Project Report

title - Smart Lender - Applicant Credibility Prediction for Loan Approval

1. **INTRODUCTION**
    a. Project Overview

        To determine the success rate of lone approval.

    b. Purpose

        To find the exact abelity of a person for loan eligible.

2. LITERATURE SURVEY

1. **Existing problem**

Anomaly detection relies on individuals' behaviour profiling and works by detecting any deviation from the norm. When it is used for online banking fraud detection, it suffers from three disadvantages. First, for an individual, the historical behaviour data are often too limited for profiling his/her behaviour pattern. Second, because of the heterogeneous nature of transaction data, there is no uniform treatment to various attribute values, which will become a potential barrier for development of the model and for further usage. Third, the transaction data are highly skewed, and it becomes a challenge for utilizing the label information effectively. Anomaly detection often suffers from poor generalization ability and a very high false alarm rate. We argue that individuals' limited historical data for behaviour profiling and fraud data's highly skewed nature could account for this defect. Since it is straightforward to use information from other similar individuals, similarity measurement itself becomes a great challenge due to heterogeneous nature of attribute values.

2. **References**

[1] Arun Kumar, Ishan Garg, and Sanmeer Kaur, \"Loan Approval Prediction Using Machine Learning Approach,\" 2018. [2] K. Hanumantha Rao, G. Srinivas, A. Damodhar, and M. Vikas Krishna at International Journal of Computer Science and Telecommunications published an article titled \"Implementation of Anomaly Detection Technique Using Machine Learning Algorithms\" (Volume2, Issue3, June 2011).

3. **Problem Statement Definition**

They have a presence across all urban, semi-urban and rural areas.

The customer first applies for a home loan and after that, the company validates the customer eligibility for the loan. The company wants to automate the loan eligibility process (real-time) based on customer detail provided while filling out online application forms. These details are Gender, Marital Status, Education, and number of Dependents, Income, Loan Amount, Credit History, and others. To automate this process, they have provided a dataset to identify the customer segments that are eligible for loan amounts so that they can specifically target these customers. We need to predict our Target label which is “Loan Status”. Loan status can have two values: **Yes** or **NO**.

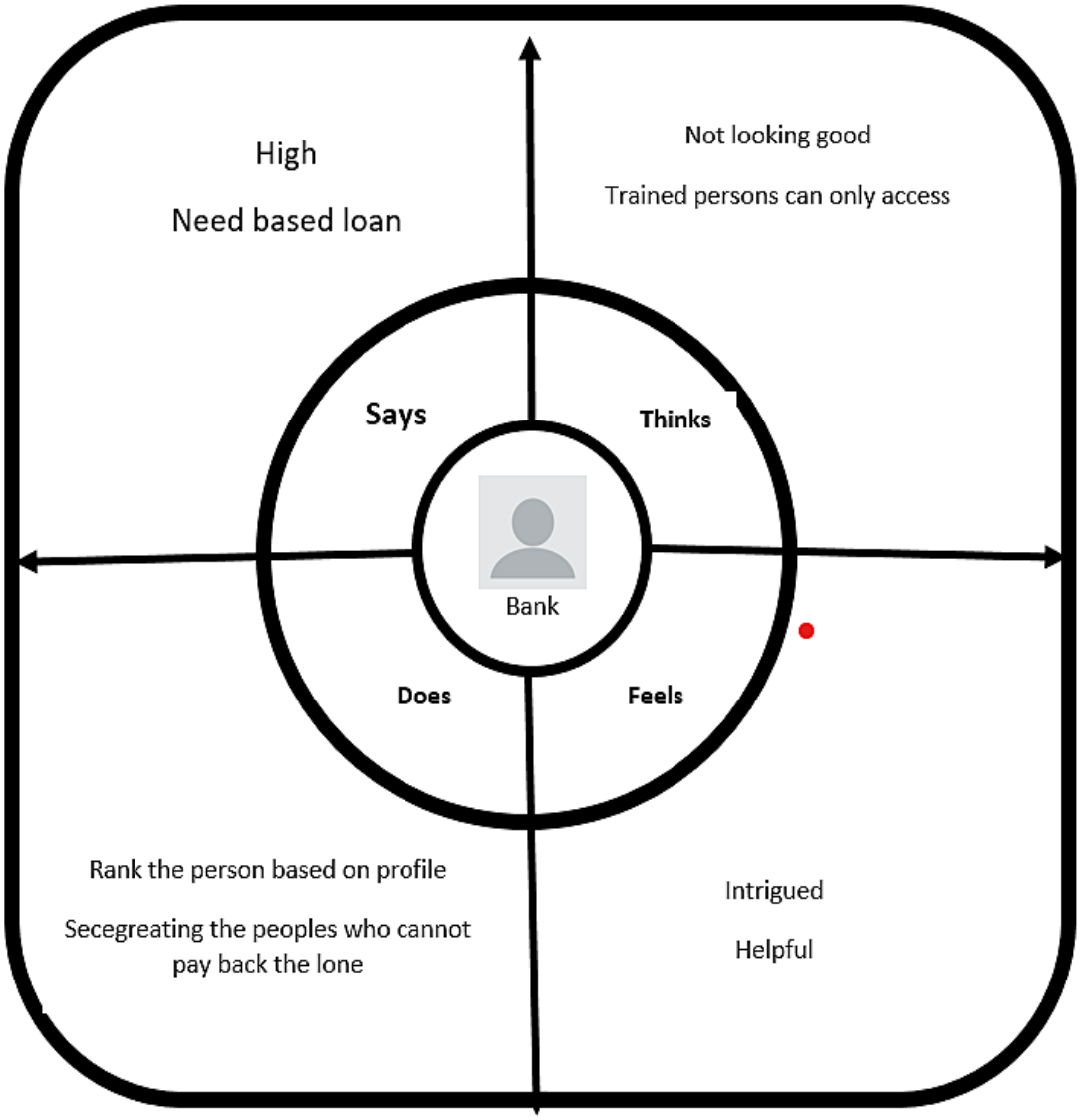
Yes: if the loan is approved

NO: if the loan is not approved

3. IDEATION & PROPOSED SOLUTION

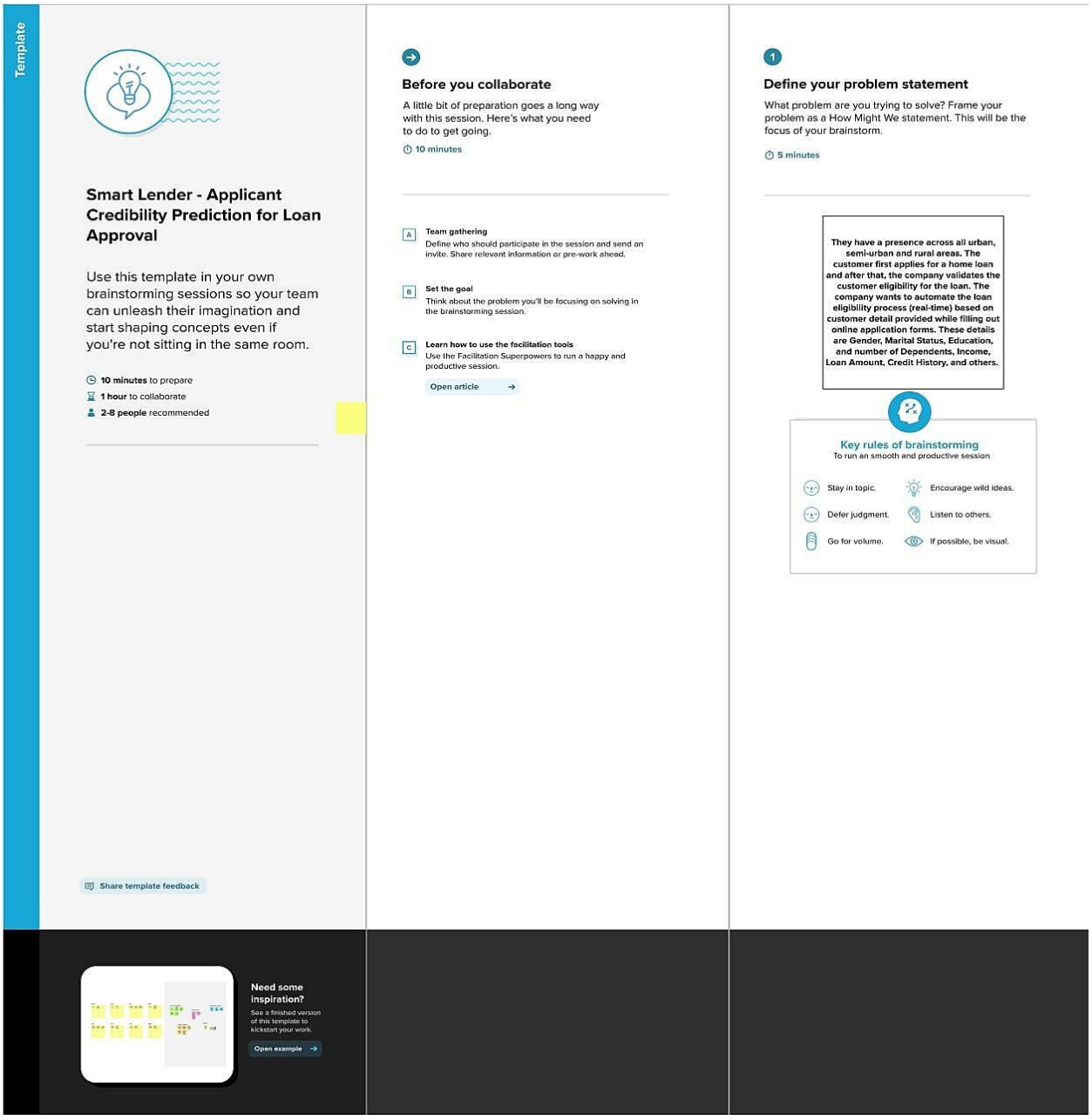
1. **Empathy Map Canvas**

empathy map is **a collaborative tool teams can use to gain a deeper insight into their customers**. Much like a user persona, an empathy map can represent a group of users, such as a customer segment. The empathy map was originally created by Dave Gray and has gained much popularity within the agile community.

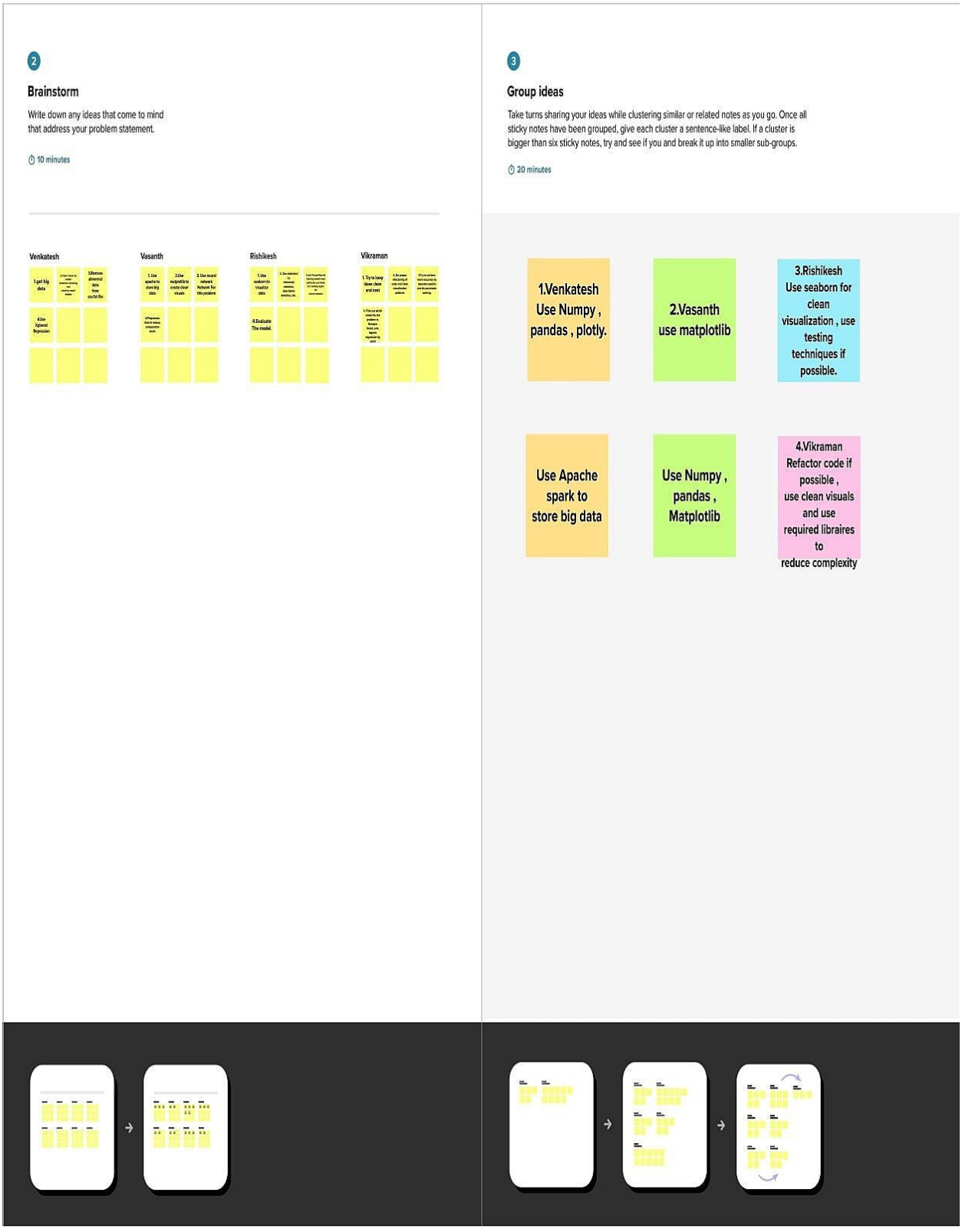

High
Need based loan
Not looking good
Trained persons can only access
Says
Thinks
Bank
Does
Feels
Rank the person based on profile
Secegreating the peoples who cannot pay back the lone
Intrigued
Helpful

2. Ideation & Brainstorming

Step-1: Team Gathering, Collaboration and Select the Problem Statement



Step-2:Brainstorm, Idea Listingand Grouping



Step-**3:Idea Prioritization**

3. Proposed Solution

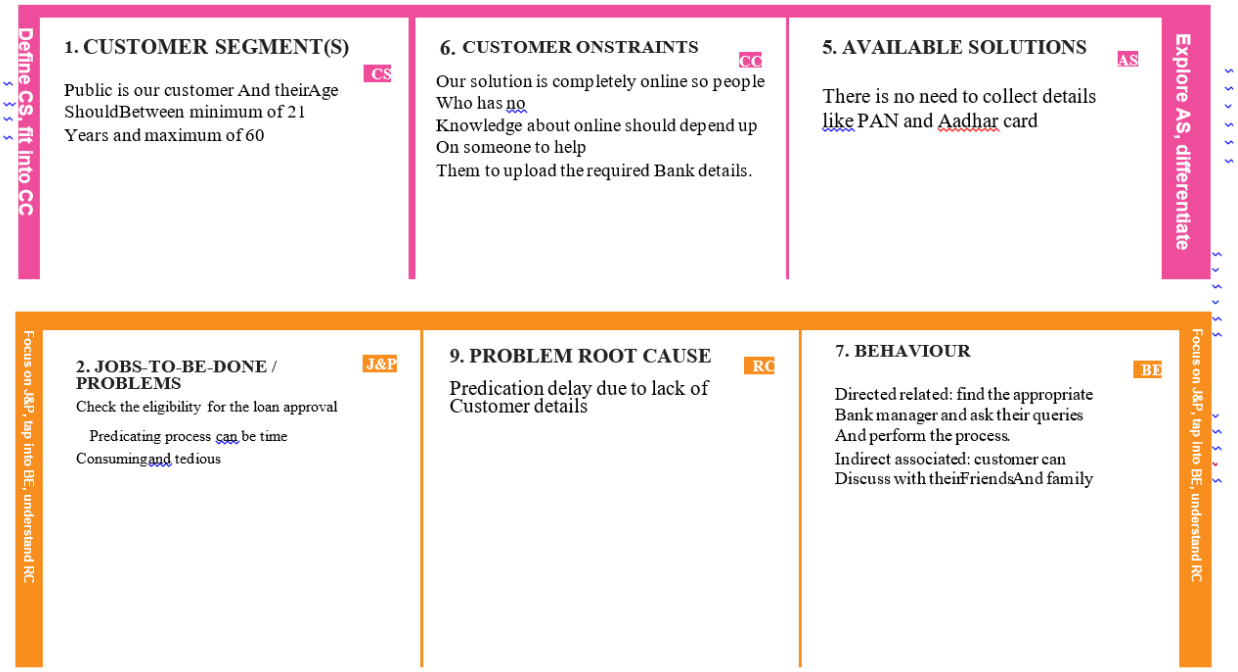
S.NO	PARAMETER	DESCRIPTION
1.	**Problem statement**	In our banking system, banks have manyproducts to sell but main source of income of any banks is on its credit line.So, they can earn frominterest of thoseloans which theycredit. A bank'sprofit or a lossdepends to a large extenton loans i.e.,whether the customers are paying back the loan or defaulting. By predicting the loan defaulters, the bank can reduce its Non-Performing Assets.Banks typically processan applicant's loan after screening and verifying the applicants eligibility, which is a difficult and time consuming process.

2.	**Solution Description**	we developed automatic loan prediction usingmachine learning techniques. We will train the machine with previous dataset. so machine can analyse and understand the process. Then machine will check for eligible applicant and give us result.

		<u>ADVANTAGESOFTHEPROPOSEDSYSTEM</u> 1. Feed- forward back propagation neuralnetwork is used to forecast the credit defaults The method in which two or more classifiers are combined together toproduce Prediction results 2. Ensemble modelfor the betterprediction 3. Compromised with noise and outlier dataof classification. 4. Removal of such abovedata was done.
3.	**Uniqueness**	1. Time period for loan sanctioning will bereduced. 2. Whole process will be automated, so humanerror will be avoided. 3. Eligible applicant will be sanctioned loanwithout any delay.

4.	**Social impact**	1. Easy and fastloan approval process for thecustomer. 2. Approves Loan to a trustable person. 3. Bank can find a genuine customer for loanand hence assure that the mentioned loan amount will be repaid.
5.	**Scalability**	1. It can be provided as software application. 2. Both banking sectorand Lender can use thissoftware application. 3. Customer can use this software anytime andanywhere. 4. This systemis easily scalability and efficient. 5. Easy and user friendly software to all.

4. Problem Solution fit



1. REQUIREMENT ANALYSIS

a. Functional requirement

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	It describes the context Who,What,When,Where and Why. The specific activities the requirements describe should reflect the both range of goal that the system must support and business goals for creating new system.
NFR-2	**Security**	Security functionality that ensures one of many different security properties of software is being satisfied.Security requirements are derived from industry standards,applicable laws,and a history pf past vulnerabilities.

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Home Page	1. Smart Lender Applicant Credibility description 2. Information about Credibility details required for loan approval 3. if new user , REGISTER 4. if already exist , SIGN IN
FR-2	User Registration	Enter Mail Id and other personal details required for Registering
FR-3	User login	User Mail Id and Password for Login
FR-4	Loan Approval form	Credibility details should be entered for prediction
FR-5	Result	if Approved - It display the information about what is done to be next. if Not Approved - It display the information about what rejection criteria you are not eligible for the loan.

b. Non-Functional requirements

Following are the non-functional requirements of the proposed solution.

NFR-3	**Reliability**	It is the measure of the stability or consistency of the test score

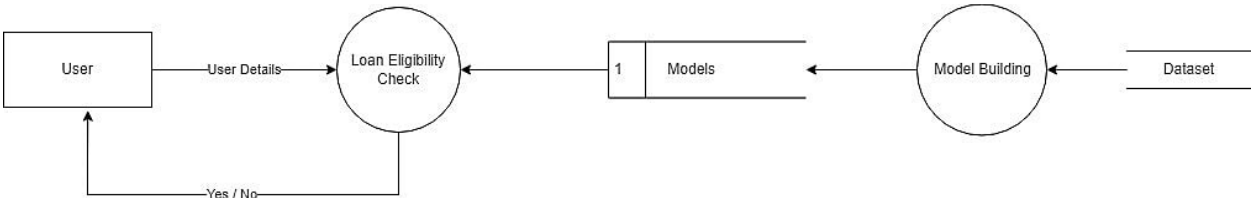
NFR-4	**Performance**	It defines how well the software system accomplishes certain functions under specific condition.
NFR-5	**Availability**	It defines how long the IT system can be unavailable without impacting operations.
NFR-6	**Scalability**	It is the measure of a system ability to increase or decrease in performance and cost in response

PROJECT DESIGN

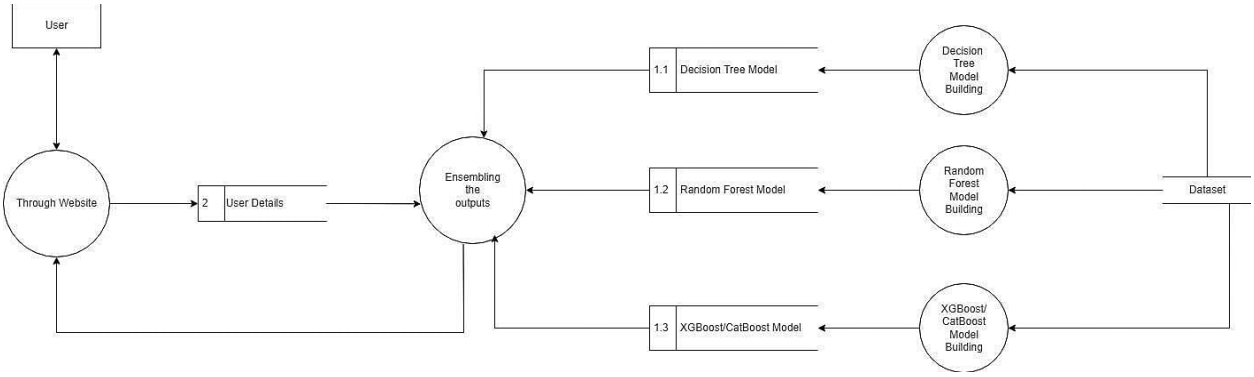
a. Data Flow Diagrams

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.

DFD LEVEL 0



DFD LEVEL 1



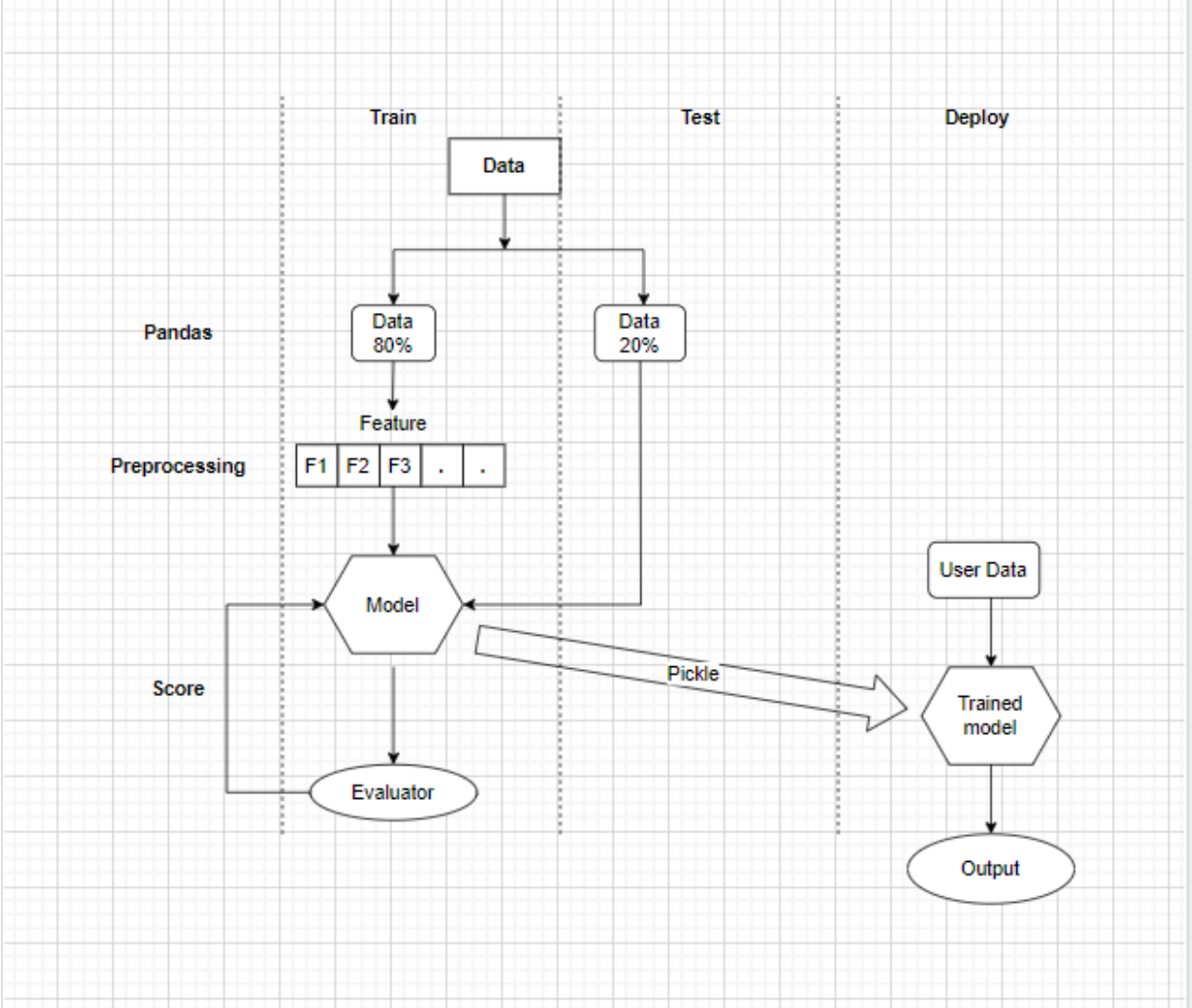
User Stories

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Money Lender (Web user)	Dashboard	USN-1	As a user, I should be able to access the dashboard.	Access the dashboard	Low	Sprint-3
		USN-2	Select the type of loan	Select the type of loan	Medium	Sprint 3

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
	Check for loan eligibility	USN-3	Fill the application with the details of the borrower.	Check the eligibility of the borrower.	High	Sprint-4
Borrower	Dashboard	USN-4	Should be able to access the dashboard.	Access the dashboard.	Low	Sprint-3
		USN-5	Choose the type of loan	Choose the type of loan	Medium	Sprint-3

	Prediction of loan approval	USN-6	Fill the application to check if the loan will be approved or not.	Check for the chances of loan approval. If the loan will not be approved for the current amount, find the amount that will be approved by the lender	High	Sprint-4
	Chatbot	USN-7	Ask doubts to the chatbot	Getting clarified on the doubts	Medium	Sprint-2

b. Solution & Technical Architecture



c. User Stories

A **user story** is an informal, general explanation of a software feature written from the perspective of the end user. Its purpose is to articulate

2. PROJECT PLANNING & SCHEDULING

a. Sprint

Planning & Estimation

discus with the team and plann how to do the work and discus about the issues in the project and try to solve the problem.

b. Sprint

Delivery Schedule

e delivery schedule is **an agreement between buyer and seller as to when and how often merchandise will be delivered**. It is a plan that outlines the specifics of future delivery periods. This can be a mutually determined schedule or one that is dictated by the buyer

c. Reports
from JIRA

1. **CODING & SOLUTIONING (Explain the features added in the project along with code)**

    1. Feature 1

        Having the high persentage to predict wether the loan will approve or not

    2. Feature 2

        Has higher accuricy.

    3. Database Schema (if Applicable)

1. **RESULTS**

    1. **Performance Metrics**

        Performing high accuricy on loan predic

1. **CONCLUSION**

The analysis starts from data cleaning and processing missing value, exploratory analysis and finally model building and evaluation of the model. The best accuracy on public test set is when we get higher accuracy score and other performance metrics which will be found out. This paper can help to predict the approval of bank loan or not for a candidate.

1. **FUTURE SCOPE**

We can make the Bank Loan Approval prediction to connect with Cloud for

future use to optimize the work to implement in Artificial Intelligence environment.

1. **APPENDIX**

Source Code

https://github.com/IBM-EPBL/IBM-Project-smart-lender/tree/main/Pre%20development/Project%20Development%20Phase

GitHub & Project Demo Link

https://drive.google.com/file/d/1lMo2kKp6Ne_yH2xpIUV26MLTeeyg3-i6/view?usp=share_link

Works Done By :

Venkatesh Prasad.S - Ideation phase, Project Design phase-1, Project Design Phasse-2, Train the IBM on model, milestone Activity list, Sprint-1.

Vasantha kumar.R - Model bulding, Application building, Data preprossing, projecSprint-2, milestone Activity list,Sprint-3,Sprint-4.

Rishikesh.B - litrature survay, prior knowledge, project objective.

vikraman.GD -Pre-Requisites, projectflow, project stucture.