Smart Bridge: Revolutionizing Automotive Resale: AI-Driven Prediction of Used Toyota Corolla Car Prices

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

The resale market for used Toyota Corolla cars is plagued by inconsistencies and inefficiencies in price determination, leading to potential financial losses for sellers and buyers alike. Traditional methods of valuation often fail to account for the myriads of factors that influence car prices, such as condition, mileage, location, and market trends, resulting in inaccurate and unfair pricing.

Problem Statement Report: Click Here

Activity 2: Project Proposal (Proposed Solution)

The automotive resale market faces challenges due to the inherent variability in used car prices. Traditional pricing methods often fall short in accuracy and efficiency. This project proposes an AI-driven solution to predict the resale prices of used Toyota Corolla cars, enhancing transparency and decision-making for buyers and sellers.

Project Proposal Report: Click Here

Activity 3: Initial Project Planning

This initial project plan outlines the roadmap for developing an AI-driven predictive model for used Toyota Corolla resale prices. By adhering to this plan, the project aims to deliver a transformative solution that enhances transparency, efficiency, and decision-making in the automotive resale market.

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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 Toyota Corolla

Car Price data from Kaggle, ensuring data quality through verification. 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 bridge- Revolutionizing Automotive Resale: AI- Driven Prediction of Used Toyota Corolla Car Prices " is sourced from Kaggle. This data collection plan outlines the strategy for gathering and ensuring the quality of data necessary for developing an AI-driven predictive model for used Toyota Corolla car prices. By adhering to this plan, the project aims to collect comprehensive, accurate, and reliable data, which will serve as the foundation for creating a high-performing predictive model.

Data Collection Report: **Click Here**

Activity 2: Data Quality Report

The dataset for "Smart bridge – Revolutionizing Automotive Resale: AI- Driven Prediction of Used Toyota Corolla Car Prices "is sourced from Kaggle. It includes car details and Data quality is ensured through thorough verification, addressing missing values, and maintaining adherence to ethical guidelines, establishing a reliable foundation for predictive modeling.

Data Quality Report: **Click Here**

Activity 3: Data Exploration and Preprocessing

Data Exploration involves analyzing the Revolutionizing Automotive Resale: AI- Driven Prediction of Used Toyota Corolla Car Prices 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 Revolutionizing Automotive Resale: AI- Driven Prediction of Used Toyota Corolla Car Prices project.

Data Exploration and Preprocessing Report: **Click Here**

Milestone 3: Model Development Phase

The Model Development Phase entails crafting a predictive model for car prices. It encompasses strategic feature selection, evaluating and selecting models (linear regression, Random Forest, Decision Tree classifier, XG boost), 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., Id, Model, Price, Age_08_04, Mfg_Month, Km, Fuel_type, HP, Met_Color, Backseat_Divider…) for the Toyota Corolla car model. It evaluates relevance, importance, and impact on predictive

accuracy, ensuring the inclusion of key factors influencing the model's ability to predict the Car Prices.

Feature Selection Report: Click Here

Activity 2: Model Selection Report

The Model Selection Report details the rationale behind choosing Random Forest, Decision Tree, support vector classifier models for Toyota Corolla car 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.

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 Toyota Corolla car 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 car prices.

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, ability to handle complexity, and successful hyperparameter tuning align with project objectives, ensuring optimal Toyota Corolla car price predictions.

Model Optimization and Tuning Phase Report: Click Here

Milestone 5: Project Files Submission and Documentation

For project file submission in Git hub, 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.