FUTURE SALES PREDICTION:

Problem:

Explain in detail the complete steps that will be taken by you to put your design that you thought of in previous phase into transformation.

Output:

1. **Data Collection:**
   - Gather historical sales data, including date, product/service, location, price, and other relevant factors.
   - Collect additional external data that may impact sales, such as economic indicators, seasonality, holidays, and marketing campaigns.

2. **Data Preprocessing:**
   - Clean and preprocess the data to handle missing values, outliers, and inconsistencies.
   - Convert categorical variables into numerical format using techniques like one-hot encoding or embeddings.
   - Normalize or scale numerical features to bring them to a common scale.

3. **Feature Engineering:**
   - Create new features that might be informative for sales predictions, such as rolling averages, trend indicators, and seasonality features.

4. **Splitting the Data:**
   - Divide the dataset into training, validation, and test sets to assess and validate the model's performance accurately.

5. **Model Selection:**
   - Choose an appropriate machine learning model for sales prediction. Common choices include:
   - Time series forecasting models (e.g., ARIMA, Exponential Smoothing).

- Regression models (e.g., Linear Regression, Random Forest).
- Neural networks (e.g., LSTM, GRU for sequence data).

6. **Model Training:**
   - Train the selected model using the training data.
   - Optimize hyperparameters using techniques like cross-validation and grid search.

7. **Model Evaluation:**
   - Evaluate the model's performance using the validation dataset.
   - Use appropriate metrics such as Mean Absolute Error (MAE), Mean Squared Error (MSE), or Root Mean Squared Error (RMSE) to measure accuracy.

8. **Hyperparameter Tuning:**
   - Fine-tune the model by adjusting hyperparameters based on validation results.

9. **Model Deployment:**
   - Deploy the trained model to a production environment, such as a web application or an API.

10. **Monitoring and Maintenance:**
    - Continuously monitor the model's performance in a real-world setting.
    - Retrain the model periodically to account for changing trends and patterns.

11. **Visualization and Reporting:**
    - Create interactive dashboards or reports to present sales predictions and insights to stakeholders.