

# SmartBridge –Smart Watch Price Prediction.

## 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 smartwatch price prediction involves creating a model to accurately forecast the future prices of smartwatches. This model should consider various factors such as brand, features, market trends, and historical pricing data. The goal is to provide reliable price predictions to help consumers make informed purchasing decisions. The solution should be robust, scalable, and adaptable to changes in the smartwatch market.

**Problem Statement Report:** [Click Here](#)

### Activity 2: Project Proposal (Proposed Solution)

The project proposal for smartwatch price prediction aims to develop a machine learning model that accurately forecasts future smartwatch prices. This will involve collecting and analyzing data on various factors like brand, features, historical prices, and market trends. The project will deliver a user-friendly tool for consumers to predict prices and make informed purchasing decisions. It will ensure scalability and adaptability to keep up with market dynamics.

**Project Proposal Report:** [Click here](#)

### Activity 3: Initial Project Planning

- **Data Collection:** Gather historical pricing, feature specifications, and market trend data from reliable sources.
- **Model Development:** Select and train machine learning models to predict future smartwatch prices based on collected data.
- **Implementation:** Develop a user-friendly application to deliver real-time price predictions to consumers.

- Testing and Deployment: **Conduct rigorous testing to ensure accuracy, then deploy the application and set up ongoing maintenance and updates.**

Project Planning Report: [Click here](#)

## Mile Stone 2: Data Collection and Preprocessing Phase

The Data Collection and Preprocessing Phase involves executing a plan to gather relevant smart watch price prediction 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 "Smartwatch Price Prediction" 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.

Raw Data Report: [Click here](#)

### Activity 2: Data Quality Report

The dataset for "Smart Watch Price Prediction" 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.

Data Quality 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 cost prediction project.

Data Exploration and Preprocessing Report: [Click here](#)

## Milestone 3: Model Development Phase

The Model Development Phase entails crafting a predictive model for price prediction. 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.

### **Activity 1: Feature Selection Report**

The Feature Selection Report outlines the rationale behind choosing specific features (e.g., brand,model,price etc) for the smartwatch price prediction model. It evaluates relevance, importance, and impact on predictive accuracy, ensuring the inclusion of key factors influencing the model's ability to discern credible customers.

**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 acquisition smartwatch price 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 smartwatch price 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 price outcomes.

**Model Development Phase Template:** [Click Here](#)

## **Mile stone 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 Regressor 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 regressor 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 as the ultimate model. Its exceptional accuracy, ability to handle complexity, and successful hyperparameter tuning align with project objectives, ensuring optimal loan approval predictions.

**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.