

# INVENTORY & DEMAND FORECASTING

## ● Overview

Cart.com offers comprehensive commerce and logistics solutions tailored for both B2C and B2B companies, streamlining the process of selling and fulfilling orders across various channels. Our primary focus has been on developing an Inventory and Demand Forecasting module for each Stock Keeping Unit (SKU) by pipelining historical data stored in the Data Warehouse.

## ● Customer

Cart.com, USA

Country: USA

Industry: B2B & B2C

Customer Size: 6000+

Publish Date: 24/01/2024

## ● Problem Statement

The challenge was to create an accurate and reliable forecasting system that could predict sales for various SKUs across different stores. The existing sales forecasting pipeline was not delivering satisfactory results, impacting sales margins and operational efficiency. We needed a solution that could process large volumes of data, provide accurate predictions, and integrate seamlessly into the existing infrastructure.

## ● Technical Solution

To achieve this, we initially established a connection between our Python development environment and the Data Warehouse to extract pertinent data, associating each SKU with its respective store. Subsequently, we conducted Exploratory Data Analysis (EDA) to gain insights into the data and understand the correlations between different features. Following this, we set up a model, ultimately opting for the Facebook Prophet model after multiple iterations.

Once the model was configured, we constructed a prediction pipeline using Kubeflow. This pipeline operates daily to forecast sales for all paying customers across each SKU for the upcoming 7, 14, 30, and 90 days. To ensure the seamless functioning of this pipeline, we implemented an ML Pipeline monitoring service. This monitoring service guarantees the pipeline runs consistently every day, free from any downtimes, and produces accurate and reliable results.

## ● Results

The implementation of the new forecasting module resulted in a 35% improvement from the existing sales forecasting pipeline and a 20% improvement in sales margins. Our solution enabled Cart.com to process approximately 25 million samples per day, delivering accurate and actionable sales forecasts that enhanced their operational efficiency and decision-making processes.

## ● Technologies

- Scikit-learn
- OpsGenie
- Cloud Functions
- Cloud Scheduler
- Kubeflow
- CI/CD
- Python
- Gitlab
- Google BigQuery
- Snowflake
- Compute Engine
- Docker

## ● Domains

- Data Science
- MLOps
- Predictive Analytics
- Platform Monitoring