PHASE 1 – DOCUMENT SUBMISSION

Team members:

Aravindraagavendhan.S (411621104004)

Abraham.p (411621104002)

Dossagayanathan.K (411621104009)

Dhanush.V(411621104007)

Ganesh kumar.S (411621104010)

Project Title: Product demand prediction with machine learning

Predicting product demand using machine learning involves analyzing historical data and creating a predictive model to forecast future demand. Here's a high-level overview of the steps you can follow to perform demand prediction with machine learning, assuming you have access to relevant historical documents and data:

1. \*Data Collection and Preprocessing:\*

- Gather historical data on product sales, inventory levels, pricing, promotions, and any other relevant factors.

- Preprocess the data by handling missing values, outliers, and converting categorical variables into numerical representations through techniques like one-hot encoding.

2. \*Feature Engineering:\*

- Create meaningful features from the data that can help the model capture demand patterns. For example, you can calculate lag features (e.g., sales from the previous month) or seasonal indicators.

3. \*Splitting the Data:\*

- Split the dataset into training, validation, and test sets. Typically, you might use 70-80% for training, 10-15% for validation, and the remaining 10-15% for testing.

4. \*Selecting a Machine Learning Model:\*

- Choose an appropriate machine learning algorithm for demand prediction. Common choices include linear regression, decision trees, random forests, gradient boosting, or more advanced models like neural networks.

5. \*Training the Model:\*

- Train the selected model using the training data. Adjust hyperparameters as needed to optimize model performance.

6. \*Validation and Fine-Tuning:\*

- Evaluate the model's performance using the validation dataset, considering metrics such as Mean Absolute Error (MAE), Mean Squared Error (MSE), or Root Mean Squared Error (RMSE).

- Fine-tune the model by adjusting hyperparameters, trying different algorithms, or incorporating domain knowledge.

7. \*Testing the Model:\*

- Assess the model's performance on the test dataset to ensure it generalizes well to unseen data.

8. \*Deployment:\*

- Once satisfied with the model's performance, deploy it in a production environment to make real-time predictions.

9. \*Monitoring and Maintenance:\*

- Continuously monitor the model's performance in the production environment and retrain it periodically with new data to adapt to changing demand patterns.

10. \*Documenting the Process:\*

- Maintain documentation that details the entire process, including data sources, preprocessing steps, model selection, hyperparameters, and performance metrics. This documentation is valuable for future reference and model maintenance.

Incorporating documents into this process can involve extracting textual information from documents (e.g., customer reviews, market reports) and using natural language processing techniques to derive insights or features that can improve prediction accuracy.

Remember that demand prediction is an iterative process, and model performance may vary depending on the nature of the products and market conditions. Regularly updating and retraining your model with fresh data is essential for accurate and reliable predictions