth analysis.

PROJECT OVERVIEW

DA Bank Loan Analysis - In order to monitor and assess our bank's lending activities and performance for the Year 2021, create a comprehensive Bank Loan Report.
This report aims to provide insights into key loan-related metrics and their changes over time. The report will help The Bank Management make data-driven decisions, track our loan portfolio's health, and identify trends that can inform our lending strategies.

Here's an overview of the key aspects involved in DA bank loan analysis:

1. **Creditworthiness Evaluation**: Banks evaluate each loan application based on its *merits, assessing the applicant's financial status, credit history, and cash flow projections to determine their ability to repay the loan by DTI, Grade and Subgrade.*
2. ***Risk Assessment**: The level of risk associated with lending to an individual or entity is carefully analyzed. High-risk applicants are less likely to be approved as they pose a greater chance of defaulting on loan payments.*
3. ***Financial Analysis**: Various financial analysis methods, such as ratio and trend analysis, are employed. I developed comprehensive cash flow estimates measured from Installments and DTI and projections to gauge the borrower's financial health.*
4. ***Collateral Review**: Collateral and other sources of repayment are reviewed using the data of Home Ownership to ensure that the bank has security in case of default.*
5. ***Decision-Making**: As a Credit analyst, I use financial reports to determine the level of risk and make informed decisions on loan approvals, considering factors like payment history, employment length, Annual Income by verification status.*
6. ***Loan Terms**: The loan amount granted depends on the lender's confidence that the loan will be repaid on the agreed terms and within the specified period which is 36 months or 60 Months.*

Data Source And ELT (Extract, Load, Transform)

CSV File from Google Drive

- I extracted the file from Mr. Swapnjeet S Google Drive.
- Loaded the File in SQL Server Management Studio(SSMS). Checked the data for anomilies and errors.
- Removed anomolies and structured related errors.

SQL Query

- Building Key Performance Indicators(KPIs) from Problem Statements.
- Verifying Each result with Dashboards.

Problem Statement

Key Performance Indicators (KPIs) Requirements:

1. ***Total Loan Applications:*** *We need to calculate the total number of loan applications received during a specified period. Additionally, it is essential to monitor the Month-to-Date (MTD) Loan Applications and track changes Month-over-Month (MoM).*

2. ***Total Funded Amount:*** *Understanding the total amount of funds disbursed as loans is crucial. We also want to keep an eye on the MTD Total Funded Amount and analyse the Month-over-Month (MoM) changes in this metric.*

3. ***Total Amount Received:*** *Tracking the total amount received from borrowers is essential for assessing the bank's cash flow and loan repayment. We should analyse the Month-to-Date (MTD) Total Amount Received and observe the Month-over-Month (MoM) changes.*

4. ***Average Interest Rate:*** *Calculating the average interest rate across all loans, MTD, and monitoring the Month-over-Month (MoM) variations in interest rates will provide insights into our lending portfolio's overall cost.*

5. ***Average Debt-to-Income Ratio (DTI):*** *Evaluating the average DTI for our borrowers helps us gauge their financial health. We need to compute the average DTI for all loans, MTD, and track Month-over-Month (MoM) fluctuations.*

SQL Query Document

Key Performance Indicators(KPIs)

All the KPIs are derived with respect to Month-to-Date(MTD) and tracking the numbers Month-over-Month(MOM).

1. *Total Loan Applications.*
2. *Total Loan Amount Disbursed to Applicants*
3. *Total Loan Amount Recovered from Borrowers.*
4. *Average Interest Rate for each Application.*
5. *Average Debt-to-Income (DTI) Ratio to measure the Applicant's Financial Health.*

DA BANK LOAN FINANCIAL ANALYSIS

SQL QUERY DOCUMENTS

Key Performance Indicators (KPI's)

A. Total Loan Application Received

```
SELECT COUNT(id) AS Total_Applications FROM Bank_Loan
```

	Total_Applications
1	38576

a. Month to Year-Total Loan Application

```
SELECT COUNT(id) AS MTD FROM Bank_Loan
WHERE MONTH(issue_date) = 12 AND YEAR(issue_date)= 2021
```

	MTD
1	4314

b. Month to Month (MOM) Total Loan Application Calculated by Previous Month.

```
SELECT SUM(loan_amount) AS Total_Loan_Disbursed FROM Bank_Loan
```

	MoM_Total_Loan_Application
1	4035

B. Total Loan Amount disbursed

```
SELECT SUM(loan_amount) AS Total_Loan_Disbursed FROM Bank_Loan
```

	Total_Loan_Disbursed
1	435757075

o/p – Total Loan Amount disbursed by Bank Approx. 435 million.

|Good Loan Application Percentage

A. Good Loan Application Percentage

```
SELECT (COUNT(CASE WHEN loan_status='Fully Paid' OR loan_status='Current' THEN id END)
* 100)
 / COUNT(id) AS Good_Loan_Application
    FROM Bank_Loan
```

	Good_Loan_Application
1	86

B. Total Good Loan Application

```
SELECT COUNT(id) AS Good_Loan_Application
FROM Bank_Loan
WHERE loan_status='Fully Paid' OR loan_status='Current'
```

	Good_Loan_Application
1	33243

C. Good Loan Funded Amount

```
SELECT SUM(loan_amount) AS Total_Funded_Good_Loan
FROM Bank_Loan
WHERE loan_status='Fully Paid' OR loan_status='Current'
```

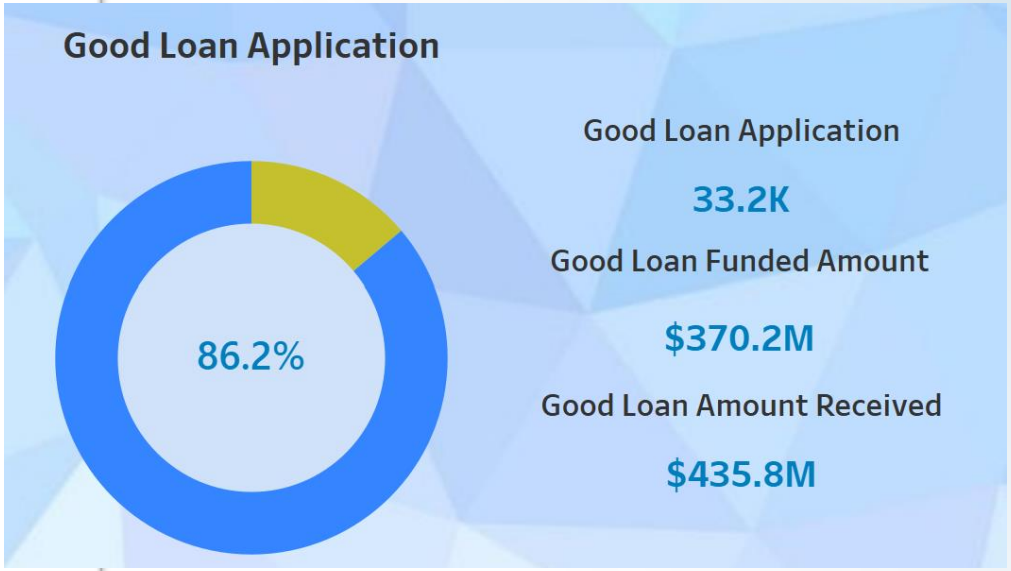
	Total_Funded_Good_Loan
1	370224850

D. Good Loan Total Amount Received

```
SELECT SUM(total_payment) AS Total_Amount_Receive_GoodLoan
FROM Bank_Loan
WHERE loan_status='Fully Paid' OR loan_status='Current'
```

	Total_Amount_Receive_GoodLoan
1	435786170

GOOD LOAN APPLICATION AND REVENUE DETAILS



BAD LOAN APPLICATIONS

A. Bad Loan Application

```
SELECT (COUNT(CASE WHEN loan_status='Charged off' THEN id END) * 100)
        / COUNT(id) AS Bad_Loan_Application
FROM Bank_Loan
```

	Bad_Loan_Application
1	13

o/p : Total 13% of Applications are Bad Loan Applications.

B. Total No of Bad Loan Applications

```
SELECT COUNT(id) AS Total_Bad_Loan_Application
FROM Bank_Loan
WHERE loan_status='Charged Off'
```

	Total_Bad_Loan_Application
1	5333

C. BAD loan Funded Amount

```
SELECT SUM(loan_amount) AS Bad_Loan_Funded_Amount
FROM Bank_Loan
WHERE loan_status='Charged Off'
```

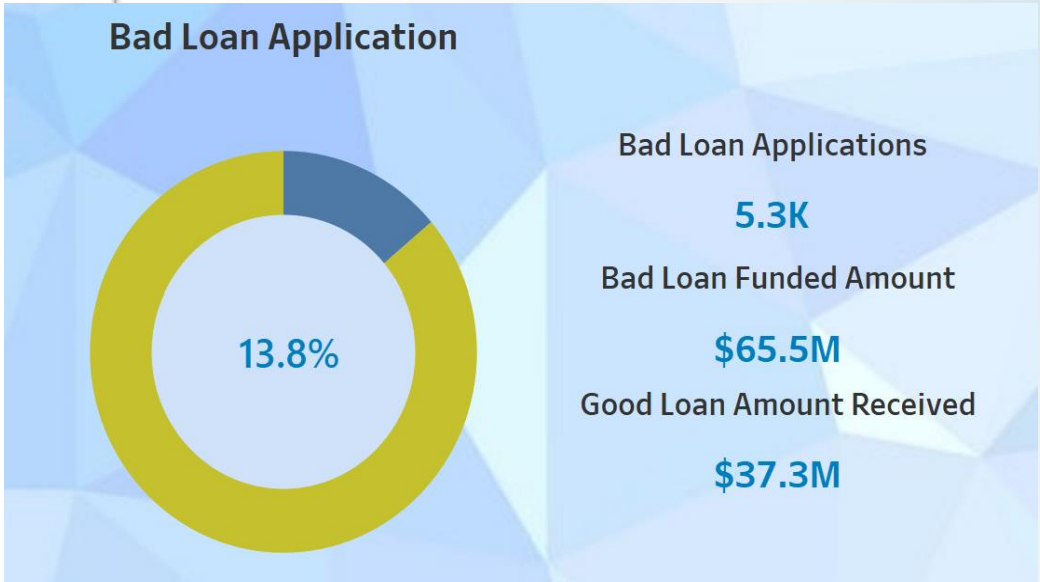
	Bad_Loan_Funded_Amount
1	65532225

D. BAD loan Received Amount

```
SELECT SUM(total_payment) AS Bad_Loan_Received_Amount
FROM Bank_Loan
WHERE loan_status='Charged Off'
```

	Bad_Loan_Received_Amount
1	37284763

BAD LOAN APPLICATION AND REVENUE DETAILS



Loan Grid View

```
Part 1. SELECT loan_status,
        COUNT(id) AS Total_Loan_Application,
        SUM(loan_amount) AS Total_Funded_Amount,
        SUM(total_payment) AS Total_Amount_Received,
        AVG(int_rate)*100 AS AVG_Interest_Rate,
        AVG(dti)* 100 AS Avg_DTI
        FROM Bank_Loan
        GROUP BY loan_status
```

	loan_status	Total_Loan_Application	Total_Funded_Amount	Total_Amount_Received	AVG_Interest_Rate	Avg_DTI
1	Fully Paid	32145	351358350	411586256	11.6410707918092	13.1673507557434
2	Current	1098	18866500	24199914	15.0993260800947	14.7243442736843
3	Charged Off	5333	65532225	37284763	13.8785749318289	14.0047328005517

LOAN STATUS REVENUE DETAILS

```
Part 2. SELECT  loan_status,
        SUM(loan_amount) AS MTD_Funded_Amount,
        SUM(total_payment) AS MTD_Amount_Received
        FROM Bank_Loan
        WHERE YEAR(issue_date)= 2021  GROUP BY loan_status
```

	loan_status	MTD_Funded_Amount	MTD_Amount_Received
1	Fully Paid	351358350	411586256
2	Current	18866500	24199914
3	Charged Off	65532225	37284763

Loan Status

Loan Status	Total Loan Applications	Total Funded Amount	Total Amount Received	MTD Total Funded Amount	MTD Total Amount Received	Average Debt-to-Income Rate	Average Interest Rate
Charged Off	5,333	$65.5M	$37.3M	$8.7M	$5.3M	14.00%	13.88%
Current	1,098	$18.9M	$24.2M	$3.9M	$4.9M	14.72%	15.10%
Fully Paid	32,145	$351.4M	$411.6M	$41.3M	$47.8M	13.17%	11.64%
Grand Total	38,576	$435.8M	$473.1M	$54.0M	$58.1M	13.33%	12.05%

38576

TOTAL DA BANK LOAN APPLICATIONS

$435.08M

TOTAL DA BANK LOAN APPLICATIONS DISBURSED

$473.01M

TOTAL DA BANK LOAN APPLICATIONS RECOVERED

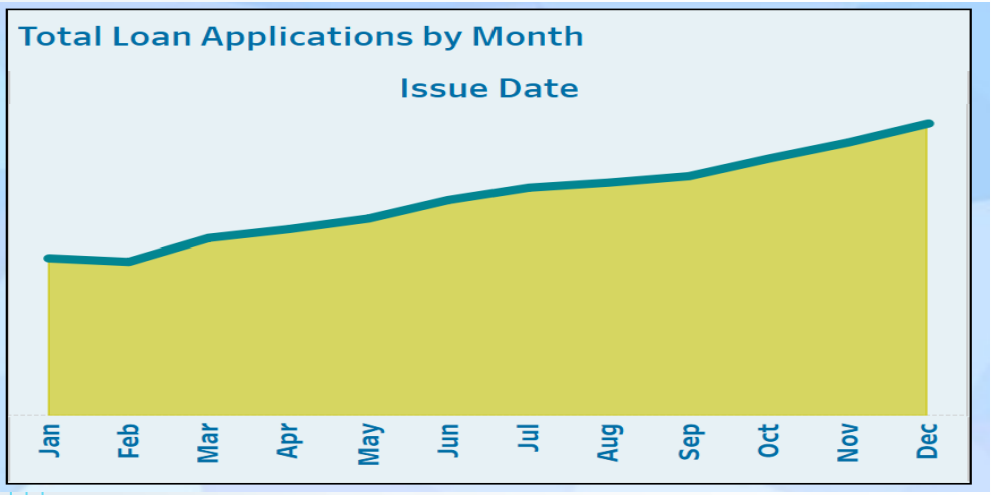
LOAN APPLICATIONS BY MONTH

DA Bank Loan Applications Monthly chart will showcase how 'Total Loan Applications,' 'Total Funded Amount,' and 'Total Amount Received' vary over time, allowing us to identify seasonality and long-term trends in lending activities.

Overview Dashboard2 - Monthly Trends by Issue date

1. Monthly Trends by Issue_date

```
SELECT
        MONTH(issue_date) AS Month_No,
        DATENAME(MONTH, issue_date) AS Month_name,
        COUNT(id) AS Total_Application,
        SUM(loan_amount) AS Total_Funded_Amount,
        SUM(total_payment) AS Total_Amount_Received
FROM Bank_Loan
GROUP BY MONTH(issue_date), DATENAME(MONTH, issue_date)
ORDER BY MONTH(issue_date)
```



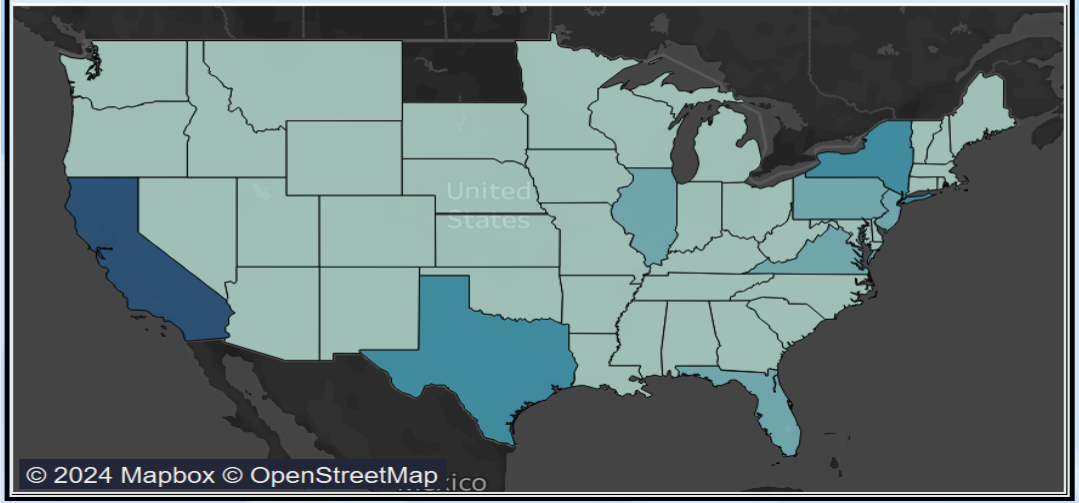
Month_No	Month_name	Total_Application	Total_Funded_Amount	Total_Amount_Received
1	January	2332	25031650	27578836
2	February	2279	24647825	27717745
3	March	2627	28875700	32264400
4	April	2755	29800800	32495533
5	May	2911	31738350	33750523
6	June	3184	34161475	36164533
7	July	3366	35813900	38827220
8	August	3441	38149600	42682218
9	September	3536	40907725	43983948
10	October	3796	44893800	49399567
11	November	4035	47754825	50132030
12	December	4314	53981425	58074380

LOAN APPLICATIONS BY STATES

DA Bank Loan Applications Regional Analysis map will visually represent lending metrics categorized by state, enabling us to identify regions with significant lending activity and assess regional disparities.

```
2. Regional Analysis by State
SELECT
        address_state,
        COUNT(id) AS Total_Application,
        SUM(loan_amount) AS Total_Funded_Amount,
        SUM(total_payment) AS Total_Amount_Received
FROM Bank_Loan
GROUP BY address_state
ORDER BY address_state
```

Total Amount Received by State



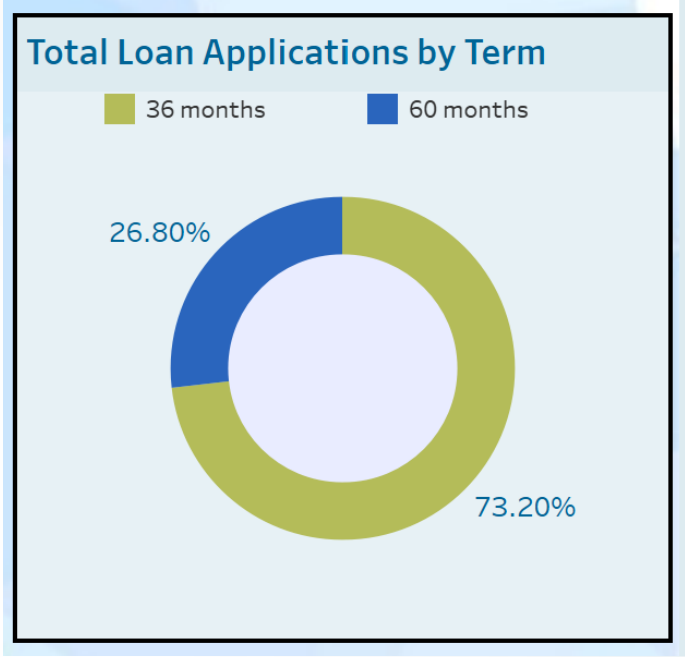
	address_state	Total_Application	Total_Funded_Amount	Total_Amount_Received
1	AK	78	1031800	1108570
2	AL	432	4949225	5492272
3	AR	236	2529700	2777875
4	AZ	833	9206000	10041986
5	CA	6894	78484125	83901234
6	CO	770	8976000	9845810
7	CT	730	8435575	9357612
8	DC	214	2652350	2921854
9	DE	110	1138100	1269136
10	FL	2773	30046125	31601905
11	GA	1355	15480325	16728040
12	HI	170	1850525	2080184
13	IA	5	56450	64482
14	ID	6	59750	65329
15	IL	1486	17124225	18875941
16	IN	9	86225	85521
17	KS	260	2872325	3247394
18	KY	320	3504100	3792530
19	LA	426	4498900	5001160
20	MA	1310	15051000	16676279
21	MD	1027	11911400	12985170
22	ME	3	9200	10808
23	MI	685	7829900	8543660
24	MN	592	6302600	6750746
25	MO	660	7151175	7692732
26	MS	19	139125	149342
27	MT	79	829525	892047
28	NC	759	8787575	9534813
29	NE	5	31700	24542
30	NH	161	1917900	2101386
31	NJ	1822	21657475	23425159
32	NM	183	1916775	2084485
33	NV	482	5307375	5451443
34	NY	3701	42077050	46108181
35	OH	1188	12991375	14330148
36	OK	293	3365725	3712649
37	OR	436	4720150	4966903
38	PA	1482	15826525	17462908
39	RI	196	1883025	2001774
40	SC	464	5080475	5462458
41	SD	63	606150	656514
42	TN	17	162175	141522
43	TX	2664	31236650	34392715
44	UT	252	2849225	2952412
44	UT	252	2849225	2952412
45	VA	1375	15982650	17711443
46	VT	54	504100	534973
47	WA	805	8855525	9531739
48	WI	446	5070450	5485161
49	WV	167	1830525	1991936
50	WY	79	890750	1046050

LOAN APPLICATIONS BY TERM

DA Bank Loan Applications donut chart will depict loan statistics based on different loan terms, allowing us to understand the distribution of loans across various term lengths.

```
    3.  Loan Term Analysis
SELECT
    term AS Term,
    COUNT(id) AS Total_Application,
    SUM(loan_amount) AS Total_Funded_Amount,
    SUM(total_payment) AS Total_Amount_Received
FROM Bank_Loan
GROUP BY term
ORDER BY term
```

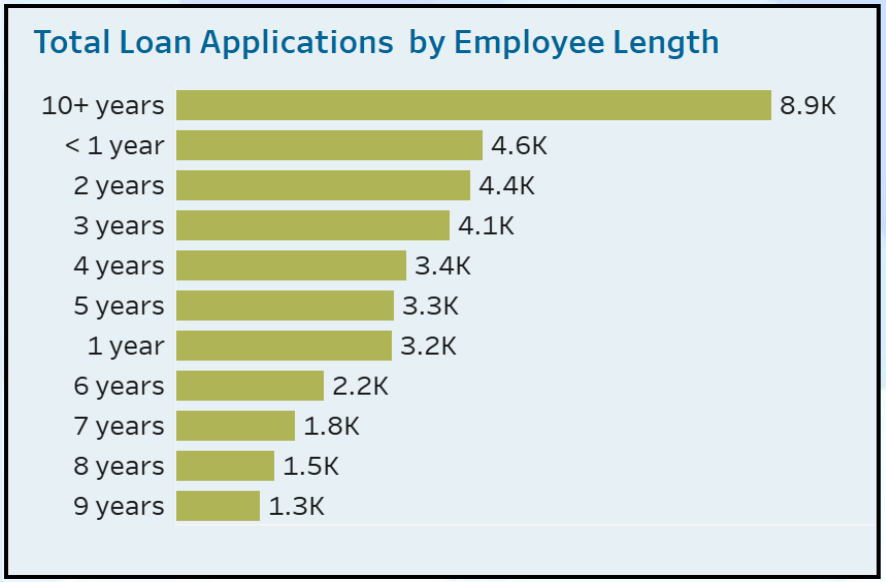
	Term	Total_Application	Total_Funded_Amount	Total_Amount_Received
1	36 months	28237	273041225	294709458
2	60 months	10339	162715850	178361475



LOAN APPLICATIONS BY EMPLOYEE LENGTH

DA Bank Loan Applications bar chart will illustrate how lending metrics are distributed among borrowers with different employment lengths, helping us assess the impact of employment history on loan applications.

```
4. Employee Length Analysis
SELECT
    emp_length AS Employee_length,
          COUNT(id) AS Total_Application,
          SUM(loan_amount) AS Total_Funded_Amount,
          SUM(total_payment) AS Total_Amount_Received
    FROM Bank_Loan
    GROUP BY emp_length
    ORDER BY COUNT(id) DESC
```



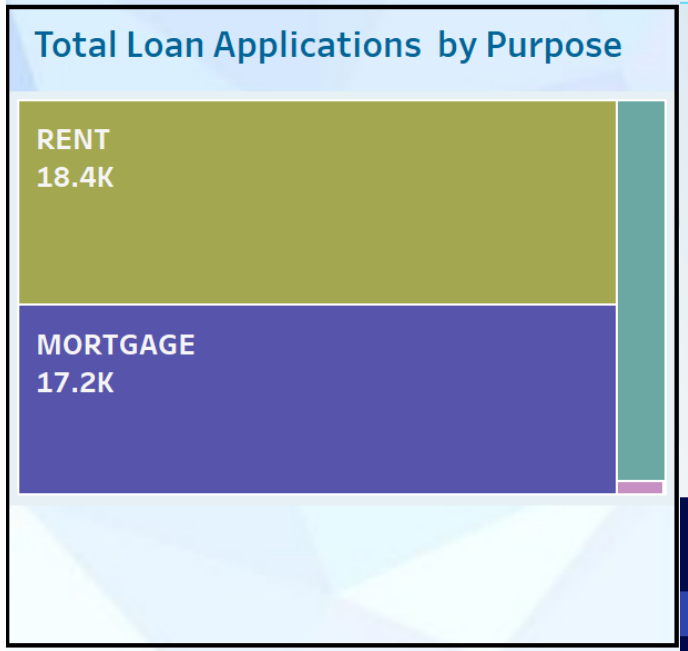
	Employee_length	Total_Application	Total_Funded_Amount	Total_Amount_Received
1	10+ years	8870	116115950	125871616
2	< 1 year	4575	44210625	47545011
3	2 years	4382	44967975	49206961
4	3 years	4088	43937850	47551832
5	4 years	3428	37600375	40964850
6	5 years	3273	36973625	40397571
7	1 year	3229	32883125	35498348
8	6 years	2228	25612650	27908658
9	7 years	1772	20811725	22584136
10	8 years	1476	17558950	19025777
11	9 years	1255	15084225	16516173

LOAN APPLICATIONS BY HOME OWNERSHIP

DA Bank Loan Applications tree map will display loan metrics categorized by different home ownership statuses, allowing for a hierarchical view of how home ownership impacts loan applications and disbursements.

```
6.  Home Ownership Analysis
SELECT
        home_ownership AS Home_Ownership,
        COUNT(id) AS Total_Application,
        SUM(loan_amount) AS Total_Funded_Amount,
        SUM(total_payment) AS Total_Amount_Received
FROM Bank_Loan
GROUP BY home_ownership
ORDER BY  Count(id) DESC
```

	Home_Ownership	Total_Application	Total_Funded_Amount	Total_Amount_Received
1	RENT	18439	185768475	201823056
2	MORTGAGE	17198	219329150	238474438
3	OWN	2838	29597675	31729129
4	OTHER	98	1044975	1025257
5	NONE	3	16800	19053



DETAILGRID VIEW

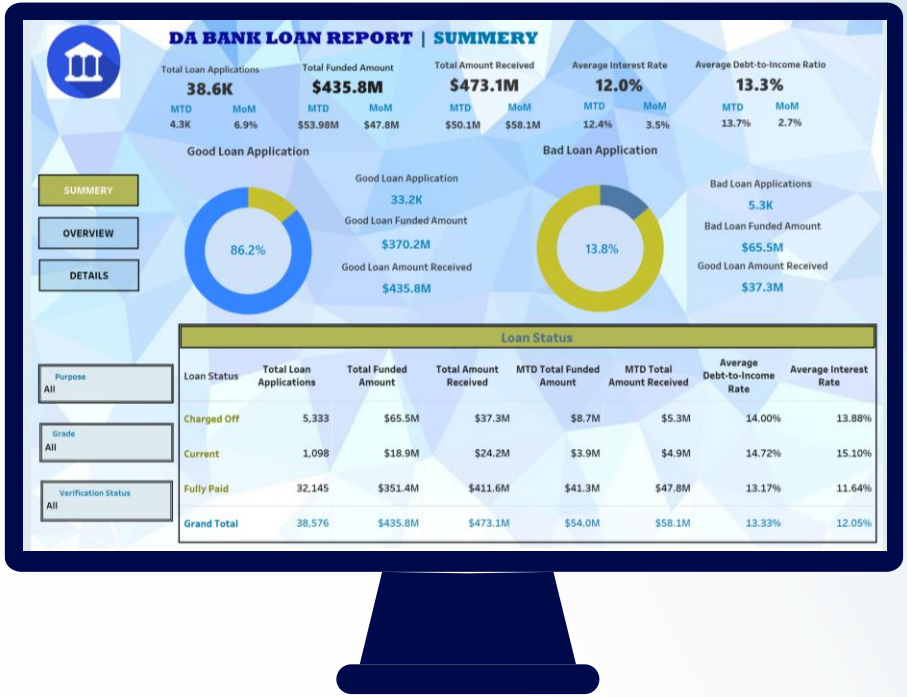
The primary objective of the Details Dashboard is to provide a comprehensive and user-friendly interface for accessing vital loan data. It will serve as a one-stop solution for users seeking detailed insights into our loan portfolio, borrower profiles, and loan performance.

Detailed Grid

Id	Purpose	Home Own..	Grade	Sub Grade	Issue Date	Int Rate	Loan Amount	Installment	Total Payment
100214	credit card	OWN	A	A2	8/7/2021	7.4%	5,000	155	5,594
101579	small business	RENT	C	C1	7/7/2021	10.3%	10,000	324	11,663
102376	small business	RENT	C	C2	7/7/2021	10.6%	25,000	814	29,270
106079	educational	RENT	B	B5	7/7/2021	10.0%	3,500	113	3,942
106360	Debt consolidation	RENT	F	F4	7/7/2021	16.0%	2,700	95	3,415
107136	small business	RENT	C	C2	7/7/2021	10.6%	12,250	399	13,129
109355	credit card	RENT	C	C5	7/7/2021	11.5%	1,200	40	1,425
111227	credit card	MORTGAGE	E	E1	8/7/2021	13.4%	20,000	678	20,340
111307	credit card	OWN	D	D3	8/7/2021	12.5%	12,000	401	14,449
111917	moving	RENT	B	B4	8/7/2021	9.6%	6,400	205	7,396
112216	Debt consolidation	RENT	D	D1	8/7/2021	11.9%	12,000	398	14,361
112245	car	RENT	A	A2	7/7/2021	7.4%	5,000	155	5,594
112323	moving	RENT	C	C1	7/7/2021	10.3%	3,500	113	4,097
112496	Debt consolidation	MORTGAGE	D	D1	8/7/2021	11.9%	3,000	99	3,580
113156	credit card	RENT	A	A4	8/7/2021	8.1%	3,500	110	3,952
113179	wedding	MORTGAGE	C	C2	8/7/2021	10.6%	1,000	33	704
113194	other	RENT	B	B5	8/7/2021	10.0%	3,500	113	4,063
116040	Debt consolidation	MORTGAGE	B	B4	8/7/2021	9.6%	5,000	161	5,778
116582	Debt consolidation	RENT	E	E2	8/7/2021	13.8%	10,000	341	12,260
117056	home improvement	MORTGAGE	A	A3	8/7/2021	7.8%	5,000	156	5,592
117249	credit card	MORTGAGE	A	A2	8/7/2021	7.4%	5,000	155	5,496
117794	home improvement	MORTGAGE	A	A4	8/7/2021	8.1%	7,500	235	7,827
117863	Debt consolidation	RENT	B	B5	8/7/2021	10.0%	8,000	258	9,200
118523	small business	MORTGAGE	F	F1	8/7/2021	15.0%	6,500	225	4,054
118533	home improvement	MORTGAGE	B	B4	8/7/2021	9.6%	2,500	80	2,087
118823	home improvement	MORTGAGE	D	D4	8/7/2021	12.8%	2,500	84	2,221
119043	Debt consolidation	MORTGAGE	C	C4	8/7/2021	11.2%	15,450	507	11,653

Computer mockup

The User Interface of the dashboards, makes it easy and extremely simple for the stakeholders, Board Members to understand the complex data flow and the outcome of every step of calculations which can improve the numbers of benefits for Bank as well as Borrowers.



Let’s have a glimpse of today’s Market

- Average personal loan rates started at 10.37 percent in January 2023.
- Rates continued to climb all year and peaked at the end of December at 11.60 percent.
- Personal loan rates may drop if the Fed starts cutting rates in the second half of 2024.

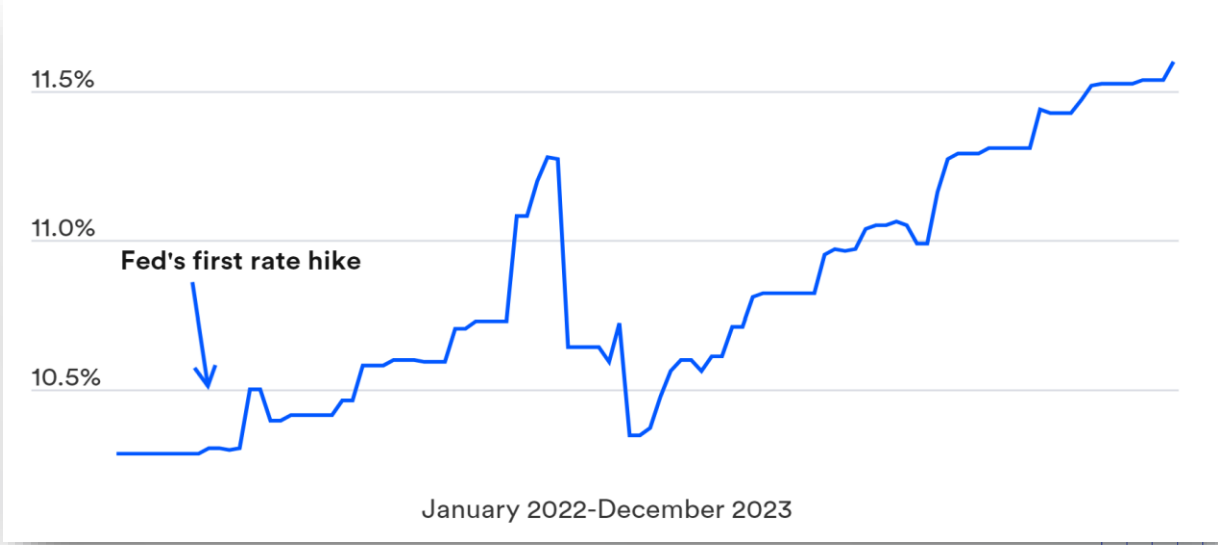
Source : Bankrate national rate survey, January 2024

“I am forecasting two rate cuts skewed toward the back half of next year, and in response to that we could see a little drop in personal loan rates.”

— GREG MCBRIDE, CFA | BANKRATE CHIEF FINANCIAL ANALYST

Source : Bankrate national rate survey, January 2024

Getting a new personal loan may be a way to improve your financial situation in 2024, especially if you paid off multiple credit card debts in 2023 with a debt consolidation loan. "You may be able to refinance a personal loan that was taken out at a much higher rate at a more competitive rate now that your credit has improved," McBride says.



Source : Bankrate national rate survey, January 2024

Thanks

Do you have any questions?

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