Eudaimonia Engine: Machine Learning Delving into Happiness Classification

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 problem statement for the Eudaimonia Engine project centers around using machine learning to delve into happiness classification, predicting happiness levels based on input features, identifying key determinants of happiness, engaging users in self-assessment, and generating insights into subjective well-being and positive psychology

Eudaimonia Engine Problem Statement Report: [Click Here](#)

Activity 2: Project Proposal (Proposed Solution)

The "Eudaimonia Engine" project aims to leverage machine learning techniques to classify and predict levels of happiness based on various input features. Happiness is a fundamental aspect of well-being, and understanding the factors that contribute to it can lead to significant insights for individuals and society. By delving into happiness classification through machine learning, we can uncover patterns, trends, and predictors that influence happiness levels.

Eudaimonia Engine Project Proposal Report: [Click Here](#)

Activity 3: Initial Project Planning

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

Eudaimonia Engine 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 the residents of the city for their happiness and gathering the required dataset from Kaggle. Ensured data quality is high with no missing values. Categorical data in the dataset is high,encoding is not required.

Activity 1: Data Collection Plan, Raw Data Sources Identified, Data Quality Report

The dataset for "Eudaimonia Engine: Machine Learning Delving into Happiness Classification" is sourced from Kaggle. It includes where people rated different metrics of their city on a scale of 5 and answered if they are happy or unhappy. The goal of this dataset is to understand the important factors that play a role in making the residents of a city happier with their lives. It includes info avail, house cost, school quality, police trust, street quality, events, happy. Data quality is ensured high with no missing values.

Eudaimonia Engine Data Collection Report: [Click Here](#)

Activity 2: Data Quality Report

The dataset for "Eudaimonia Engine: Machine Learning Delving into Happiness Classification" is sourced from Kaggle. It includes. Information about house cost, school quality, police trust, street quality, events for the residents of the city happier. Data quality is ensured high with no missing values.

Eudaimonia Engine Data Quality Report:[Click Here](#)

Activity 3: Data Exploration and Preprocessing

Data Exploration involves analyzing the loan applicant 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 loan approval project.

Eudaimonia Engine Data Exploration and Preprocessing Report: [Click Here](#)

Milestone 3: Model Development Phase

The Model Development Phase entails crafting a predictive model for happiness level of residents in the city. It encompasses strategic feature selection, evaluating and selecting models (Decision Tree, Random Forest Tree, KNN, SVC, Logistic Model, XGB), initiating training with code, and rigorously validating and assessing model performance for informed decision-making for the happiness level.

Activity 1: Feature Selection Report

The Feature Selection Report outlines the rationale behind choosing specific features (e.g., info avail, house cost, school quality, police trust, street quality, events, happy) for the happiness level of the residents in the city. It evaluates relevance, importance, and impact on predictive accuracy, ensuring the inclusion of key factors influencing the model's ability to predict the happiness level of the residents in the city.

Eudaimonia Engine Feature Selection Report:[Click Here](#)

Activity 2: Model Selection Report

The Model Selection Report details the rationale behind choosing Random Forest, Decision Tree, KNN, SVC and XGB models for happiness level 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.

Eudaimonia Engine 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 happy 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 happiness outcomes.

Eudaimonia Engine 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 Decision Tree 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 Decision Tree 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 Decision Tree Model as the ultimate model. Its exceptional accuracy, ability to handle complexity, and successful hyperparameter tuning align with project objectives, ensuring optimal Happiness level predictions.

Eudaimonia Engine Model 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 to explain their project and demonstrate its execution during the presentation.