Time Series Prediction using Deep Learning

1) **Introduction**

   This project involves developing a predictive model using a deep learning framework to forecast future sales from historical time series data.

2) **Data Exploration**
   - Initial data inspection showed no missing values.
   - Data visualizations indicated clear seasonal trends.

3) **Data Preprocessing**
   - Data was interpolated to handle any potential missing values.
   - Extracted time-based features and normalized sales data using StandardScaler.
   - Split the data into training (80%) and testing (20%) sets.

4) **Model Selection**
   - Selected an ANN model due to its flexibility and ease of implementation.

5) **Model Implementation**
   - Built a sequential ANN model with 8 dense layers.
   - Compiled the model with Adam optimizer, mean squared error loss and mean_absolute_error metrics.

6) **Model Training**
   - Trained the model over 50 epochs with a batch size of 30.
   - Achieved a MSE, MAE, RMSE and R2.

7) **Conclusion**
   - The ANN model performed well on the test data, indicating its suitability for time series forecasting.

8) **Future Work**
   - Explore other model architectures than ANN.