WEEK 7 PROJECT REPORT

DATA SCIENCE: RETAIL FORECASTING PROJECT

TEAM MEMBER DETAILS:

GROUP NAME: FORECAST NINJA

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COUNTRY: UNITED KINGDOM

UNIVERSITY: UNIVERSITY OF GREENWICH

SPECIALIZATION: DATA SCIENCE

PROBLEM DESCRIPTION:

The project is concerned with assisting a large beverage organization located in Australia to enhance its demand forecasting methodology. This organization sells its commodities through several supermarket chains and constantly operates promotional activities all year round. It is due to these promotions plus other elements such as holidays and seasons that great influence the demand for their product.

The company used an in-house tool for product-level weekly demand. The tool could not return accurate or even understandable forecasts for products with different time series patterns. Some had obvious seasonality, some had trends, and some had neither.

To resolve this, the firm wants to study new AI/ML- bases predicting ways that can give better exactness, higher growth ability, and clearer explainability. The aim is to swap their old setup with a stronger answer that can guess need on a week-by-week basis for each item using past data and related effecting elements.

BUSINESS UNDERSTANDING:

The beverage company is operating in a very competitive retail environment through many supermarket chains all over Australia. Since it sells its products through various supermarket chains across Australia, the pattern of demand heavily influenced by promotions as well as holidays and seasons makes accurate forecasting critical to maintain optimal stocks levels and align production with real-world consumption patterns.

At present, the business uses an in-house developed tool for its forecasts which most of the time has proved to be inconsistent- especially when dealing with products that have irregular time series behavior. This therefore translates to operational inefficiencies through overstocking (leading to wastage and storage costs) or understocking (unattained sales as well as unhappy customers).

To better help in the decision process, the firm seeks to implement an upgraded ML/AI-based prediction system that can deal with a great assortment of product conduct and provide item-level week-by-week forecasts as well as explicitly indicate the commitment of affecting factors. The main objective is to improve forecast precision as well as computing speed and lucidity in the forecasting process; thus, supporting confident planning for supply chain and sales plus marketing teams.

PROJECT LIFECYCLE WITH DEADLINE

Phase	Week	Description
Project Kickoff	7	Team setup, project selection, problem understanding, and scope definition
Data Ingestion & Schema Validation	7	Intake of raw CSV files, format checks, YAML schema creation, and validation
Exploratory Data Analysis (EDA)	8	Identifying trends, seasonality, nulls, outliers, and initial insights
Feature Engineering	9	Creating new variables (lag features, rolling stats, promo flags, etc.)
Model Selection Planning	10	Researching suitable ML & DL models, selecting 4–5 forecasting approaches
EDA Presentation + Model Planning	11	Present findings from EDA and explain proposed modeling strategy
Model Building & Evaluation	12	Train and test ML/DL models, tune hyperparameters, evaluate forecast accuracy
Explainability + Dashboarding	12	Show variable contributions; build dashboard or charts to interpret results
Final Report & GitHub Submission	13	Prepare final PDF, upload notebooks/code to GitHub, and submit deliverables

DATA INTAKE REPORT:

Dataset name: forecasting_case_study.xlsx

Total rows: 1218

Total columns: 12

Size: ~50KB

File format: Excel originally, using as CSV

Source: Provided as part of the Retail forecasting project case study

Column name: Product, date, sales, price discount (%), In-store promo, catalogue promo, Store end promo, Google mobility, covid flag, V-day, Easter, Christmas.

forecasting_case_study.xlsx - Sheet1

Product	date	Sales	Price Discount (%)	In-Store Promo	Catalogue Promo	Store End Promo	Google_Mobility	Covid_Flag	V_DAY	EASTER	CHRISTMAS
SKU1	2/5/2017	27750	0%	0	0	0	0	0	0	0	0
SKU1	2/12/2017	29023	0%	1	0	1	0	0	1	0	0
SKU1	2/19/2017	45630	17%	0	0	0	0	0	0	0	0
SKU1	2/26/2017	26789	0%	1	0	1	0	0	0	0	0
SKU1	3/5/2017	41999	17%	0	0	0	0	0	0	0	0
SKU1	3/12/2017	29731	0%	0	0	0	0	0	0	0	0
SKU1	3/19/2017	27365	0%	1	0	0	0	0	0	0	0
SKU1	3/26/2017	27722	0%	1	0	1	0	0	0	0	0
SKU1	4/2/2017	44339	17%	1	0	0	0	0	0	0	0
SKU1	4/9/2017	54655	17%	1	0	0	0	0	0	1	0
SKU1	4/16/2017	108159	44%	0	0	0	0	0	0	0	0
SKU1	4/23/2017	30361	0%	1	0	1	0	0	0	0	0
SKU1	4/30/2017	42154	17%	1	0	1	0	0	0	0	0
SKU1	5/7/2017	39782	17%	0	0	0	0	0	0	0	0
SKU1	5/14/2017	29490	0%	0	0	0	0	0	0	0	0
SKU1	5/21/2017	25936	0%	0	0	0	0	0	0	0	0
SKU1	5/28/2017	26045	0%	0	0	0	0	0	0	0	0
SKU1	6/4/2017	25903	0%	1	0	1	0	0	0	0	0
SKU1	6/11/2017	43689	17%	0	0	0	0	0	0	0	0
SKU1	6/18/2017	25446	0%	1	0	1	0	0	0	0	0
SKU1	6/25/2017	42543	17%	0	0	0	0	0	0	0	0
SKU1	7/2/2017	27001	0%	1	0	1	0	0	0	0	0
SKU1	7/9/2017	45198	17%	0	0	0	0	0	0	0	0
SKU1	7/16/2017	28650	0%	1	0	1	0	0	0	0	0

GITHUB REPO:

https://github.com/ashwinibn3/Retail-forecasting_project