Data to Decisions Qlik Journey through LendingClub Issued Loans Analysis (Qlik)

The "Data to Decisions Qlik Journey through LendingClub Issued Loans Analysis" project aims to utilize the Qlik platform to analyze and derive insights from the issued loan data of LendingClub, a peer-to-peer lending company. This project involves leveraging data visualization and analytics tools provided by Qlik to explore various facets of LendingClub's loan portfolio, facilitating informed decision-making processes.

Project Flow

To accomplish this, we have to complete all the activities listed below,

- ➤ Define Problem / Problem Understanding
  - ● Specify the business problem

- Business requirements
- Literature Survey
➤ Data Collection
- Collect the dataset,
- Connect Data with Qlik Sense
➤ Data Preparation
➤ Prepare the Data for Visualization
➤ Data Visualizations
- Visualizations
➤ Dashboard
- Responsive and Design of Dashboard
➤ Story
- Story Creation
➤ Performance Testing
- Amount of Data Rendered to DB '
- Utilization of Data Filters
➤ Project Demonstration & Documentation
- Record explanation Video for project end to end solution
- Project Documentation–Step by step project development procedure

Define Problem / Problem Understanding

Specify the business problem

The business problem lies in the inadequacy of the current lending strategy, which fails to leverage insights from LendingClub loan data. This results in ineffective risk assessment, challenges in predicting loan defaults, and a lack of adaptability in lending criteria, ultimately exposing the institution to financial losses and reduced competitiveness in the market.

Business Requirements

Business requirements will provide a strong foundation for the projectanalysis, allowing us to explore various aspects of LendingClub's loan data while delivering actionable insights to stakeholders.

- Loan Performance Analysis : Assess the performance of loans issued by LendingClub by analyzing metrics such as repayment rates, default rates, and average loan amounts.

- Customer Segmentation : Identify and segment borrowers based on characteristics such as income, credit score, loan purpose, and loan amount.

- Risk Assessment : Analyze historical data to develop risk profiles for borrowers and predict the likelihood of loan defaults using predictive analytics.

- Market Trend Analysis : Explore trends in loan issuance over time, including the types of loans being issued and fluctuations in demand based on economic conditions.

- Interest Rate Analysis : Analyze how different factors (such as borrower credit rating, loan type, or market conditions) affect interest rates offered on loans.

- Fraud Detection : Implement data analytics techniques to detect potentially fraudulent loan applications or behaviors.

Literature Survey

Source- investopedia.com

The overview of LendingClub's personal loan offerings highlights both pros and cons, making it essential for potential borrowers to weigh their options carefully.

Pros:

1. Direct Creditor Payments: LendingClub allows for direct payments to creditors when consolidating debt, streamlining the process for borrowers.
2. Multiple Loans Allowed: Qualified borrowers can take out more than one personal loan, with a cumulative maximum of $50,000.
3. Customer Satisfaction: LendingClub generally receives positive feedback from customers, which is somewhat atypical for financial service providers.

Cons:

1. Origination Fees: LendingClub charges origination fees ranging from 3% to 8%, which may deter some borrowers.
2. Unspecified Credit Score Requirement: The lack of a disclosed minimum credit score can be a barrier for fair-credit borrowers.
3. Shorter Maximum Term: The maximum loan repayment term is 60 months, which is shorter compared to some competitors.

LendingClub offers unsecured personal loans and auto refinancing loans, covering various uses such as debt consolidation, home improvements, medical expenses, moving costs, and large purchases. However, loans cannot be used for education expenses, investments, cryptocurrency purchases, or illegal activities.

The application process is relatively quick, with approval possible within hours and funding within one day. Borrower requirements include a minimum age of 18, a verifiable bank account, and citizenship or residency status in the U.S.

LendingClub also provides unique features like the option to change payment due dates and work with borrowers facing payment difficulties. Co-applicants may be included in loan applications, sharing equal responsibility for repayment.

However, refinancing an existing LendingClub loan is not possible; borrowers would need to seek loans from other lenders. Customer service is primarily available via phone, with operating hours from Monday to Saturday, and there are mixed reviews regarding service responsiveness.

In terms of offerings, LendingClub's APR ranges from 8.98% to 35.99%, with amounts available up to $40,000 and loan terms between 24 to 60 months. Comparatively, LendingClub's APRs are higher than some competitors that may offer lower rates and longer terms.

Despite its shortcomings, LendingClub remains a credible option in the personal loan space, accredited by the Better Business Bureau and holding a respectable rating on Trustpilot. Borrowers with a minimum credit score of 660 may find greater loan opportunities with potentially lower rates.

Overall, LendingClub's personal loan products offer competitive features, but borrowers should consider their specific financial needs and compare multiple lenders for the best options available.

Lending Club is an online credit marketplace in the US that functions as a matchmaking platform, connecting investors with individuals and small businesses seeking loans. The company offers diverse financial products, allowing borrowers to apply for personal, business, and medical patient loans. Loan amounts for personal borrowers range from 1,000 to 40,000, while business loans can reach up to 300,000 *and patient solution loan scan goup to* 50,000.

The unique feature of Lending Club's model is the division of loans into $25 fragments, termed 'notes', which investors can purchase. These notes have associated risk profiles, categorized by grades from 'A1' (lowest risk) to 'G5' (highest risk), allowing investors to choose between active and passive investment strategies. Active investors select their desired notes while passive investors select based on risk profiles, with Lending Club facilitating purchases on their behalf. However, note holders face the risk of not being repaid in the event of borrower default. The platform also allows for trading these notes, adding liquidity to the investment process.

Founded in 2006, Lending Club initially started as a Facebook application and evolved into a stand-alone peer-to-peer (P2P) lending entity after significant venture capital investment. It became the first P2P lender to go public in 2014 but has faced challenges post-IPO, including a dramatic decline in stock value and management changes. To date, Lending Club has processed over 1.6 million loans, amounting to approximately $20 billion, with repeat borrowers constituting 14% of its customer base.

Lending Club serves six main customer segments: individual investors, institutional investors, individual borrowers, small and medium enterprises (SMEs), medical patients, and medical practices, all based in the United States. The platform has gained substantial traction, with estimates indicating over 700,000 users actively engaging with its services.

Data Collection & Extraction from Database

Downloading the dataset

Link – https://www.kaggle.com/datasets/husainsb/lendingclub-issued-loans

I have used Test data set (lc_2016_2017.csv) for analysis which contains loans issued from 2016 till 2017.

Understand the data

- The LendingClub dataset includes detailed financial records of loans issued to borrowers.
- It spans the years 2016 and 2017, providing a snapshot of lending practices during that period.
- Dataset contains complete loan data for all loans issued through the time period stated, including –
  - Current loan status (Current, Late, Fully Paid, etc.)
  - Unique member id of the members
    Loan amount taken by members
    Tenure for the loan_amount
    Rate of Interest for the loan_amount
    Grades of the members
  - Funded amount taken by members
  - States of the members, etc.

Data Preparation

Importing the dataset-

Importing data into Qlik Cloud is a straightforward process. Here's how to do it step-by-step:

- Log In to Qlik Cloud:

  - Open your web browser and go to the Qlik Cloud login page.
  - Enter your credentials to access your Qlik Cloud account.

- Create or Open an App:

  - Once logged in, you can either create a new app by clicking on "Create new app" or select an existing app from your library.

- Add Data:

  - Inside your app, locate the "Add data" button. This can typically be found on the top right corner of the app interface.
  - Click the "Add data" button.

- Select a Data Source:

  - You will see several options for data sources, including:
    - Files: Upload files such as Excel, CSV, or text files.
    - Databases: Connect to various databases (e.g., SQL Server, MySQL).
    - Web Files: Import data from online sources.
    - REST Connector: For accessing data from RESTful APIs.
    - Other integrations: Various cloud services and tools.

- Upload Files (if applicable):

  - If you select a file to upload, click on "Choose files" to browse your computer and select the desired file.
  - After selecting the file, click "Next."

- Data Preview and Transformation:

  - Qlik Cloud will display a preview of your data. You can make adjustments here if needed (renaming fields, changing data types, etc.).
  - If you need to further refine the data, use the built-in tools for transformation.

- Load Data:

  - After making any necessary adjustments, click "Load data" to import the dataset into your app.
  - You will receive a confirmation once the data is successfully loaded.

- Explore Your Data:

    - After loading, your data will be available in your app, and you can begin creating visualizations and insights using the imported dataset.

- Save Your App:

    - Ensure you save your app after importing and making changes, to keep all your data and visualizations secure.

Prepare the Data for Visualization

To prepare data for Qlik analysis, follow these steps:

- **Clean the Data**: Remove any irrelevant or missing information to ensure the dataset is accurate and reliable.
- **Transform the Data**: Convert the data into a format that works well with Qlik, making sure it's structured properly for analysis.
- **Explore the Data**: Look for patterns and trends to better understand the dataset and its characteristics.
- **Filter the Data**: Narrow down to specific subsets that are most relevant to your analysis goals.
- **Prepare for Qlik**: Ensure the data is formatted correctly for seamless integration with Qlik's tools.
- **Validate the Data**: Double-check that the data is complete and accurate before proceeding with analysis.

I have removed blank column named member id.

Data Visualization

Data visualization is the graphical representation of information and data. It uses visual elements like charts, graphs, infographics, and maps to communicate data insights clearly and effectively.

Bar Chart:

- Go to the "Sheets" section and click "Create New Sheet" or open an existing one.
- Click on "Edit" to enter the sheet editing mode.
- From the chart options on the left, drag and drop the "Bar Chart" onto the sheet.
- Dimensions: Select the field you want to use as the x-axis (e.g., Categories).
- Measures: Choose the metric for the y-axis (e.g., Sales Amount).
- Customize: Adjust the chart's appearance and settings as needed.

Pie Chart:

- Open the sheet where you want to add the pie chart or create a new one.
- Click "Edit" to enter the sheet editing mode.
- Drag and drop the "Pie Chart" from the chart options onto the sheet.
- Dimensions: Select the field to represent the slices of the pie (e.g., Product Categories).
- Measures: Choose the value for each slice (e.g., Total Sales).
- Customize: Modify colors, labels, and other settings to enhance the chart.

KPI Object:

- In the edit mode of the sheet, look for the visualization panel on the left side.Drag the KPI object into the sheet.
- Measure: This is the numeric value you want to display (e.g., sum of sales, average revenue, etc.). Click on the '+' sign under "Measures" to add a new measure.
- Label: Enter a label for your KPI to describe what the KPI represents (e.g., "Total Sales").
- Format: Optionally, format the number (e.g., currency, percentage, etc.) based on your requirements.
- Add Additional KPIs (Optional) – If you want to add more KPIs to your sheet, repeat the previous steps to add more KPI objects. You can display multiple KPIs in a single sheet for better insights.

Tree Map:

- Select Tree Map: In the visualization panel on the left, find the Tree Map option.
- Drag and Drop: Drag the Tree Map visualization onto your sheet.
- Add Dimensions: In the properties panel on the right, add a dimension that categorizes your data (e.g., categories or labels).
- Add Measures: Add a measure that represents the values you want to visualize (e.g., the numeric values you provided).
- If your values are in billions, ensure they are treated as numeric values.

Donut Chart:

- Select Donut Chart: In the visualization panel on the left, find the Donut Chart option.
- Drag and Drop: Drag the Donut Chart visualization onto your sheet.
- Add Dimensions : In the properties panel on the right, add a dimension that categorizes your data (e.g., categories or labels).
- Add Measures : Add a measure that represents the values you want to visualize (e.g., the numeric values you provided).
- Ensure the values are treated as numeric for accurate representation

Boxplot:

- Find the visualization options on the left sidebar. Look for "Boxplot" or use the search bar to search for "Boxplot".Drag and drop the Boxplot visualization to your sheet.

- Add the dimension that you want to analyze (e.g., categories, groups).

- Add the measure you want to display, typically a numerical field (e.g., sales figures, test scores).

- You can also set properties such as color and labels in the properties panel.

- Use the properties panel on the right to adjust the appearance of your boxplot. This can include changing colors, adjusting the axis, and editing the title.

- You can also set filters or interactive elements to allow for dynamic exploration of the data.

Table:

- Find the visualization options on the left sidebar. Locate the "Table" visualization or use the search bar to quickly find it. Drag and drop the Table visualization onto your sheet.
- Add the dimensions you want to use as rows in your table. These could be categorical fields (e.g., product name, region, etc.).
- Add one or more measures, which are typically numerical fields that will populate the table cells (e.g., sales amount, count of records).
- In the properties panel on the right, you can customize various aspects of the table, like sorting, formatting, and styles.
- You can modify column headers, set number formats for your measures, and choose whether to show totals or subtotals.
- You can sort the columns by clicking on the column headers in the visualization, and apply filters interactively to refine the data displayed based on user selection.

Filter:

- Look for the visualization options on the left sidebar. Search for the "Filter Pane" or "Filter" in the visualization types. Drag and drop the Filter Pane onto your sheet.
- In the properties panel, add the dimensions you want users to filter by. These dimensions can be fields, such as categories (e.g., product type, region, date) that users may want to apply as filters.
- You can customize the appearance of the filter pane through the properties panel on the right. Options include: Title: Give your filter pane a meaningful title. Show Options: Decide whether you want checkboxes, drop-down lists, or sliders for numerical values.
- You can allow multi-select options for fields where users may want to select multiple items.
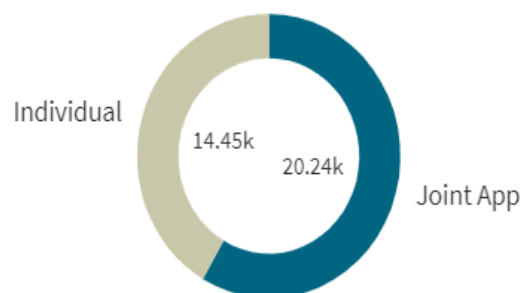
1) Loan Amount Analysis –

Termwise average loan
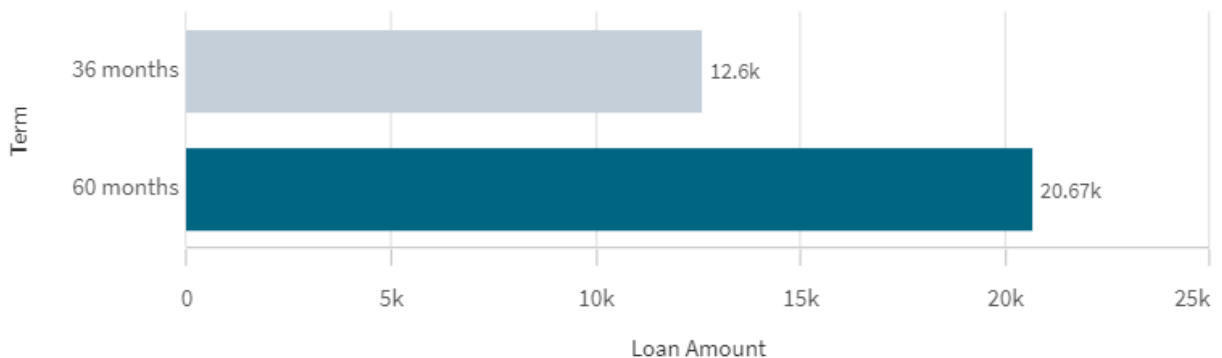
2) Average Loan Amount for the Account_Type –
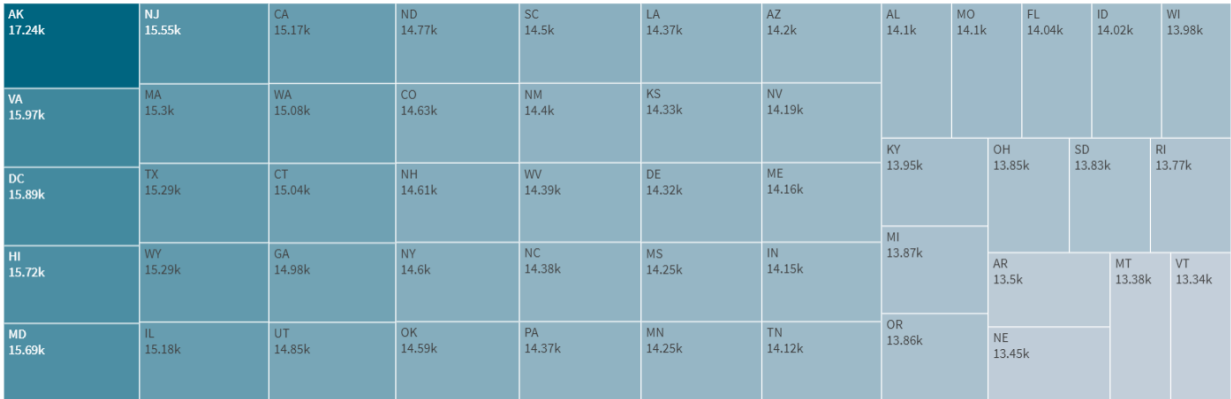
Average loan by account type

3) Total Loan Amount –

Total Loan Amount

11,168,172,650

4) Total Number of Loan Account –

Total no. of Accounts

759.3k

5) Average Loan Amount – State Wise

Average loan amount by state

AK 17.24k	NJ 15.55k	CA 15.17k	ND 14.77k	SC 14.5k	LA 14.37k	AZ 14.2k	AL 14.1k	MO 14.1k	FL 14.04k	ID 14.02k	WI 13.98k
VA 15.97k	MA 15.3k	WA 15.08k	CO 14.63k	NM 14.4k	KS 14.33k	NV 14.19k	KY 13.95k	OH 13.85k	SD 13.83k	RI 13.77k	
DC 15.89k	TX 15.29k	CT 15.04k	NH 14.61k	WV 14.39k	DE 14.32k	ME 14.16k	MI 13.87k	AR 13.5k	MT 13.38k	VT 13.34k	
HI 15.72k	WY 15.29k	GA 14.98k	NY 14.6k	NC 14.38k	MS 14.25k	IN 14.15k	OR 13.86k	NE 13.45k			
MD 15.69k	IL 15.18k	UT 14.85k	OK 14.59k	PA 14.37k	MN 14.25k	TN 14.12k					

13.34k   17.24k

6) Grade wise – Count of Members –

Customer distribution on the basis of grades

grade
- A
- B
- C
- D
- E
- F
- G

Pie values: E 41.25k, D 97.96k, A 124.52k, B 230.81k, C 244.9k
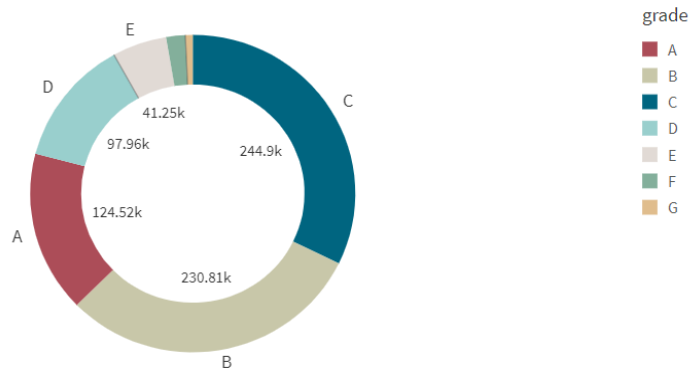
7)

Verification Status –

Count of members for verification

| Source Verified 298.67k	Not Verified 249.25k	Verified 211.42k

Dashboards

A dashboard is a graphical user interface (GUI) that displays information and data in an organized, easy-to-read format. Dashboards are often used to provide real-time monitoring and analysis of data and are typically designed for a specific purpose or use case. Dashboards can be used in a variety of settings, such as business, finance, manufacturing, healthcare, and many other industries. They can be used to track key performance indicators (KPIs), monitor performance metrics, and display data in the form of charts, graphs, and tables.
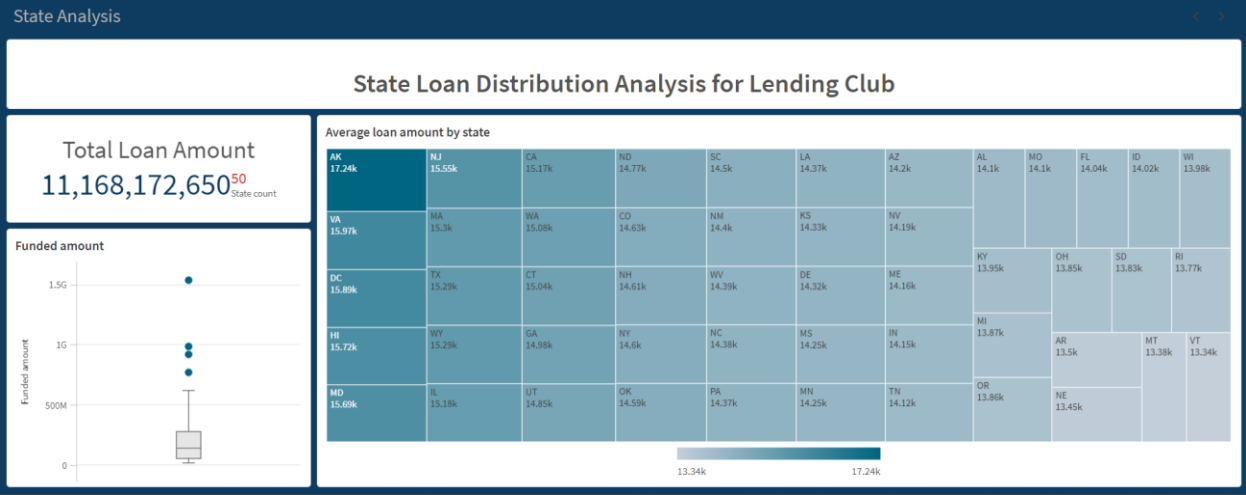
Responsive and Design of Dashboard
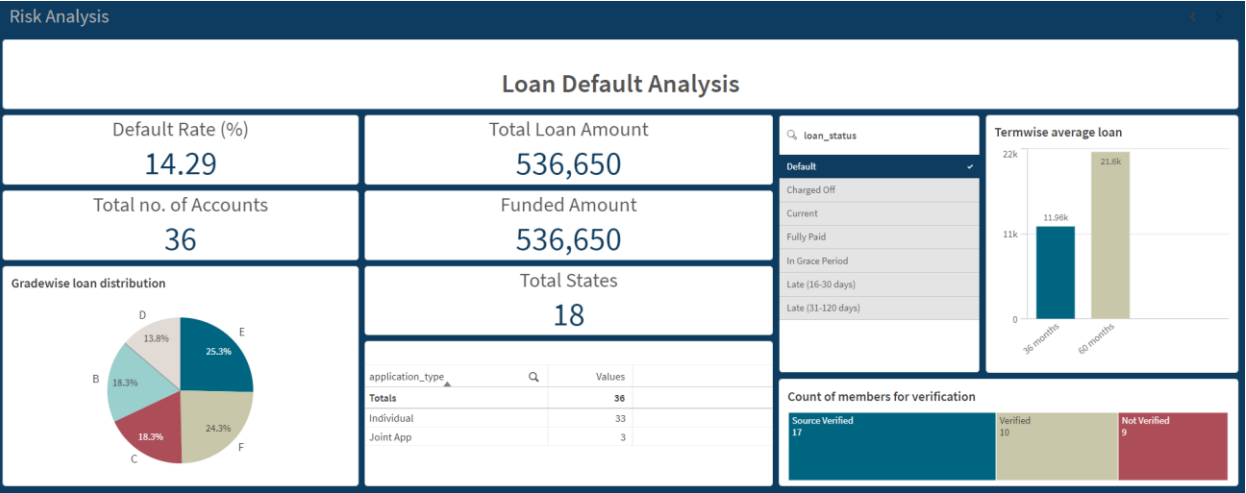
1) Loan Analysis Dashboard :
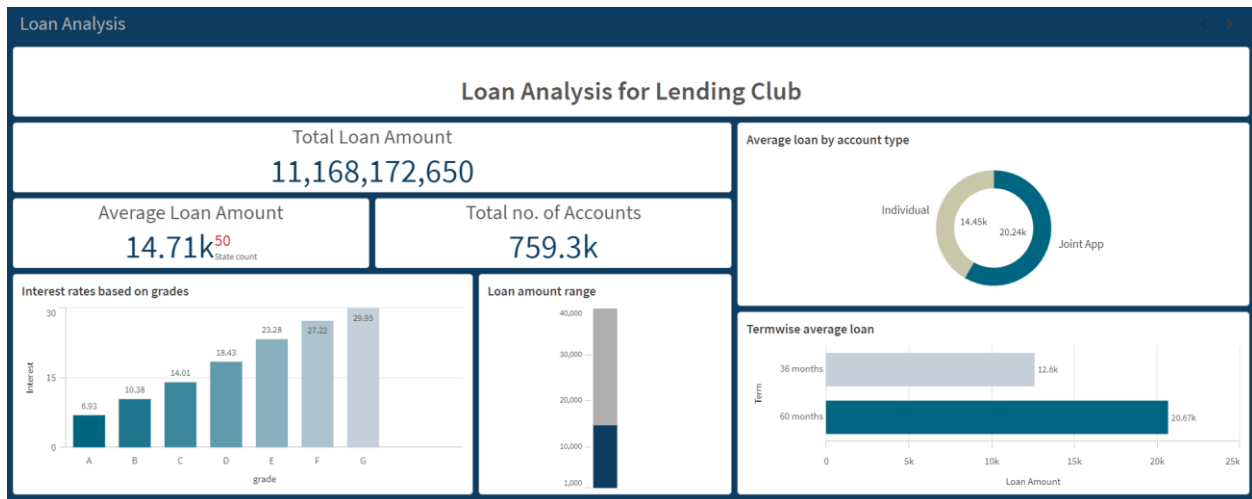
2) Customer Analysis Dashboard :
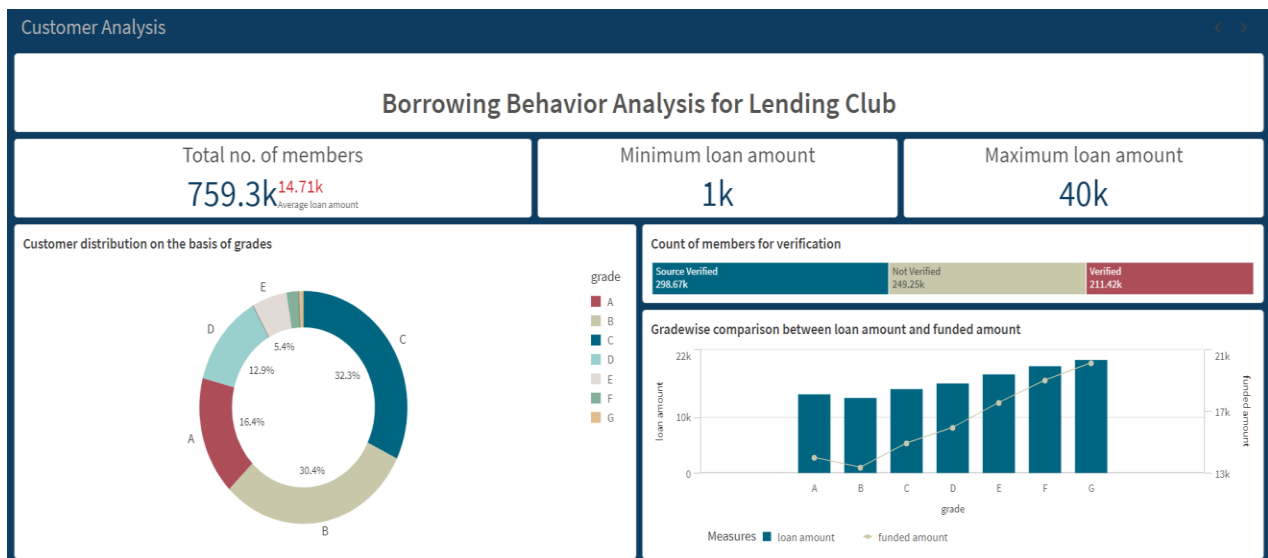
3) State Analysis Dashboard :

4) Risk Analysis Dashboard :

Story

A data story is a way of presenting data and analysis in a narrative format, with the goal of making the information more engaging and easier to understand. A data story typically includes a clear introduction that sets the stage and explains the context for the data, a body that presents the data and analysis in a logical and systematic way, and a conclusion that summarizes the key findings and highlights their implications. Data stories can be told using a variety of mediums, such as reports, presentations, interactive visualizations, and videos.

Steps to create story in qlik cloud:

Create a New Story:

- In your Qlik Cloud app, navigate to the "Stories" option typically found in the sidebar or menu.
- Click on "Create New Story" to start a new storytelling project.

Customize Your Story:

- Utilize formatting options to customize the appearance of your story.
- Change backgrounds, layouts, and designs to make the story visually appealing.

Add Interactivity:

- Consider adding interactive elements, like filters, so that viewers can engage with the data in real time.
- Use story navigation options to allow viewers to move freely between points or sections of the story.

Save Your Story:

- Once you are satisfied with your story layout and content, save your work.
- You may also want to give your story a meaningful name for easier identification later.

Share Your Story:

- Qlik Cloud allows you to share your story with other users. You can set permissions for who can view or edit.

- Share the link or invite others to view your story directly within Qlik Cloud.

Present Your Story:

- You can present your story directly from Qlik Cloud, using the built-in presentation features to navigate through the story points.

Design of Story

Storytelling in Qlik Cloud is an effective way to present data insights and narratives in a visual format. With Qlik Cloud's storytelling tools, you can create dynamic presentations that guide your audience through important findings, visualizations, and data-driven decision making.

1) Loan Analysis

2) Credit Score Analysis

Credit Score Analysis

Count of members for each grade.

E
D
C — 244.9k
41.25k
97.96k
A
124.52k
230.81k
B

Average loan of members for each grade.

B
G — 20.14k
A
13.38k
14.02k
F — 19.03k
C
14.95k
15.96k
E — 17.57k
D

Interest rates based on grades

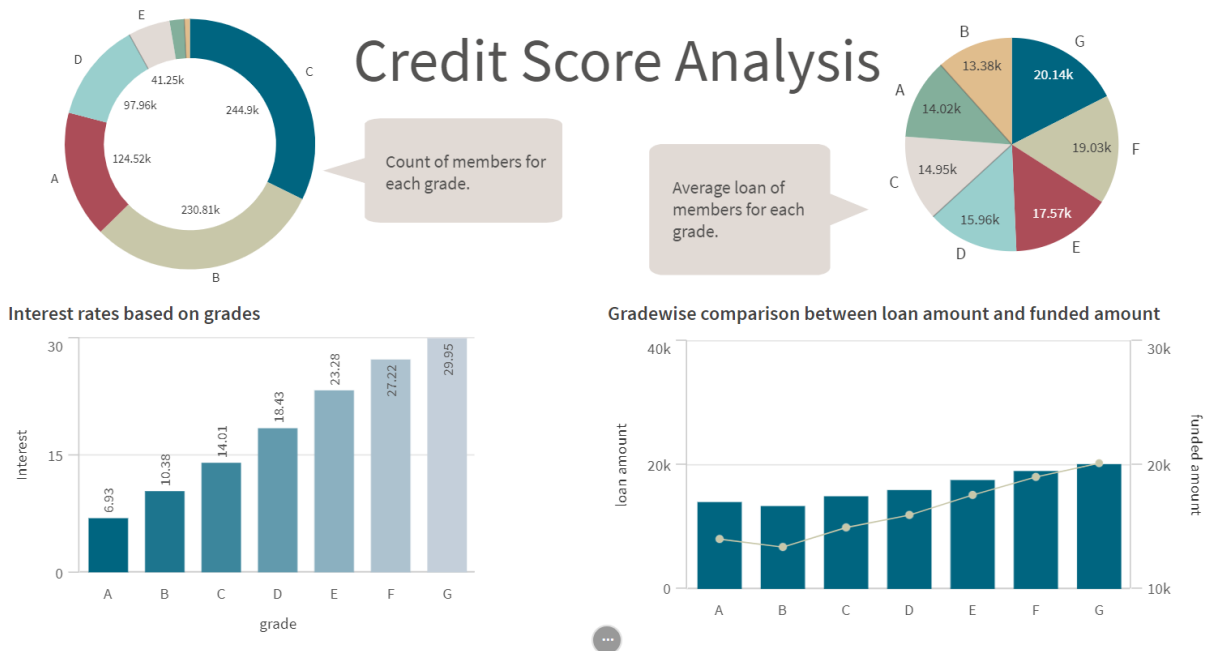| grade	Interest
A	6.93
B	10.38
C	14.01
D	18.43
E	23.28
F	27.22
G	29.95

Gradewise comparison between loan amount and funded amount
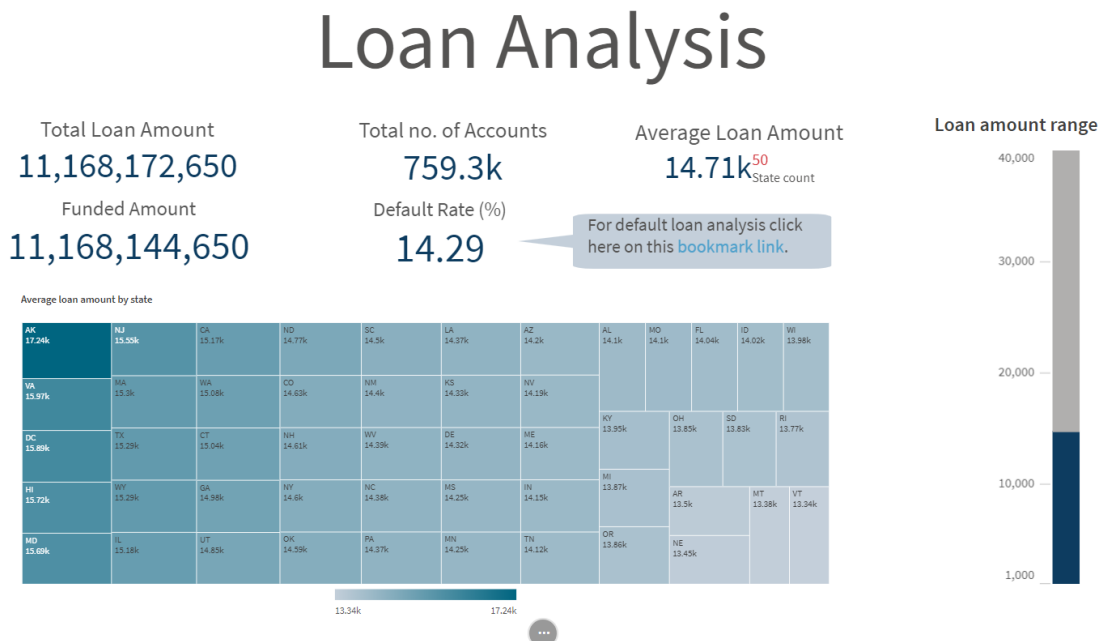
3) Other Analysis

Application, Verification Status and Term Analysis

Count of members by application type

application_type	Values
Totals	**759338**
Individual	725335
Joint App	34003

Average loan by application type

Individual
14.45k   20.24k   Joint App

Termwise average loan

36 months	12.6k
60 months	20.67k

Count of members for verification

Source Verified 298.67k	Not Verified 249.25k	Verified 211.42k
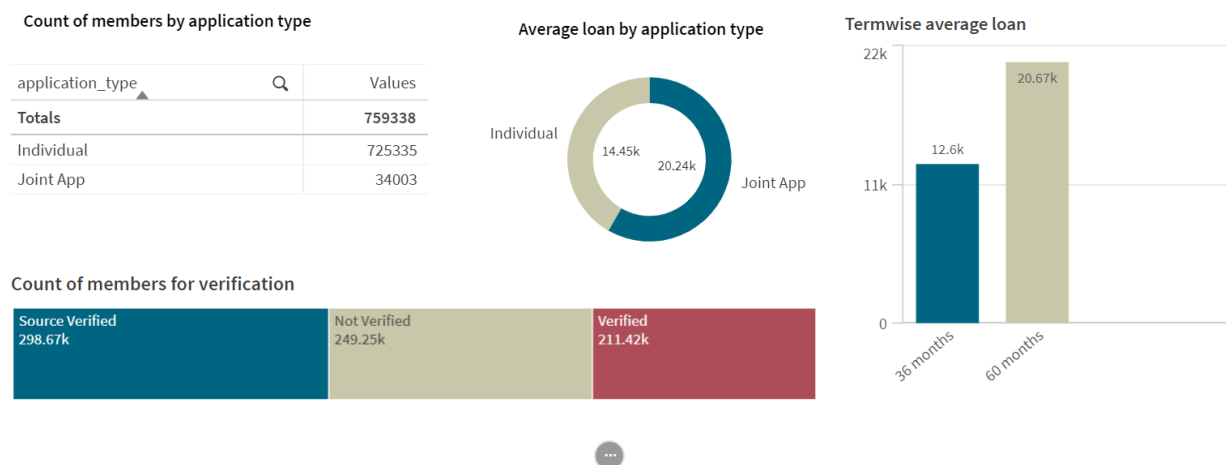
Performance Testing

Amount of Data Loaded

It represents the total number of columns of the dataset.

id	member_id	loan_amnt	funded_amnt	funded_amnt_inv	term	int_rate	installment	grade	sub_grade	emp_title	emp_length	home_ownership	annual_inc	verification_status	issue_d	loan_status	pymnt_plan	desc	purpose	title	zip_code	addr_state	dti	delinq_2yrs	earliest_cr_line	inq_last_6mths	mths_since_last_delinq	mths_since_last_record	open_acc	pub_rec	revol_bal	revol_util	total_acc	initial_list_status	out_prncp	out_prncp_inv	total_pymnt

total_pymnt_inv	total_rec_prncp	total_rec_int	total_rec_late_fee	recoveries	collection_recovery_fee	last_pymnt_d	last_pymnt_amnt	next_pymnt_d	last_credit_pull_d	collections_12_mths_ex_med	mths_since_last_major_derog	policy_code	application_type	annual_inc_joint	dti_joint	verification_status_joint	acc_now_delinq	tot_coll_amt	tot_cur_bal	open_acc_6m	open_il_12m	open_il_24m	mths_since_rcnt_il	total_bal_il	il_util	open_rv_12m	open_rv_24m	max_bal_bc	all_util	total_rev_hi_lim	inq_fi	total_cu_tl	inq_last_12m

Utilization of Filters

The filter used here is loan status.

Default Rate (%)	Total Loan Amount
14.29	536,650

Total no. of Accounts	Funded Amount
36	536,650

Gradewise loan distribution

Total States
18

loan_status

Default ✓
Charged Off
Current
Fully Paid
In Grace Period
Late (16-30 days)
Late (31-120 days)

Termwise average loan

application_type		Values
Totals		36
Individual		33
Joint App		3

Count of members for verification

Source Verified	Verified	Not Verified
17	10	9

No of Visualizations/ Graphs

1. Loan Analysis dashboard –
    1. Total Loan Amount (KPI)
    2. Average Loan Amount with State Count (Dual KPI)
    3. Total no. of Accounts (KPI)
    4. Interest rates based on grades (Bar Graph)
    5. Loan amount range (Gauge)
    6. Average loan by account type (Donut Chart)
    7. Termwise average loan (Bar Graph)

2. Customer Analysis Dashboard –
    1. Total no. of members (KPI)
    2. Minimum loan amount (KPI)
    3. Maximum loan amount (KPI)
    4. Customer distribution on the basis of grades (Donut Chart)
    5. Count of members for verification (Tree Map)
    6. Gradewise comparison between loan amount and funded amount (Combo Chart)

3. State Analysis Dashboard –
    1. Total Loan Amount with State Count (Dual KPI)
   2. Average loan amount by state (Tree Map)

3. Funded amount (Boxplot)

4. Risk Analysis Dashboard –
   1. Default Rate (%) (KPI)
   2. Total Loan Amount (KPI)
   3. Total no. of Accounts (KPI)
   4. Funded amount (KPI)
   5. Total States (KPI)
   6. Gradewise loan distribution (Pie Chart)
   7. loan_status (Filter Pane)
   8. Termwise average loan (Bar Graph)
   9. application_type (Table)
   10. Count of members for verification (Tree Map)

Project Demonstration & Documentation

Github link - https://github.com/Ishita2003M/Qlik_project

Video Demonstration link -

https://drive.google.com/file/d/1PfLMwchwUQOuLgi4miHfeqHa8vRqCknb/view?usp=drive_link.
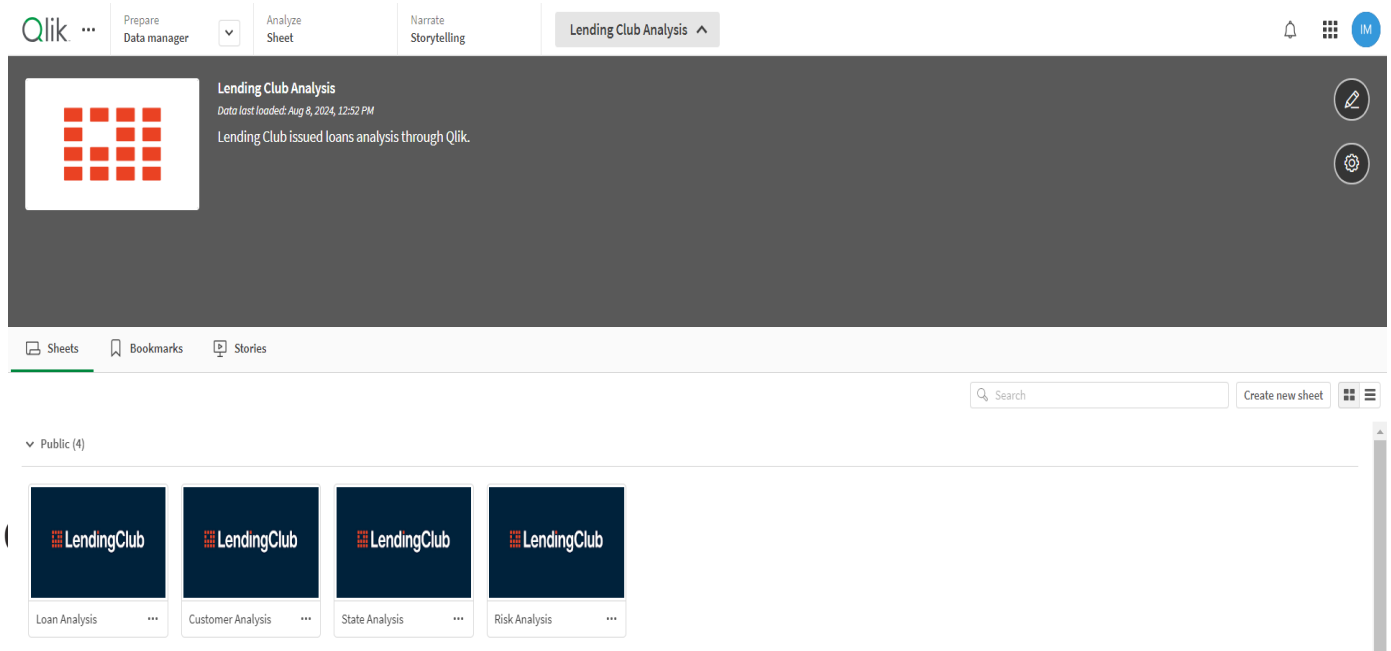
LendingClub is a peer-to-peer lending platform that connects borrowers and investors. Here are the key points of a loan analysis on LendingClub:

- Loan Types: LendingClub primarily offers personal loans, which can be used for debt consolidation, medical expenses, home improvement, and other personal needs. Business loans and auto refinance loans are also available.

- Borrower Criteria: Borrowers typically undergo a credit check and are assessed based on credit score, income, employment history, and debt-to-income ratio. This determines their eligibility and interest rates.

- Loan Amounts and Terms: Loans are available in various amounts, generally ranging from 1,000 to 40,000, with repayment terms typically between 36 to 60 months.

- Interest Rates: Rates vary based on the borrower's creditworthiness. As of the latest data, interest rates can range from 6% to 36%.

- Investor Returns: Investors earn returns based on the interest paid by borrowers. The platform offers a diversified investing approach, allowing investors to fund fractions of multiple loans.

- Risk Assessment: The platform employs risk grading to evaluate loans from A (lowest risk) to G (highest risk), helping investors make informed decisions.

- Default Rates: The analysis includes tracking historical default rates and delinquencies to project future performance and risk for investors.

This research project thoroughly leveraged data analytics and visualization tools, specifically Qlik Sense, to analyze lending patterns and borrower behaviors within Lending Club. The findings from this analysis provide valuable insights into credit risk assessment, loan performance, and default trends. By identifying key factors that influence borrower repayment and the overall lending landscape, these insights can inform strategic decision-making and policy development, ultimately enhancing lending practices and risk management approaches. The outcomes of this study have the potential to drive improvements in financial inclusion and foster responsible lending within the peer-to-peer lending ecosystem.

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