Loan Prediction System Using Machine Learning

Group – 57
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INTRODUCTION

Loans are the core business of banks. The main profit comes directly from the loan's interest. The loan companies grant a loan after an intensive process of verification and validation. However, they still don't have assurance if the applicant can repay the loan with no difficulties. In our Final Year Project, we built a predictive model to predict if an applicant is eligible for the loan or not. We prepareda model to predict the target variable. And made a User Interface / web application.

Content

Literature Review

In[1] The author has described a system designed particularly for bank employees to categorize the loan application based on priority. The paper has shown the output in the form of yes or no based on the different parameters enters in the given form such as loan history, gender, income, etc. for loan applications.

In[2] the author has taken the customer data from the banks which has approved their loan request. The author has used the Logistic Regression algorithm of machine learning technology and focused on the pre-processing steps required to be performed after getting the datasets for the better model development.

In[3] the author has described about the prediction of modernized loan approval system based on machine learning approach to know the status whether the loan will pass or not. They have also given the details of technology used such as XG Boot, Random forest and decision tree to classify the data into the appropriate classes and has found the good accuracy.

In[4] the author has described the system for commercial bank to predict the loan status using classification methodology. The author has used the K-Nearest Neighbor classifier machine learning method and has explained it's detailed working to predict even without building a model. The paper shows the KNN model accuracy as 75.08

In[5] the author has discussed about the existing system problem which consumes a lot of time and efforts of bank employees and there are chances to occur human error due to manual checking. The author has developed an automated system using decision tree algorithm to solve the existing system problem.

Generation Gap

This is the user interface of the old system, which has an outdated user interface. Old systems were made using java, so they needed to be installed on the device. And old system didn't provide feature of online backup.

Fig. Old System

Problem Statement & Problem Solution

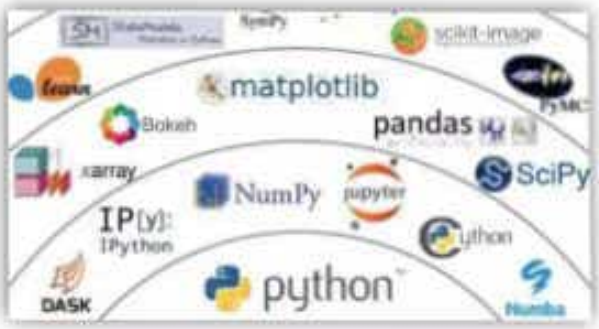
Problem Statement

1) Intensive time Consumption process of verification and validation.
2) Human errors can be introduced during the validation process.
3) No cross referencing previous loan records
4) Lot of human resource required.

Problem Solution

1) Our Machine learning model calculates all the parameters given and predicts if the applicant is eligible for loan or not in very less time.
2) Time required for verification, and validation reduces significantly.

Hardware & Software Used



Hardware Used

1) Windows Computer

Software/Code Editor Used

1) JUPYTER Notebook
2) VS Code

Libraries Used

1) Pandas
2) NumPy
3) Seabom
4) Matplotlib
5) Sklearn
6) Pickle

Languages Used

1) Python3 & Python Flask
2) HTML5 with Tailwind CSS
3) JavaScript

Aim and objective of the Research

- To make the process of loan approval easy using fewer resources and human resources.
- To make the web-app which can be accessible by anyone on the internet without downloading any desktop software.
- To make the prediction model which will make the accurate predictions and help banks to make approving the loans very easy.

Fig. Web App

Proposed Work

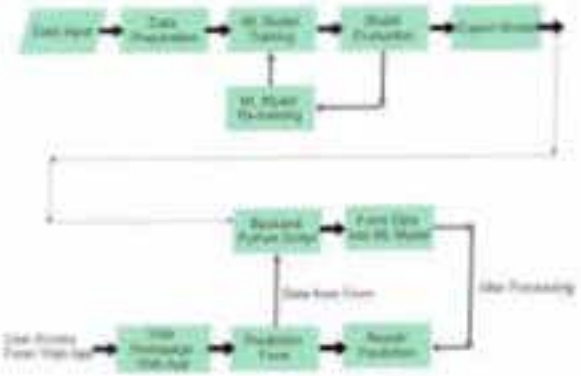


Fig. Project Flow chart

1)Data Collection –Two CSV files: train, test are used for this Project.
2) Analyzing Data – Analyzing what kind of data we are dealing with.
3)Data Cleaning – Cleaning the Data of any null values, if present.
4)Model Building- After analyzing and cleaning the data we can build ML models.
5)Evaluating Performance Metrics of Models- Evaluating which ML model works best & tuning it.
6)Exporting the model and building the User Interface/Web app using HTML5 & Tailwind CSS.
7) Writing the backend Server Script Using Python3.
8) Connecting Model, backend & frontend.

Models

Random Forest Classifier
Accuracy – 77.922 %

Logistic Regression
Accuracy – 77.272 %

Decision Tree Classifier
Accuracy – 68.1818 %

Random Forest Classifier

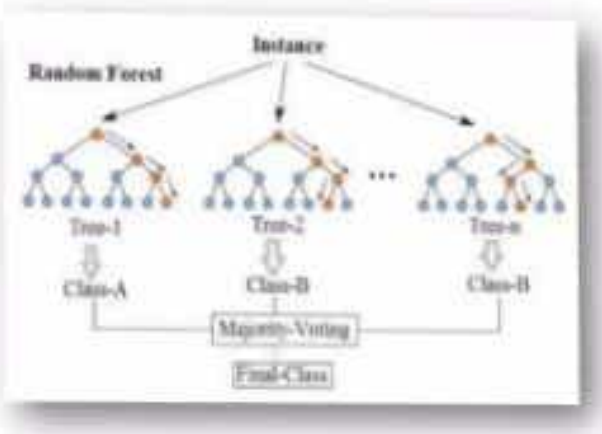


Fig. Random Forest Classifier Flow Chart

Random forest is a flexible, easy to use machine learning algorithm that produces good results, even without hyper-parameter tuning, a great result most of the time. It is also one of the most used algorithms, because of its simplicity and diversity (it can be used for both classification and regression tasks).

Random Forest classifier Accuracy - 77.92%.

Result & Working

Step 1

Open the Web-app and navigate to the prediction form page where we fill our data

Fig. Web-app Home page

Working

Step 2

Fill all the data in the given form and press predict button to get the prediction.

(All the data will then be send to the backend script and then to the prediction model for processing.)

Fig. Web-app – Prediction form page

Additional Features

1) Interest Rate Calculator

2) Global Finance News Section

3) Online Database Backup

Interest Rate Calculator

The interest rate is the amount a lender/bank charges a borrower/loan applicant and is a percentage of the principal the amount loaned. We have added a feature where users can calculate simple interest easily.

Fig. Web-app – Simple Interest rate Calculator section

User Interface (UI)

Fig. Web-app on Desktop Screen

Fig. Web-app on Tablet Screen

User interface (UI) is responsive and compatible with all screen sizes.

Conclusion & Discussion

The system approved or rejects the loan applications. Recovery of loans is a major contributing parameter in the financial statements of a bank. It is very difficult to predict the possibility of payment of loan by the customer. Machine Learning (ML) techniques are very useful in predicting outcomes for large amount of data. In our project, three

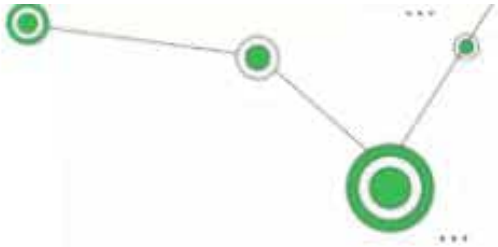
Applications

1) In Banking Sector.
2) Co-operate sectors which provides loans to their employees.
3) An individual/applicant who wants to know about his capability of taking loan.

Global Finance News Section

Financial deals shouldn't be conducted without knowing the global market's condition. Here we added a section where users can see the news related to global financial conditions.

Fig. Web-app – Global finance news section



Thank You