IT4010 – Research Project - 2024

Topic Assessment Form

Project ID: 24-25J-268

1. Topic (12 words max)

Bank Loan Eligibility and Predict credit limit using ML approach.

2. Research group the project belongs to

Technology Integration & Management (TIM)

3. Research area the project belongs to

Machine Learning (ML)

4. If a continuation of a previous project:

Project ID	None
Year	None

5. Brief description of the research problem including references (200 – 500 words max) – references not included in word count.

Generally known as that the lending industry generates billions of dollars per year.(Meenaakumari et al., 2022) Lenders profit from interest payments and provide competitive rates, while borrowers seek the most beneficial terms. Borrowers are often required to disclose their income, assets, and credit score when applying for a loan. Both lenders and borrowers may find this method complicated and frustrating. This research project will examine the use of artificial intelligence and machine learning to assess loan eligibility. It is critical to have a thorough understanding of the challenges connected with evaluating loan eligibility, as well as how these limitations can be solved through the creation of machine learning models. We will demonstrate how machine learning may be used to benefit both.

Eligibility for a loan is the fundamental process of determining whether a potential borrower meets the conditions for that loan. This may be determined by factors such as each individual's salary, length of employment, and credit history. Eligibility for loans is critical in ensuring that borrowers can repay their debt. The default could have major consequences, such as a decline in credit score and difficulty obtaining new funding in future. Lenders apply unexpected caution while considering loan suitability. Borrowers can improve their chances of loan approval by knowing about the criteria utilized by lenders. Lenders will often use a variety of criteria to determine a borrower's condition for a loan, because there are many elements that may influence this decision. Obtaining the borrower's credit report (CRIB) is common procedure. This document provides information on a borrower's current debt load and payment history. Lenders will also look into the borrower's credit history and other public records. Lenders may request proof of income from the borrower, such as tax returns and pay slips.

Loans are the main activity of banks. The principal profit is derived straight from the loan's interest. To identify high-risk customers for investment and business loans, feasibility study, financial documentation, and credibility research can be used. Banks issuing private loans must collect thorough information on prospective borrowers and monitor their conduct throughout the loan's life to make informed lending decisions. Banks should analyze how credit risk relates to other risks. Effective credit risk management is essential for a financial organization's long-term existence and is a key component of a risk management plan.

Reference

Meenaakumari, M. *et al.* (2022) 'Loan eligibility prediction using machine learning based on personal information', *2022 5th International Conference on Contemporary Computing and Informatics (IC3I)* [Preprint]. doi:10.1109/ic3i56241.2022.10073318.

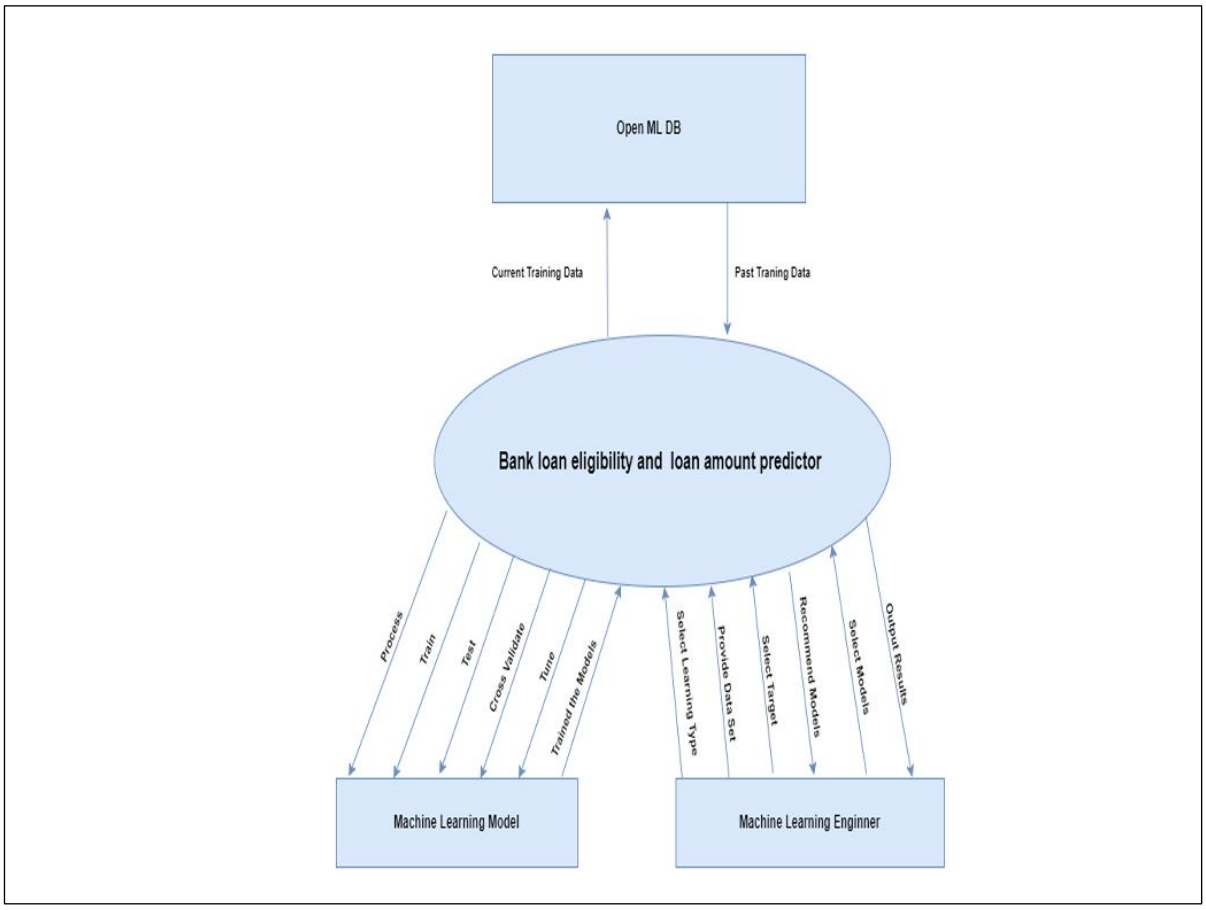
6. Brief description of the nature of the solution including a conceptual diagram (250 words max)

Key issues are:

1. The present loan eligibility evaluation process is complex and frustrating for both lenders and applicants, relying mainly on manual assessments of credit reports, income documentation, and financial information.
2. To better serve lenders and consumers, loan eligibility assessments must be improved in terms of accuracy and efficiency.
3. Leveraging artificial intelligence (AI) and machine learning (ML) could provide a solution to these problems.

Important components of the solution would be:

1. Data from borrower applications is loaded into an AI/ML model for determining loan eligibility.
2. An AI/ML model is also used by the lender's systems to independently determine loan eligibility.
3. The loan decision process is then improved for both the borrower and the lender using the outputs from these AI/ML models.
4. Both parties participating in the lending process stand to gain from this approach's potential to increase the loan eligibility assessment's precision, speed, and transparency.



7. Brief description of specialized domain expertise, knowledge, and data requirements (300 words max)

Loan Procedures and the Lending Industry.

1. A deep understanding of the loan sector, including the major stakeholders (lenders, borrowers), loan categories, qualifying standards, and the entire loan application and approval procedure.
2. Understanding of the loan assessment industry's guidelines, compliance needs, and regulatory environment.

Credit Risk Assessment.

1. Expertise in credit risk estimation, including factors controlling credibility, credit scoring methods, and loan fail prediction methodologies.
   Understand how lenders presently measure credit risk, in addition to the limits of traditional credit risk assessment approaches.

Financial Data and Modeling.

1. Access full datasets for loan applications, borrower profiles, credit histories, and loan performance.
2. Proficiency in financial data analysis, feature engineering, and machine learning-based predictive modeling.
3. Understanding of financial accounting, lending terminology, and the ability to understand financial statements and other related data sources.

AI/ML Modeling and Implementation.

1. Expertise in designing and implementing AI/ML models, including both unsupervised and supervised learning techniques, network design, and combined approaches.
2. Understanding model validation, performance evaluation, and deployment techniques is critical for ensuring the accuracy, fairness, and durability of the AI/ML-based loan eligibility assessment system.
3. Expertise in R or Python

Ethical and Regulatory Considerations.

1. Ethical and regulatory considerations include ensuring fairness and non-discrimination in AI-based loan eligibility decisions.
2. Understanding of relevant rules, such as the Equal Credit Opportunity Act (ECOA) and the Fair Credit Reporting Act (FCRA), and how to ensure adherence to these guidelines.

8. Objectives and Novelty

Main Objective Bank Loan Eligibility and Predict credit limit using ML approach.			
Member Name	Sub Objective	Tasks	Novelty
D N Pathirathna IT21164644	Implement real-time data processing and data streaming to determine loan eligibility and credit limits.	• Development and execution of a real-time data processing and analytics pipeline to enable rapid loan approval and credit limit estimation. • Integrate streaming data sources and use algorithms to detect and react to changes in a customer's financial status. • Improve the system's performance and scalability to support high-volume, real-time transactions.	• The implementation of real-time data and streaming analytics to lending decision-making is an innovative method that has the potential to significantly enhance lending efficiency and responsiveness. • The capacity to respond promptly to changes in a customer's financial condition improves the customer experience and allows lenders to make more informed and timelier • decision-making.

P.R.I.Pravean IT21191060	Provide financial literacy and appropriate financing practices among customers.	• Generate comprehensive educational content and interactive modules on the basic concepts of personal finance (budgeting, saving, and investing), responsible of customers KYC information as inputs borrowing behaviors (debt management, repayment plans), and financial goal setting and planning. • Offers interactive tools and calculators. • Provides suitable prediction of fulfill the gap of the Provide financial literacy and appropriate financing	Integrated financial instruction in the lending platform and customized budgeting evaluations Provide financial literacy and appropriate financing real times to the users.
Weerakoon W.M.A.O.B IT21018046	Implement Real-Time Data Processing and Streaming for Corporate Loan Eligibility and Credit Limits	• Develop a Financial Health and Scenario Analysis Tool that integrates scenario planning, predictive analytics, and behavioral analysis into a single, comprehensive model. It applies machine learning to estimate future cash flows and financial health, simulates different economic scenarios and corporate decisions, and examines at spending and payment patterns to spot trends in financial hardship or stability. • Develop a Comprehensive Creditworthiness Analysis Tool that	• A complete, real-time analysis tool that incorporates financial and non-financial indicators that ensures fast and accurate loan approval and credit limit calculations.

		combines non-financial aspects with enhanced credit rating models. By integrating sophisticated analytics with key performance indicators like customer satisfaction, turnover, and operational efficiency, it provides a comprehensive evaluation of a company's creditworthiness. • Using the tools mentioned earlier, implement a real-time analytics and data processing pipeline to provide speedy loan approval and accurate credit limit computation.	
Hilma M.I.F IT21142178	Develop an AI Assistant Chatbot to improve customer and bank staff interactions, smoothen loan management, and provide comprehensive support throughout the loan process	• Assist new customers with the loan application process by guiding them through necessary steps and required documentation. • Enable existing customers to create an account and track the status of their loans through the chatbot. • Provide bank staff with instant access to existing customers' loan details and histories. • Offer interactive tools for customers to estimate potential loan amounts and repayment plans.	• Assists with loan application guidance, real-time loan tracking, instant access for bank staff to detailed loan histories, interactive financial tools for estimating loan amounts and repayment plans, notifications for payment reminders, and real-time performance reports for actionable insights

		• Provide reminders and notifications to customers about upcoming payments and important loan-related dates. • Generate real-time reports for bank staff on customer loan performance and trends.	

9. Supervisor checklist

a) Does the chosen research topic possess a comprehensive scope suitable for a final-year project?

Yes		No	

b) Does the proposed topic exhibit novelty?

Yes		No	

c) Do you believe they have the capability to successfully execute the proposed project?

Yes		No	

d) Do the proposed sub-objectives reflect the students' areas of specialization?

Yes		No	

e) Supervisor's Evaluation and Recommendation for the Research topic:

10. Supervisor details

	Title	First Name	Last Name	Signature
Supervisor				
Co-Supervisor				
External Supervisor				
Summary of external supervisor’s (if any) experience and expertise				

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Topic Assessment Form

<u>This part is to be filled by the Topic Screening Panel members.</u>

Acceptable: Mark/Select as necessary

Topic Assessment Accepted	
Topic Assessment Accepted with minor changes (should be followed up by the supervisor)*	
Topic Assessment to be Resubmitted with major changes*	
Topic Assessment Rejected. Topic must be changed	

* Detailed comments given below

Comments

The Review Panel Details

Member's Name	Signature

*__Important__:

1. According to the comments given by the panel, make the necessary modifications and get the approval by the **Supervisor** or the **Same Panel**.
2. If the project topic is rejected, identify a new topic, and follow the same procedure until the topic is approved by the assessment panel.