Genetic Classification Of An Individual By Using Machine Learning

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 project "Genetic Classification of an Individual Using Machine Learning" aims to accurately classify individuals based on their genetic data. This involves developing a machine learning model that can effectively analyze genetic information to categorize individuals, considering the vast and complex nature of genetic data. The challenge lies in handling the large volume of genetic markers and ensuring the model's accuracy and reliability. The project necessitates a robust dataset, advanced preprocessing techniques, and sophisticated algorithms to achieve high classification accuracy, providing valuable insights into genetic markers and facilitating applications in personalized medicine, genetic research, and ancestry analysis.

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Genetic Problem Statement Report: Click Here

Activity 2: Project Proposal (Proposed Solution)

The proposed project, " Genetic Classification of An Individual," aims to leverage machine learning for more accurate applicant Genetic predictions. Using a comprehensive dataset including all the generation details, the project seeks to develop a predictive model optimizing Gene processes. This initiative aligns with Ancestors objective to enhance decision-making, reduce risks, and streamline Gene operations, ultimately improving the health.

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Activity 3: Initial Project Planning

The project "Genetic Classification of an Individual Using Machine Learning" aims to develop a highly accurate model to classify individuals based on their genetic data. This involves collecting

a comprehensive genetic dataset, preprocessing the data to handle missing values and noise, and selecting relevant genetic markers for classification. The project will utilize advanced machine learning algorithms to analyze patterns within the genetic data and create a robust classification model. Key objectives include achieving high classification accuracy, providing insights into significant genetic markers, and developing a user-friendly interface for inputting genetic data and obtaining classification results. Effective initial planning involves outlining clear objectives, defining the project's scope, identifying stakeholders, setting timelines, allocating resources, and establishing a workflow for data processing and analysis to ensure a systematic and successful execution of the project.

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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, Raw Data Sources Identified, Data Quality Report

The dataset for "Genetic Classification of an Individual Using Machine Learning" is sourced from Kaggle. It includes detailed genetic information for individuals. 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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Activity 2: Data Quality Report

The dataset for " Genetic Classification of an Individual Using Machine Learning " is sourced from Kaggle. It includes applicant 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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Genetic 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.

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Milestone 3: Model Development Phase

The Model Development Phase entails crafting a predictive model for loan approval. 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 in the lending process.

Activity 1: Feature Selection Report

The Feature Selection Report outlines the rationale behind choosing specific features (e.g., Gender, Married, Credit History) for the loan approval model. It evaluates relevance, importance, and impact on predictive accuracy, ensuring the inclusion of key factors influencing the model's ability to discern credible loan applicants.

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Activity 2: Model Selection Report

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

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

The Initial Model Training Code employs selected algorithms on the loan approval 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 loan outcomes.

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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.

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 Genetic predictions.

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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.