ECOMMERCE SHIPPING PREDICTION USING MACHINE LEARNING

Milestone 1: Project Initialization and Planning Phase

The "Project Initialization and Planning Phase" marks the project's outset, defining goals, scope. 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 execute0 challenges.

Activity 1: Define Problem Statement

Problem Statement: Develop a model to accurately predict the delivery times of e-commerce orders based on various factors such as order details, shipping methods, and external conditions.

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Ecommerce Shipping Problem Statement Report: Click here

Activity 2: Project Proposal (Proposed Solution)

The proposed solution involves creating a machine learning model that utilizes historical shipping data to predict delivery times for e-commerce orders. The model will incorporate features such as order details, shipping methods, and external conditions like weather and traffic. We will use advanced algorithms like gradient boosting and neural networks to enhance prediction accuracy. The solution will be integrated into the e-commerce platform to provide real-time shipping estimates. Continuous model training and validation will ensure the system adapts to changing conditions and maintains high accuracy.

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Ecommerce Shipping Project Proposal Report: Click here

Activity 3: Project Planning

Initial Project Planning involves outlining key objectives, defining scope, and identifying stakeholders for an e-commerce shipping prediction system. 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 prediction accuracy, and plans the workflow for data collection and preprocessing. Effective initial planning lays the foundation for a systematic and well-executed project, ensuring successful outcomes.

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Ecommerce Shipping 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 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, Data Preprocessing Report

The dataset for "Ecommerce Shipping Prediction using Machine Learning" is sourced from Kaggle. The download data set is not suitable for training the machine learning model as it might have so much randomness so we need to clean the dataset properly in order to fetch good results. This activity includes the following steps.

- Handling missing values
- Handling categorical data
- Handling Outliers

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Ecommerce Shipping Data Preprocessing Report: Click here

Activity 2: Data Quality Report

The dataset for " Ecommerce Shipping Prediction using Machine Learning " is sourced from Kaggle. It includes customer, shipping details. Data quality is ensured through thorough verification, addressing missing values, and maintaining adherence to ethical guidelines, establishing a reliable foundation for predictive modeling.

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Ecommerce Shipping Data Quality Report: Click here

Activity 3: Raw Data Source & Data Quality Report

Data Exploration and Preprocessing for e-commerce shipping prediction involves thoroughly examining the collected historical shipping data to understand its structure, quality, and key characteristics. This phase includes identifying and handling missing values, outliers, and inconsistencies to ensure data integrity. Key features such as order details, shipping methods, and external factors like weather and traffic are extracted and transformed as needed.

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Ecommerce Shipping Raw Data Report: Click here

Milestone 3: Model Development Phase

The Model Development Phase involves selecting appropriate machine learning algorithms training them on the pre processed historical shipping data. This phase includes evaluating and selecting models(Random Forest, Logistic Regression ,KNN ,Decision Tree, XGBoost, Ridge, SVM), hyperparameter tuning, cross-validation, and model evaluation to ensure high prediction accuracy. The development process also involves feature selection and engineering to enhance model performance. Once the model is trained, it is validated using a separate test dataset to confirm its predictive capabilities.

Activity 1: Feature Selection Report

The feature selection process in their model development phase involves evaluating various features such as warehouse location, mode of shipment, customer service calls, customer rating, product cost, prior purchases, product importance, gender, discount offered, and product weight. Each feature is assessed for its relevance to the shipping prediction model, aiming to streamline decision-making and enhance transparency.

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Ecommerce Shipping Model Feature Selection Report: Click here

Activity 2: Model Selection Report

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

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Ecommerce Shipping Model Selection Report: Click here

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

The initial model training in the ecommerce shipping prediction project, we utilized historical shipping data to train a gradient boosting regressor. The code included data preprocessing steps such as handling missing values and encoding categorical variables. We split the dataset into training and validation sets, using cross-validation to optimize hyperparameters and ensure robust performance.

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Ecommerce Shipping Initial Model Training Phase Template: Click here

Milestone 4: Model Optimization and Tuning Phase

During the model optimization and tuning phase for e-commerce shipping prediction, the focus is on refining and enhancing the predictive performance of the models developed in earlier stages. This involves fine-tuning hyperparameters, such as learning rates and tree depths for gradient boosting models, and adjusting architecture and layers for neural networks. Techniques like grid search and randomized search are employed to explore various combinations of hyperparameters efficiently.

Activity 1: Model Optimization and 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.

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Ecommerce Shipping Model Optimization and Tuning Phase Template: Click here

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 loan approval predictions.

Milestone 5: Project Files Submission and Documentation

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

For the documentation, Kindly refer to the link.

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.