

# SmartLender - Applicant Credibility Prediction for Loan Approval

## Milestone 1: Project Initialization and Planning Phase

The "Project Initialization and Planning Phase" marks the project's outset, defining goals, scope, and stakeholders. This crucial phase establishes project parameters, identifies key team members, allocates resources, and outlines a realistic timeline. It also involves risk assessment and mitigation planning. Successful initiation sets the foundation for a well-organized and efficiently executed machine learning project, ensuring clarity, alignment, and proactive measures for potential challenges.

### Activity 1: Define Problem Statement

Problem Statement: The current Human Development Index (HDI) is a widely recognized measure used to rank countries based on human development levels. However, it primarily considers three dimensions: health (life expectancy at birth), education (mean years of schooling and expected years of schooling), and standard of living (Gross National Income per capita).

Ref. template: [Click Here](#)

SmartLender Problem Statement Report: <https://github.com/deekshithpattipaka/Mini-Project-Templates/tree/main/A%20Comprehensive%20Measure%20of%20well%20being%3A%20The%20Human%20Development%20Index%20using%20Machine%20Learning%20/1.Project%20Initialisation%20and%20Planning%20Phase>

### Activity 2: Project Proposal (Proposed Solution)

The proposed project "The Human Development Index (HDI) with SmartLender" is a composite statistic used to rank countries based on human development. It takes into account factors such as life expectancy, education, and income per capita. Traditional methods of calculating HDI have limitations in capturing the nuances and complexities of human development. This project aims to enhance HDI prediction using machine learning techniques and to provide an interactive web application for users to predict HDI based on their inputs.

Ref. template: [Click Here](#)

SmartLender Project Proposal Report: [Click Herehttps://github.com/deekshithpattipaka/Mini-Project-Templates/tree/main/A%20Comprehensive%20Measure%20of%20well%20being%3A%20The%20Human%20Development%20Index%20using%20Machine%20Learning%20/1.Project%20Initialisation%20and%20Planning%20Phase](https://github.com/deekshithpattipaka/Mini-Project-Templates/tree/main/A%20Comprehensive%20Measure%20of%20well%20being%3A%20The%20Human%20Development%20Index%20using%20Machine%20Learning%20/1.Project%20Initialisation%20and%20Planning%20Phase)

### Activity 3: Initial Project Planning

Initial Project Planning involves outlining key objectives, defining scope, and identifying stakeholders for the HDI. It encompasses 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 analysis, and plans the workflow for data processing. Effective initial planning lays the foundation for a systematic and well-executed project, ensuring successful outcomes.

Ref. template: [Click Here](#)

SmartLender Project Planning Report:

[ClickHerehttps://github.com/deekshithpattipaka/Mini-Project-Templates/tree/main/A%20Comprehensive%20Measure%20of%20well%20being%3A%20The%20Human%20Development%20Index%20using%20Machine%20Learning%20/1.Project%20Initialisation%20and%20Planning%20Phase](https://github.com/deekshithpattipaka/Mini-Project-Templates/tree/main/A%20Comprehensive%20Measure%20of%20well%20being%3A%20The%20Human%20Development%20Index%20using%20Machine%20Learning%20/1.Project%20Initialisation%20and%20Planning%20Phase)

## Milestone 2: Data Collection and Preprocessing Phase

The Data Collection and Preprocessing Phase involves executing a plan to gather relevant loan

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 "SmartLender - A Comprehensive Measure Of Well-Being: The Human Development Using Machine Learning" is sourced from Kaggle. It includes country and HDI, GNI and etc. Data quality is ensured through thorough verification, addressing missing values, and maintaining adherence to ethical guidelines, establishing a reliable foundation for predictive modelling.

Ref. template: [Click Here](#)

SmartLender Data Collection Report:

[ClickHerehttps://github.com/deekshithpattipaka/Mini-Project-Templates/tree/main/A%20Comprehensive%20Measure%20of%20well%20being%3A%20The%20Human%20Development%20Index%20using%20Machine%20Learning%20/2.Data%20Collection%20And%20Preprocessing%20Phase](https://github.com/deekshithpattipaka/Mini-Project-Templates/tree/main/A%20Comprehensive%20Measure%20of%20well%20being%3A%20The%20Human%20Development%20Index%20using%20Machine%20Learning%20/2.Data%20Collection%20And%20Preprocessing%20Phase)

### Activity 2: Data Quality Report

The dataset for "SmartLender - A Comprehensive Measure Of Well-Being: The Human Development Using Machine Learning" is sourced from Kaggle. A Comprehensive Measure Of Well-Being: The Human Development Using Machine Learning

Ref. template: [Click Here](#)

SmartLender Data Quality Report:

[ClickHerehttps://github.com/deekshithpattipaka/MiniProject-Templates/tree/main/A%20Comprehensive%20Measure%20of%20well%20being%3A%20The%20Human%20Development%20Index%20using%20Machine%20Learning%20/2.Data%20Collection%20And%20Preprocessing%20Phase](https://github.com/deekshithpattipaka/MiniProject-Templates/tree/main/A%20Comprehensive%20Measure%20of%20well%20being%3A%20The%20Human%20Development%20Index%20using%20Machine%20Learning%20/2.Data%20Collection%20And%20Preprocessing%20Phase)

### Activity 3: Data Exploration and Preprocessing

Dataset variables will be statistically analyzed to identify patterns and outliers, with Python employed for preprocessing tasks like normalization and feature engineering. Data cleaning will address missing values and outliers, ensuring quality for subsequent analysis and modeling, and forming a strong foundation for insights and predictions.

Ref. template: [Click Here](#)

SmartLender Data Exploration and Preprocessing Report: [Click](#)

[Herehttps://github.com/deekshithpattipaka/Mini-Project-Templates/tree/main/A%20Comprehensive%20Measure%20of%20well%20being%3A%20The%20Human%20Development%20Index%20using%20Machine%20Learning%20/2.Data%20Collection%20And%20Preprocessing%20Phase](https://github.com/deekshithpattipaka/Mini-Project-Templates/tree/main/A%20Comprehensive%20Measure%20of%20well%20being%3A%20The%20Human%20Development%20Index%20using%20Machine%20Learning%20/2.Data%20Collection%20And%20Preprocessing%20Phase)

## Milestone 3: Model Development Phase

The Model Development Phase entails crafting a predictive model for loan 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 lending process.

### Activity 1: Feature Selection Report

The Feature Selection Report outlines the rationale behind choosing specific features (e.g., Country, HDI, GNI) for the loan approval model. It evaluates relevance, importance, and impact on predictive accuracy, ensuring the inclusion of key factors influencing the model's ability to discern credible loan applicants.

Ref. template: [Click Here](#)

SmartLender Feature Selection Report:

[ClickHerehttps://github.com/deekshithpattipaka/Mini-Project-Templates/tree/main/A%20Comprehensive%20Measure%20of%20well%20being%3A%20The%20Human%20Development%20Index%20using%20Machine%20Learning%20/3.Model%20Development%20Phase](https://github.com/deekshithpattipaka/Mini-Project-Templates/tree/main/A%20Comprehensive%20Measure%20of%20well%20being%3A%20The%20Human%20Development%20Index%20using%20Machine%20Learning%20/3.Model%20Development%20Phase)

### Activity 2: Model Selection Report

In the forthcoming Model Selection Report, various models will be outlined, detailing their descriptions, hyperparameters, and performance metrics, including Accuracy or F1 Score. This comprehensive report will provide insights into the chosen models and their effectiveness

Ref. template: [Click Here](#)

SmartLender Model Selection Report:

[ClickHerehttps://github.com/deekshithpattipaka/Mini-Project-Templates/tree/main/A%20Comprehensive%20Measure%20of%20well%20being%3A%20The%20Human%20Development%20Index%20using%20Machine%20Learning%20/3.Model%20Development%20Phase](https://github.com/deekshithpattipaka/Mini-Project-Templates/tree/main/A%20Comprehensive%20Measure%20of%20well%20being%3A%20The%20Human%20Development%20Index%20using%20Machine%20Learning%20/3.Model%20Development%20Phase)

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

The initial model training code will be showcased in the future through a screenshot. The model validation and evaluation report will include classification reports, accuracy, and confusion matrices for multiple models, presented through respective screenshots.

Ref. template: [Click Here](#)

SmartLender Model Development Phase Template:

[ClickHerehttps://github.com/deekshithpattipaka/Mini-Project-Templates/tree/main/A%20Comprehensive%20Measure%20of%20well%20being%3A%20The%20Human%20Development%20Index%20using%20Machine%20Learning%20/3.Model%20Development%20Phase](https://github.com/deekshithpattipaka/Mini-Project-Templates/tree/main/A%20Comprehensive%20Measure%20of%20well%20being%3A%20The%20Human%20Development%20Index%20using%20Machine%20Learning%20/3.Model%20Development%20Phase)

## 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 Line as the ultimate model. Its exceptional accuracy, ability to handle complexity, and successful hyperparameter tuning align with project objectives, ensuring optimal loan approval predictions.

Ref. template: [Click Here](#)

SmartLender Model Optimization and Tuning Phase Report: [Click Here](https://github.com/deekshithpattipaka/Mini-Project-Templates/tree/main/A%20Comprehensive%20Measure%20of%20well%20being%3A%20The%20Human%20Development%20Index%20using%20Machine%20Learning%20/4.Model%20Optimisation%20and%20Tuning%20Phase)  
<https://github.com/deekshithpattipaka/Mini-Project-Templates/tree/main/A%20Comprehensive%20Measure%20of%20well%20being%3A%20The%20Human%20Development%20Index%20using%20Machine%20Learning%20/4.Model%20Optimisation%20and%20Tuning%20Phase>

## 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](https://github.com/deekshithpattipaka/Mini-Project-Templates/tree/main/A%20Comprehensive%20Measure%20of%20well%20being%3A%20The%20Human%20Development%20Index%20using%20Machine%20Learning%20/1.Project%20Initialisation%20and%20Planning%20Phase)  
<https://github.com/deekshithpattipaka/Mini-Project-Templates/tree/main/A%20Comprehensive%20Measure%20of%20well%20being%3A%20The%20Human%20Development%20Index%20using%20Machine%20Learning%20/1.Project%20Initialisation%20and%20Planning%20Phase>

## 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.