**Product Demand Predictions with**

**Machine Learning**

**Problem Understanding:**

* It is about creating a Machine Learning program that can predicts the product demand accurately for inventory Management and for meeting customer needs.
* This prediction is based on past sales data and relevant information.
* The main goal is to help business from avoid making too much or too little of a product.

We can solve these problem by doing following steps:

* Data Collection: We need to collect the data about Pre-historic sales and relevant information

(The dataset is already provided in Kaggle)

* Data Preparation: We need to clean up the information and transform it to make sure it is understandable by computer.
* Choose Models: We need to choose the right machine learning model for predicting accurately.
* Train Models: We need to train the model to make prediction based on the past data and helping it to learn patterns.
* Test models: After training the model, we need to test the model to check its accuracy and the model should be trained until the required accuracy is achieved.

**Approach:**

**1.Data Collection:**

* We will use the provided Dataset from Kaggle for the Pre-historic data sales
* These dataset consist of data about Product ID, Store ID, Total Price, Base Price, Units Sold

**2.Data Preprocessing:**

* We should clean data to remove errors and inconsistencies.
* Handle missing values
* Format data for modeling
* We can use “Pandas” package from Python for Data Preprocessing

**3.Feature Engineering:**

* We will create additional features like seasonality, Discounts and Holidays.
* We need to enhance data with relevant Information.

**4.Model Selection:**

* We will choose the right Machine Learning models like Time series models or Regression models
* We need to Choose the best performing model.
* We can use tools like Scikit-learn, Statsmodel.

**5.Model Training:**

* We will train the selected model using the given dataset.
* Use a portion of data for validataion.
* We need to Fine-tune the model hyperparameters.
* For training we can use Python and Machine learning libraries.

**6.Model Evaluation:**

* We need to evaluate the model accuracy using Mean Absolute Error(MAE) and Root Mean Squared Error(RMSE).
* We need to compare the model predictions to actual demand.
* Decision Threshold: MAE < 5% of average demand.

**Conclusion:**

This Document outlines our Problem Understanding and our approach for predicting the demand for the products using Machine Learning.