**FUTURE SALES PREDICTION**

Innovation:

In this project, our objective is to predict future sales accurately, enabling businesses to make informed decisions about inventory management, marketing strategies, and resource allocation. To introduce innovation into this future sales prediction project, we can integrate a recommendation system that suggests complementary products to customers based on their historical purchase behaviour.

Dataset and its details:

We carefully selected a dataset from Kaggle ([www.kaggle.com](http://www.kaggle.com/)) known for its accuracy and reliability. This dataset consists of historical sales data, including detailed product attributes, store information, and daily sales figures. It is well-maintained, up-to-date, and comes from a reputable source.

key columns from the dataset, including:

* Date: To capture the temporal aspect of sales data.
* Product ID: To identify individual products.
* Sales Quantity: The target variable we aim to predict.
* Price: To consider price fluctuations.
* Store ID: To account for store-specific effects.
* Promotions: To incorporate promotional campaigns as a feature.
* Weather Data: External data to examine its impact on sales.

Train and test:

a. Data Preprocessing: Clean the dataset, handle missing values, and encode categorical variables.

b. Split Data: Divide the dataset into training and testing subsets (e.g., 80% for training, 20% for testing).

c. Model Selection: Choose a suitable algorithm (e.g., XGBoost, LSTM) based on the problem's nature.

d. Train the Model: Use the training data to train the selected model.

e.Test the Model: Evaluate the model's performance using metrics such as MAE, MSE, RMSE, and R2 on the testing dataset.

This system includes:

* **Purchase Complementarity Model**: Develop a recommendation system that identifies frequently purchased product pairs.
* **Real-time Suggestions**: Implement real-time recommendations when customers shop online.
* **Personalization**: Customize suggestions for individual customers.
* **A/B Testing**: Measure the impact of recommendations on sales through controlled experiments.
* **Feedback Loop**: Allow customers to rate and improve recommendations.

This enhances sales forecasting accuracy and provides customers with personalized shopping experiences, potentially increasing sales and satisfaction.