**PHASE-1 Presentation**

**Project Name :** Product Demand Prediction with

Machine Learning

**Team Members:**

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Project Description:

Create a machine learning model that forecasts product demand based on historical sales and external factors, helping businesses optimize inventory management and production planning to meet customer needs efficiently

Introduction:

By leveraging data insights from machine learning algorithms, we can design more effective marketing strategies that target specific groups and channels.

Data Collection:

Gather historical data on your product's sales, including factors that may influence demand (e.g., price, promotions, seasonality).

Data Preprocessing:

Clean and prepare the data. This may involve handling missing values, encoding categorical variables, and scaling numeric features.

Feature Selection/Engineering:

Identify relevant features and create new ones if needed to improve model performance. For instance, you might create lag features to capture past sales patterns.

Split Data:

Divide the data into training and testing sets to evaluate the model's performance accurately.

Model Selection:

Choose an appropriate machine learning algorithm. Common choices include linear regression, decision trees, random forests, or more advanced methods like XGBoost or neural networks.

Model Training:

Train the selected model using the training data.

Model Evaluation:

Evaluate the model's performance using the testing data. Common evaluation metrics include Mean Absolute Error (MAE), Mean Squared Error (MSE), and Root Mean Squared Error (RMSE).

Hyperparameter Tuning:

Fine-tune the model's hyperparameters to optimize its performance.

Deployment:

Once satisfied with the model's performance, deploy it in your production environment.

Monitoring and Maintenance:

Continuously monitor the model's predictions and retrain it periodically to adapt to changing demand patterns.

Remember that the success of your product demand predictor depends on data quality, feature engineering, and the choice of the right machine learning model. It's also important to consider domain-specific factors that may influence demand, such as market trends and external events.

Conclusion:

In conclusion, developing a product demand prediction system with machine learning is a valuable endeavor for businesses seeking to optimize inventory management, pricing strategies, and overall operational efficiency. By following a systematic approach that includes data collection, preprocessing, feature engineering, model selection, and deployment, organizations can harness the power of predictive analytics .