iJETRM
International Journal of Engineering Technology Research & Management
Published By:
https://www.ijetrm.com/

LOAN PREDICTION ANALYSIS

G. RAMPRASAD, K. SHIVA RAMPRASAD, R. NEELESH KUMAR, M. VENKATESH
UG Students, J.B. Institute of Engineering & Technology, Department of Artificial Intelligence and machine learning, Yenkapally, Moinabad Mandal, R.R. Dist-75 (TG), India

DR. MOHAMMAD ABDUL KHALEEL
Associate Professor, J.B. Institute of Engineering & Technology, Department of Artificial Intelligence and machine learning, Yenkapally, Moinabad Mandal, R.R. Dist-75 (TG), India

ABSTRACT
In the current manual process, the complexity of assessing loan applicants often leads to misconceptions and delays in decision-making. By leveraging machine learning, especially Logistic Regression, we aim to automate and streamline the selection process for eligible candidates, ensuring a more objective and accurate evaluation of an applicant's likelihood to repay the loan. Logistic Regression is a powerful algorithm for binary classification tasks, making it well-suited for predicting whether a loan applicant falls into the category of likely repayers or non-repayers. The utilization of such machine learning models not only enhances the efficiency of the decision-making process but also minimizes the risks associated with human biases and errors in manual assessments. The implementation of a Logistic Regression-based loan prediction system holds immense benefits for both the financial institution and the applicants. For the institution, it translates to improved accuracy in identifying genuine applicants, thereby reducing the risk of defaults. This, in turn, contributes to a more profitable loan portfolio. Simultaneously, applicants benefit from a quicker and more objective evaluation process, leading to faster loan approvals and an overall enhanced customer experience. Furthermore, the integration of machine learning algorithms, such as Logistic Regression, promises a significant reduction in the time required for loan approval, addressing a key pain point in the traditional lending process. This modern approach not only aligns with the current technological landscape but also reflects a commitment to leveraging data-driven insights for more informed decision-making in the realm of financial services.

Keywords:
Loan Prediction ,Machine Learning, Logistic Regression ,Credit Risk Assessment Loan Eligibility ,Financial Analysis ,Data-Drive Decision Making ,Risk Management ,Automated Loan Approval ,Credit Scoring , Debt-to-Income Ratio ,Predictive Modeling, Binary Classification Customer Evaluation , AI in Finance

INTRODUCTION
In banking and finance, assessing loan applicants' repayment capacity is a major challenge. Despite strict verification, uncertainties remain. Our advanced predictive model uses machine learning, like Logistic Regression, to analyze factors such as credit history, income stability, and debt-to-income ratio. This enhances decision-making, helping banks predict and manage risks more accurately. By leveraging data-driven insights, financial institutions can ensure responsible and sustainable lending.

METHODOLOGY
Loan prediction begins with **data collection** (credit history, income, loan amount) and **preprocessing** (handling missing values, encoding, normalization). **Feature selection** identifies key factors, followed by **model training** using Logistic Regression, Decision Trees, or XGBoost. **Evaluation** ensures accuracy with metrics like precision and AUC-ROC. The model is then **deployed** as a Flask API and integrated into a web app. **Continuous improvement** refines accuracy with new data.
System Architecture
1. Data Collection & Preprocessing

iJETRM
International Journal of Engineering Technology Research & Management
Published By:
https://www.ijetrm.com/

The first stage we are going to gather the dataset relevant for our project, explore and analyze the data to understand its characteristics. The dataset collected for the model implementation are – Train.csv,Test.csv.
The next stage is to cleaning the data i.e. to check whether if the datasets contain any null values/missing values and to scale the data if required.
Encoding the Categorical variables into numerical variables for better understand for ML Model.
2.**Split the Data into Training and Testing set**
Divide your dataset into a training set and a testing set. The training set is used to train the model, and the testing set is used to evaluate its performance on unseen data.
3: **Train the Logistic Regression Model:**
Fit the logistic regression model to the training data. Logistic regression models the probability of the binary outcome (0 or 1). The logistic function (sigmoid function) is commonly used for this purpose.
4: Model Evaluation
Now we are going to check the performance of the logistic regression model using metrics such as accuracy.
5: Deploy the Model
Deploying the ML model into the Streamlit Web-Application to display the output of the unseen data

4 DESIGNS
4.1 Architecture

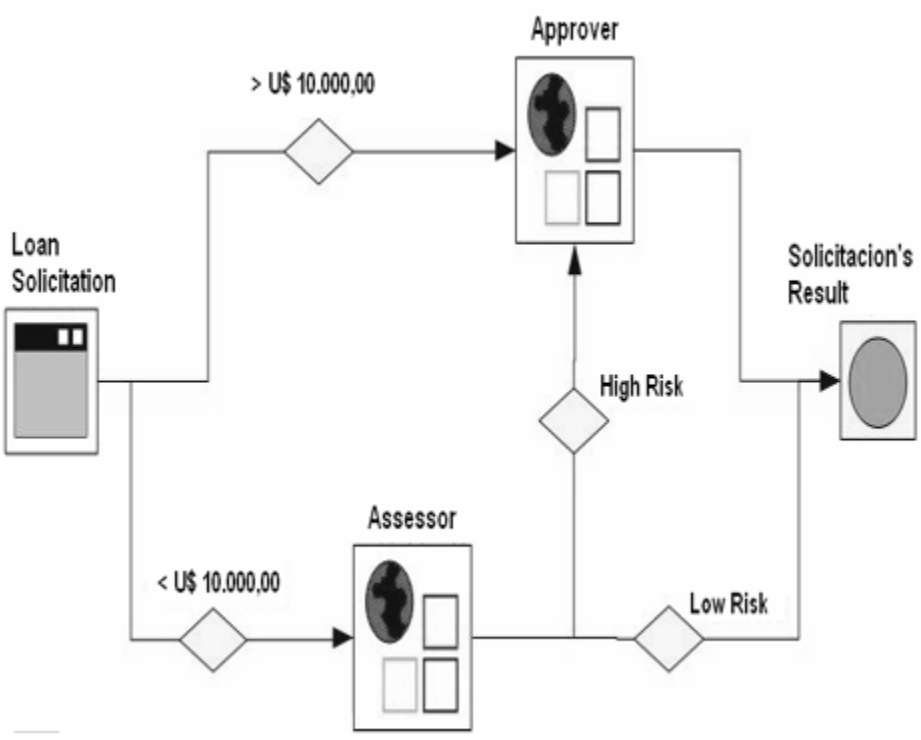

Figure 4.1 Architecture of Loan Analysis System

iJETRM
International Journal of Engineering Technology Research & Management
Published By:
https://www.ijetrm.com/

4.2 Flow Chart

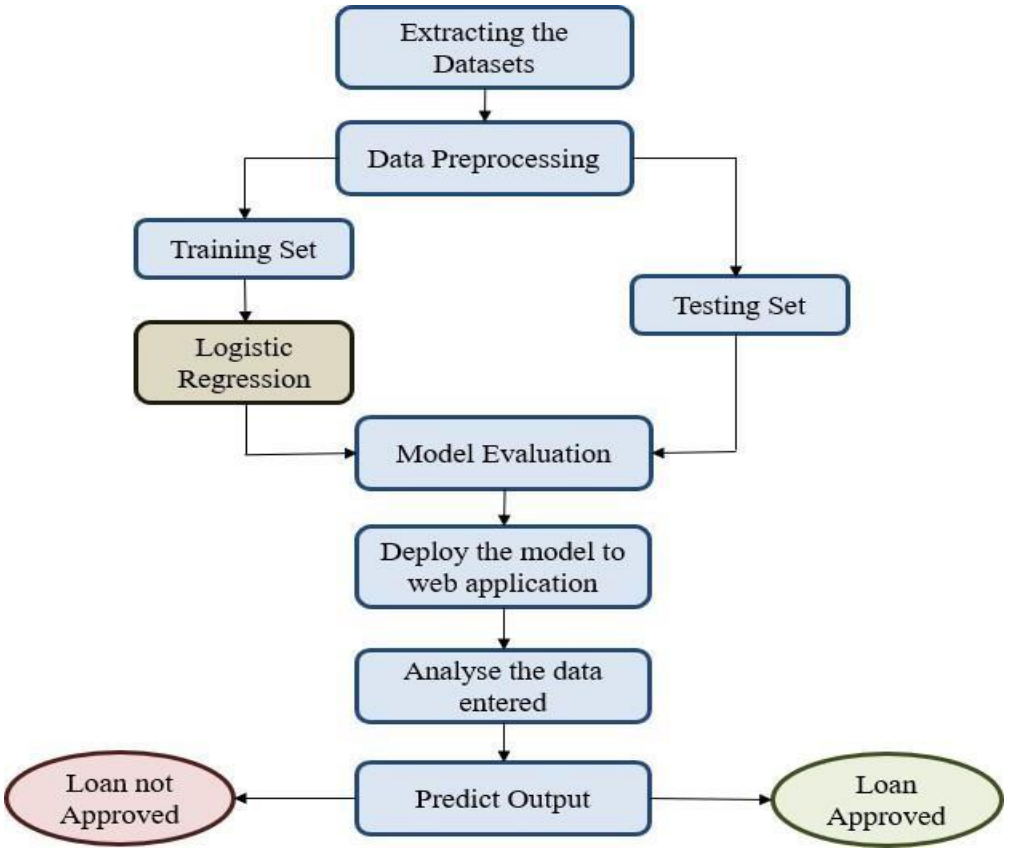

Figure 4.2 Flow Chat of Loan Approval System

RESULTS AND DISCUSSION

In the result analysis the ML model analyses the data entered and predicts whether or not the loan should be granted based on several characteristics such as credit score, loan amount, lifestyle, career, and assets.The ML model expresses the output in binary, or 0's and 1's, whereas the webpage offers us the output if the candidate is eligible for a loan or not.

CONCLUSION

In conclusion, our loan prediction analysis project, leveraging logistic regression and presented through a streamlined Streamlit web application, demonstrates the efficacy of predictive modeling in assessing credit risk. The simple interface enables stakeholders to make accurate choices, resulting in a more efficient and transparent loan process.

iJETRM
International Journal of Engineering Technology Research & Management
Published By:
https://www.ijetrm.com/

ACKNOWLEDGEMENT

We express our gratitude to the Almighty for His blessings in completing this project. We thank **Dr. P. C. Krishnamachary** (Principal) for permitting us to proceed with this work. Our sincere appreciation goes to **Dr. G. Arun Sampaul Thomas** (HoD, AI & ML) for his support and **Dr. Mohammed Abdul Khaleel** (Associate Professor, AI & ML) for his valuable guidance. We also extend our thanks to the teaching and non-teaching staff of the AI & ML department for their knowledge and support.

REFERENCES

[1] K. Hanumantha Rao, G. Srinivas, A. Damodhar, M. Vikas Krishna: Implementation ofAnomaly Detection Technique Using Machine Learning Algorithms: International Journal of Computer Science and Telecommunications (Volume2, Issue3, June 2011).

[2] Kumar Arun, Garg Ishan, Kaur Sanmeet, May-Jun. 2016. Loan Approval Prediction based on Machine Learning Approach, IOSR Journal of Computer Engineering (IOSR-JCE)

[3] Survey on Prediction of Loan Approval Using Machine Learning Techniques published by International Journal of Advanced Research in Science, Communication & Technology (IJARSCT) on 1st May 2021. Authors- Ambika and Santosh Biradar

[4] Loan Approval Prediction using Machine Learning published by The Journals of Engineering Science on 06th June 2021. Authors - Ritika Purswani, Sakshi Verma

[5] Nikhil Madane, Siddharth Nanda, "Loan Prediction Analysis using Decision Tree", December 2019.

[6] Sivasree M.S., Rekha Sunny T., "Loan Credibility Prediction System using Decision Tree Algorithm", (IJERT), 09 September 2015.

[7] "Prediction of Loan Approval using Machine Learning" Rajiv Kumar, Vinod Jain, Premsagar Sharma, International Journal of Advanced Science and Technology, (2019)

[8] "Bank loan analysis using customer usage data: A big data approach using Hadoop," 2017 2nd International conference on Telecommunication & Networks.

.