Customer Segmentation using Machine Learning

Milestone1: project initialization and Planning phase:

The “Project Initialization and planning phase” marks the project’s outset, definite goals, scope. This crucial phase establishes project parameters, identifiers 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.

Activity1: Define problem Statement Problem statement: Customer segmentation is a challenging task in marketing that aims to build homogeneous segments of customers based on their similar characteristics and activities. Most existing segmentation methods are based on the optimization of a single-objective function, which makes it difficult to identify homogeneous customer segments in terms of both predictive and descriptive variables. To address this issue, a multi-objective segmentation approach is proposed that considers descriptive, predictive, and quality-validation axes. These challenges lead to a less-than-optimal customer experience, potentially affecting trust and satisfaction. To enhance our services and improve customer perceptions, we aim to address these pain points. By understanding customers' specific frustrations during the application journey and implementing solutions, we can create an efficient, user-friendly experience that aligns with our customer's expectations and fosters a positive relationship with our brand

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Customer segmentation Problem Statement reports: Click here

Activity 2: Project Proposal (Proposal Solution)

This proposed project, Enhancing the “Customer Segmentation using machine learning”, aims to leverage machine learning for more accurate applicant credibility predictions. Using a comprehensive dataset including gender, marital status, education, income, the project seeks to develop a predictive model optimizing the customer segmentation process.

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Customer segmentation Project Proposal report: Click Here

Activity3: Initial project planning

Initial Project Planning involves outlining key objectives, defining scope, and identifying the customers. 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

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Customer segmentation 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 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

The dataset for “Customer Segmentation" is sourced from Kaggle. It includes customer details and financial metrics. 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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Customer Segmentation Data Collection Report: Click Here

Activity 2: Data Quality Report

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Customer Segmentation Data Collection Report: Click Here

Activity 3: Data Exploration and Preprocessing

Data Exploration involves analyzing the Customer 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 project.

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Customer Segmentation Data Exploration and Preprocessing Report: Click Here

Milestone 3: Model Development Phase

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

Activity 1: Feature Selection Report

The Feature Selection Report outlines the rationale behind choosing specific features (e.g.. Gender, Married, Income) for the model It evaluates relevance, importance. and impact on predictive accuracy, causing the inclusion of key factors influencing the model's ability to discern the customer segmentation.

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Customer Segmentation 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 Customer segmentation prediction. It considers each model's strengths in brandling complex relationships, interpretability, adaptability, and overall predictive performance, ensuring an informed choice aligned with project objectives.

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Customer Segmentation Model Selection Report: Click Here

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

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

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Customer Segmentation 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 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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Customer Segmentation hyperparameter tuning Documentation Report: 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

model. This assessment provides a clear understanding of the refined predictive capabilities achieved through hyperparameter tuning.

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Customer Segmentation Performance Metrics Comparison Report: Click Here

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

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Customer Segmentation 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 is explain their project and demonstrate is execution during the revisitation