**PROGRESS REPORT**

**Project Topic:** Store Item Demand Forecasting

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Özlem Deniz Yıldız

**Store Item Demand Forecasting**

What is demand forecasting ?

Demand forecasting is the process of predicting future demand for a product or service. It is an integral part of a retailer’s strategic planning and execution. Forecasting helps retailers plan their inventory and supply chain, which are the backbone of their operations.

It allows you to better manage your inventory levels and consistently meet demand while only storing the inventory you need at a given period. For instance, when a product comes in stock, it's available for purchase by customers who want it—and not sitting on shelves gathering dust.



daire, diyagram, metin, yazı tipi içeren bir resim

Açıklama otomatik olarak oluşturulduDemand Forecasting Models

Machine Learning : We prefer the machine learning model. Feeding historical data into a machine learning platform can reveal patterns and make predicting future demand much easier.

What do we aim fort this project ?

Our aim is to predict sales in the next 3 months based on data from the past 5 years for 10 different stores and 50 different product types.

**Variables:**

**Date - Date of Sales Date**

**Store – Store ID**

**Item – Item ID**

**Sales – Number of Products Sold at a Specific Store on a Specific Date**

**Analysis Steps**

**1) Data Discovery and Cleaning: We checked for missing data, handled outliers, and performed data cleaning.**

2) Feature Engineering: Various date features will be derived from the date column and we have created features that are necessary to improve model performance.

**3) Model Development: It will be modeled separately for each store and product type. Among these models, for example, ARIMA, LSTM, or XGBoost models can be used.**

XGBoost (eXtreme Gradient Boosting) is a machine learning algorithm that is particularly successful on tabular data and has a wide range of applications and so we decided to use this algorithm.

LightGBM uses a histogram-based method in which data is bucketed into bins using a histogram of the distribution. The bins, instead of each data point, are used to iterate, calculate the gain, and split the data. This method can be optimized for a sparse dataset as well. We are also researching to use this algorithm.