Early Prediction Of Restaurant Revenue

Milestone 1: Project Initialization and Planning Phase

The "Project Initialization and Planning Phase" marks the project's outset, defining goals, scope, and predictions. 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 1:** A restaurant chain wants to predict the monthly revenue of its outlets. They can use machine learning models to analyze data such as location, menu items, pricing, and customer reviews to forecast revenue.
- **Problem Statement 2:** A new restaurant is looking to estimate its potential monthly revenue based on similar restaurants' data, taking into account factors like local competition, demographics, and seasonal trends.
- **Problem Statement 3:** A restaurant owner wants to optimize their marketing spend by predicting the revenue impact of different promotional strategies, using historical data on past promotions and sales..
- **Problem Statement 3:** A restaurant owner wants to optimize their marketing spend by predicting the revenue impact of different promotional strategies, using historical data on past promotions and sales.

Ref. template: Click Here

Restaurant revenue prediction Project Statement Report: Click Here

Activity 2: Project Proposal (Proposed Solution)

The proposed project, "Early Prediction of Restaurant Revenue," aims to leverage machine learning for accurate revenue predictions. Using a comprehensive dataset that includes factors such as location, menu pricing, customer ratings, and marketing expenses, the project seeks to develop a predictive model optimizing revenue forecasting.

Ref. template: Click Here

Restaurant revenue prediction Project Proposal Report: Click Here

Activity 3: Initial Project Planning

Initial Project Planning involves outlining key objectives, defining scope, and identifying early prediction of restaurant revenue. 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](#)

Restaurant revenue prediction 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 data from various sources, 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 "Early Prediction of Restaurant Revenue" is sourced from multiple platforms, including restaurant databases, online reviews, and market research reports. 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](#)

Restaurant revenue prediction Data Collection Report: [Click Here](#)

Activity 2: Data Quality Report

The dataset for "Early Prediction of Restaurant Revenue" is sourced from multiple platforms. 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](#)

Restaurant revenue prediction Data Quality Report: [Click Here](#)

Activity 3: Data Exploration and Preprocessing

Data Exploration involves analyzing the restaurant revenue dataset to understand patterns, distributions, and outliers. Preprocessing includes handling missing values, scaling, and encoding categorical variables. These crucial steps enhance data quality, ensuring the reliability and effectiveness of subsequent analyses in the prediction of restaurant revenue.

Ref. template: [Click Here](#)

Restaurant revenue prediction Data Exploration and Preprocessing Report: [Click Here](#)

Milestone 3: Model Development Phase

The Model Development Phase entails crafting a predictive model for restaurant revenue. 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..

Activity 1: Feature Selection Report

The Feature Selection Report outlines the rationale behind choosing specific features (e.g., location, menu pricing, customer ratings) for the revenue model. It evaluates relevance, importance, and impact on predictive accuracy, ensuring the inclusion of key factors influencing the model's ability to predict revenue..

Ref. template: [Click Here](#)

Restaurant revenue prediction Feature Selection Report: [Click Here](#)

Activity 2: Model Selection Report

The Model Selection Report details the rationale behind choosing Random Forest and Linear Regression models for revenue 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.

Ref. template: [Click Here](#)

Restaurant revenue prediction 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 restaurant revenue dataset, setting the foundation for predictive modeling. The subsequent Model Validation and Evaluation Report rigorously assesses model performance, employing metrics like mean absolute error and R-squared to ensure reliability and effectiveness in predicting restaurant revenue outcomes.

Ref. template: [Click Here](#)

Restaurant revenue prediction Model Development Phase Template: [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 Random Forest 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 Random Forest 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 Random Forest as the ultimate model. Its exceptional accuracy and ability to handle complexity justify its selection.

Ref. template: [Click Here](#)

Restaurant revenue prediction Model Optimization and Tuning Phase Report: [Click Here](#)

Milestone 5: Project Files Submission and Documentation

For project file submission in GitHub, refer to the provided guidelines and template. Documentation should comprehensively cover all aspects of the project, ensuring clarity and reproducibility.

For the documentation, Kindly refer to the link.

Milestone 6: Project Demonstration

In the upcoming Project Demonstration module, 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.