Credit Card Approval Prediction Using ML

Milestone 1: Project Initialization and Planning Phase

The "Project Initialization and Planning Phase" for the credit card approval prediction project marks the project's outset, defining its goals, scope, and stakeholders. This phase establishes the parameters for predicting whether a credit card application will be approved using machine learning techniques, focusing on gathering and cleaning data from financial institutions and credit bureaus. Key activities include defining features such as applicant income, credit history, and employment status, selecting appropriate models for prediction, and establishing evaluation criteria for model accuracy and fairness

Activity 1: Define Problem Statement

Problem Statement: A self-employed married male applicant with a good credit history seeks to secure a credit card without a co-applicant or additional income sources. The challenge arises due to his employment status and reliance on a sole income stream, despite his optimism regarding credit card approval. This situation requires a thorough analysis of his creditworthiness using machine learning models to assess approval likelihood based on his financial background and risk factors

Predicting Credit Card Approval Problem Statement Report: Click Here

Activity 2: Project Proposal (Proposed Solution)

The proposed project, *"Enhancing Credit Card Approval with Smart Card Predict,"* aims to leverage machine learning for more accurate predictions of credit card applicant approval. Using a comprehensive dataset including factors like income, employment status, credit score, and financial history, the project seeks to develop a predictive model that optimizes the credit card approval process. This initiative aligns with
Smart Card Predict objective to improve decision-making, minimize financial risk, and streamline credit approval operations, ultimately enhancing customer satisfaction and operational efficiency.

Predicting Credit Card Approval Project Proposal Report: Click Here

Activity 3: Initial Project Planning

Initial Project Planning for a *credit card approval prediction system* involves outlining key objectives, defining the project scope, and identifying stakeholders. It includes

setting timelines, allocating resources, and determining the overall project strategy. During this phase, the team establishes a clear understanding of the dataset, formulates goals for predictive analysis, and plans the workflow for data preprocessing, feature selection, and model building. Effective initial planning ensures a systematic approach, laying the foundation for a successful and efficient project outcome, improving credit card approval accuracy and decision-making.

Predicting Credit Card Approval Project Planning Report: Click Here

Milestone 2: Data Collection and Preprocessing Phase

The Data Collection and Preprocessing Phase involves executing a plan to gather relevant credit card application data from Kaggle, ensuring data quality through verification and addressing missing values. Preprocessing tasks include cleaning, encoding, and organizing the dataset for subsequent exploratory analysis and machine learning model development.

Activity 1: Data Collection Plan, Raw Data Sources Identified, Data Quality Report

The dataset for "Smart Card Predict - Credit Card Approval Prediction" is sourced from Kaggle and other financial institutions. It includes applicant details such as income, credit score, employment status, and financial metrics. Data quality is ensured through thorough verification, handling missing values, and maintaining adherence to privacy and ethical guidelines. This establishes a reliable foundation for developing an accurate predictive model for credit card approval.

Predicting Credit Card Approval Data Collection Report: Click Here

Activity 2: Data Quality Report

The dataset for *"Smart Card Predict - Credit Card Approval Prediction"* is sourced from Kaggle and financial databases. It includes applicant details such as credit score, income, employment status, and financial history. Data quality is ensured through rigorous verification, handling missing or inconsistent values, and maintaining adherence to ethical and privacy standards. This ensures the dataset's reliability, providing a strong foundation for building accurate predictive models for credit card approval.

Predicting Credit Card Approval Data Quality Report: Click Here

Activity 3: Data Exploration and Preprocessing

Data exploration involves analyzing the credit card applicant dataset to identify patterns, distributions, and outliers. Preprocessing includes handling missing data, normalizing income and credit score values, and encoding categorical variables such as employment status and marital status. These essential steps improve data quality, ensuring the reliability and accuracy of the predictive model in the credit card approval project.

Predicting Credit Card Approval Data Exploration and Preprocessing Report: Click Here

Milestone 3: Model Development Phase

The Model Development Phase entails crafting a predictive model for credit card approval. It encompasses strategic feature selection, evaluating and selecting models (Random Forest, Decision Tree, KNN, XGB), initiating training with code, and rigorously validating and assessing model performance for informed decision-making in the credit score process.

Activity 1: Feature Selection Report

The Feature Selection Report outlines the rationale behind choosing specific features (e.g., Income, Employment Status, Credit Score) for the credit card approval model. It evaluates the relevance, importance, and impact of each feature on predictive accuracy, ensuring the inclusion of key factors that influence the model's ability to accurately predict credit card approval decisions. This careful selection enhances the model's performance and its ability to assess applicant creditworthiness.

Predicting Credit Card Approval Feature Selection Report: Click Here

Activity 2: Model Selection Report

The Model Selection Report details the rationale behind choosing Random Forest, Decision Tree, KNN, and XGB models for credit card approval prediction. It considers each model's strengths in handling complex relationships, interpretability, adaptability, and overall predictive performance, ensuring an informed choice aligned with project objectives.

Predicting Credit Card Approval Model Selection Report: Click Here

Activity 3: Initial Model Training Code, Model Validation and Evaluation Report

The Initial Model Training Code employs selected algorithms on the credit card approval dataset, setting the foundation for predictive modeling. The subsequent Model Validation and Evaluation Report rigorously assesses model performance, employing metrics like accuracy and precision to ensure reliability and effectiveness in predicting credit card approval outcomes.

Predicting Credit Card Approval Model Development Phase Template Report: Click Here

Milestone 4: Model Optimization and Tuning Phase

The Model Optimization and Tuning Phase involves refining machine learning models for peak performance. It includes optimized model code, fine-tuning hyperparameters, comparing performance metrics, and justifying the final model selection for enhanced predictive accuracy and efficiency.

Activity 1: Hyperparameter Tuning Documentation

The Gradient Boosting model was selected for its superior performance, exhibiting high accuracy during hyperparameter tuning. Its ability to handle complex relationships, minimize overfitting, and optimize predictive accuracy aligns with project objectives, justifying its selection as the final model.

Activity 2: Performance Metrics Comparison Report

The Performance Metrics Comparison Report contrasts the baseline and optimized metrics for various models, specifically highlighting the enhanced performance of the Gradient Boosting model. This assessment provides a clear understanding of the refined predictive capabilities achieved through hyperparameter tuning.

Activity 3: Final Model Selection Justification

The Final Model Selection Justification articulates the rationale for choosing Gradient Boosting as the ultimate model. Its exceptional accuracy, ability to handle complexity, and successful hyperparameter tuning align with project objectives, ensuring optimal credit card approval predictions.

Predicting Credit Card Approval Model Optimization and Tuning Phase Report: Click Here

Milestone 5: Project Files Submission and Documentation

For project file submission in Github , Kindly click the link and refer to the flow. Click Here

For the documentation, Kindly refer to the link. Click Here

Milestone 6: Project Demonstration

In the upcoming module called Project Demonstration, individuals will be required to record a video by sharing their screens. They will need to explain their project and demonstrate its execution during the presentation.