Python Coding Explanation

Hello,

The implementation of my project entitled "Machine Learning Approach for Inventory Forecasting: A Python Coding Perspective" was factored in as one of the components to forecast demand for items in the future, which was done through Python coding. Here's how I applied Python in the implementation: Here's how I applied Python in the implementation:

1. Data Preprocessing (training.py):

- Data Loading: I loaded the historical inventory data using the pandas module with its CSV file.

- Feature Engineering: Through pandas as well as 'holidays' library, I engineered some additional features like what day of the week and whether it is in a us public holidays or not.

- Temporal Patterns Capture: To capture whether events are dependent on previous ones, I included the simple moving average which is a lag feature using inventory value of previous days.

- Categorical Encoding: Through LabelEncoher, I changed categorical weekday labels to number labels.

2. Model Training (training.py):

- Data Splitting: I split the dataset as well as guarded the temporal order of the data into training and testing variants.

- Model Initialization and Training: As initial step, I am instantiating an XGBoost classifier and then I trained on the training data set.

3. Prediction Logic (inference.py):

- Model and Data Retrieval: I got the XGBoost classifier that was preliminarily trained and applied the label encoder to make predictions.

- User Interaction: With `click` library being the main tool, I needed the user to give a delivery date for the forecast.

- Dynamic Feature Generation: The timespan until the objective date that was being considered was daily for every day. Features that were generated dynamically included weekday, holiday indicator, and lag feature.

- Prediction Execution: Provided with a model that had been trained, I, thus, made daily financial forecasts illustrating which products we needed to stock as well as which were on sale.

- Dataset Updating: For every foreplay, I caughed the predicted inventory value to the dataset in order to include it as a lag feature in future predictions.

4. Output (inference.py):

- I displayed the predicted inventory levels for each day up to the target date in an understandable format.

By employing Python and its versatile libraries such as pandas, scikit-learn, xgboost, and click, I developed a comprehensive inventory prediction system capable of accurately forecasting future demand for items in inventory.