

DS Project Portfolio

Showcasing Some Use Cases in the Past

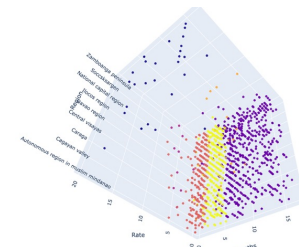
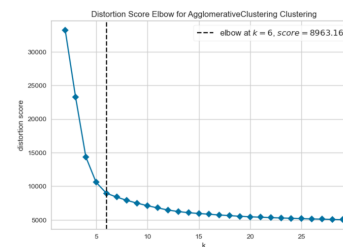
Project 1: Impact of El Nino on Sales Volume of Products

Business Problem and Objective

- How does El Niño impact the sales of company brands across regions, and how can we adapt our strategies to mitigate the effects and enhance resilience during such events?
- The objective is to understanding the climatic effects on the sales performance of 500+ SKU and quantify the magnitude of changes in sales volume during and after El Niño events.

Outcome and Insights

2 sets of 6-cluster groupings have been identified among 500+ SKUs for each instances of El Nino from 2010 to 2023



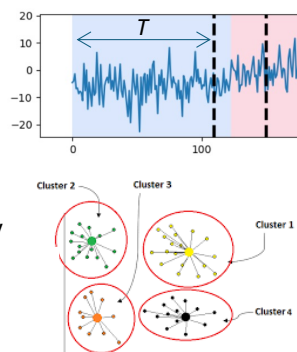
Technical Solution

Data: Nino SST 3.4, SISO (monthly)

Stage 1: Determination of observation periods. KNN imputation.

Stage 2: Gaussian Kernel CPD via *ruptures* package. Collection of time-delay effect T from onset of El Nino and calculation of impact $M = \sum 3$ steps forward / $\sum 3$ steps backward.

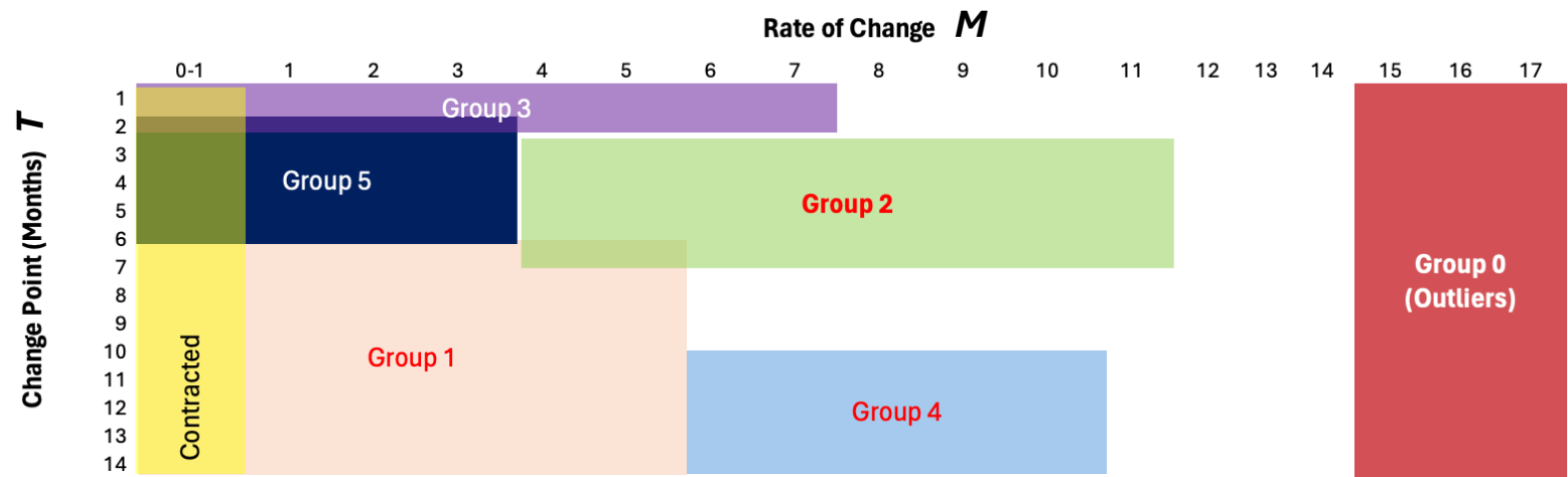
Stage 3: K-means clustering on T , M , brand and region. Elbow method was used.



Strategic Recommendations

- Root Cause Analysis per BU** to help identify specific factors driving sales volume changes and tailor strategies to address these issues effectively.
- Analyzing Impact on Raw Material Prices** could provide insights into how these price changes might directly influence SKU sales volumes.
- Reapply with Updated El Niño Data** to ensure that the analysis reflects the latest climatic conditions and adds confidence in the insights for decision-making.

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Group 0 The Outliers

These could indicate very unusual circumstances or data errors. Since they occur during the El Niño period, this could also represent brands where net volumes were incredibly high due to a surge in demand.

Group 1 Delayed Low Impact

This could be typical for products on regions that are less sensitive to the conditions driven by El Niño

Group 2 Mid-Term Moderate Impact

These might reflect products with a more standard reaction to El Niño conditions, where sales volumes adjust significantly but not drastically after a moderate period.

Group 3 Immediate Low Impact

These could be brands whose sales volumes respond quickly to El Niño, but the overall impact is moderate. They could also be those not affected by El Niño as the captured impact is due to other factors.

Group 4 Delayed Moderate Impact

It suggests a delayed but noticeably high response to El Niño conditions in sales volume.

Group 5 Early-to-Mid Low Impact

This group might consist of SKUs with sales volumes that are somewhat responsive to El Niño conditions but do not fluctuate wildly.

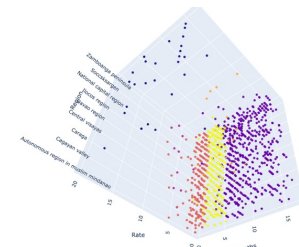
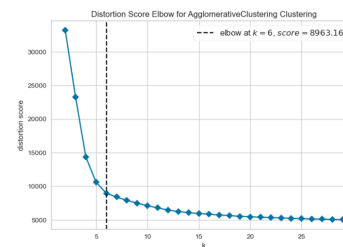
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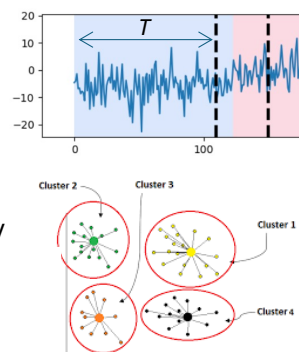
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Project 2: Office Space Optimization

Business Problem and Objective

- The issue came to light when one day, a vice president officer observed significant discrepancy between room occupancy and availability in the building, raising concerns on whether additional space needed to be leased.
- The goal was to enhance the efficiency of office space utilization by developing an optimized seating plan based on room capacities and employee demand.

Technical Solution

- Data:** Room capacity, seat demand per department
- Stage 1:** Identification of reserved and non-reserved seats.
- Stage 2:** Determination of constraints like number of required days per week. Formulation of utilization function.
- Stage 3:** Experiment on Linear programming (via *Gurobi*). 3 days vs. 4 days onsite setup.

Room	j	capacity
501-503-505	1	56
502	2	26
506	3	11
504	4	24
702-704-706	5	15
801	6	18
804	7	14
805	8	16

Department	d_original	scheme_3	scheme_4
a	12	3	4
b	8	4	4
c	14	3	4
d	20	3	4
e	21	5	5
f	3	3	4
g	20	3	4
h	15	3	4
i	23	3	4
j	14	3	4
k	10	3	4
l	3	3	4
	-	-	-

Outcome and Insights

Room	Department	Available Workstation	Requirement	Mon	Tue	Wed	Thu	Fri
501-503-505	Marketing	56	3	0	0	0	3	0
501-503-505	Meat	56	8	0	0	0	0	8
501-503-505	Domestic Sales	56	22	22	0	22	0	0
501-503-505	Procurement and by Products / Corp...	56	4	0	4	0	4	0
501-503-505		56	23	0	23	0	23	23
501-503-505	Global	56	4	0	4	0	4	0
501-503-505	Investor Relations	56	3	0	3	0	0	3
501-503-505		56	12	12	0	12	0	0
502	Dairy	26	20	20	20	0	20	0
502	Domestics Sales	26	20	0	0	20	0	20
504	Domestic Sales	24	22	0	22	0	0	0
504	Domestic Sales	24	20	20	0	0	0	0
504	Sardines	24	20	0	0	20	20	20

- 3-day onsite presence per week achieved near-maximal utilization, with 20% of the space still available for potential reallocation.
- 4-day scheme is not feasible
- The linear program optimizes the layout by attempting to free up adjacent spaces.

Strategic Recommendations

- **Incorporate Proximity and Floor Preferences** to ensure that departments with interrelated functions are situated near each other and align with any preferences for specific floors, improving overall operational efficiency and collaboration.
- **Space Utilization Monitoring System** to help verify that the planned seating layout is effectively implemented and maintained, allowing for timely adjustments if deviations are detected.

Project 3: Optimal Contract Level Through Simulation

Business Problem and Objective

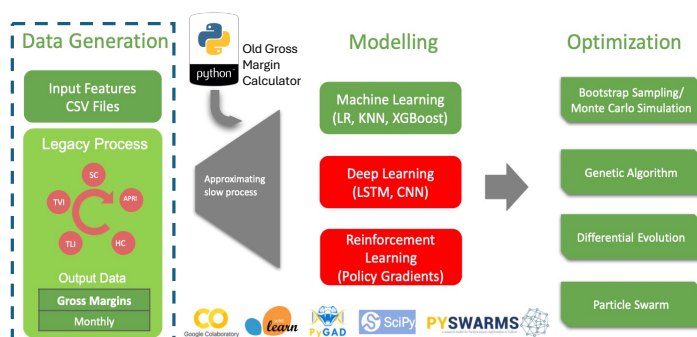
- A team of energy traders needed to determine the optimal ratio of energy sourced from power plants versus the spot market (**contract level**) to fulfill customer contracts.
- The goal was to identify the most advantageous contract levels by analyzing various future economic scenarios. It involved optimizing the mix of energy procurement from power plants and the spot market to maximize gross margin for the next 5 years and meet customer demands under different market conditions.

Outcome and Insights

- The old and slow python calculator for gross margin can be replaced by a ML algorithm with 99% accuracy.
- A tool was made to calculate the risk of falling below a threshold of total gross margin based on chosen contract level.



Technical Solution



Strategic Recommendations

- **Deploy the Modeling, Simulation and Output Tool on a Cloud Platform** to facilitate scalable analysis, real-time updates, and easier collaboration, allowing for more efficient and flexible management of energy supply ratios and contract optimizations.