WILD CODE SCHOOL

Soda Logistics

Project Week 01

Welcome to this business case!
It's time to take a step back from the technical, and focus on the value of analysis: the advice.

In this project, a client has a business problem. You'll need to provide data-driven advice to help them make the best decision. This is what we call D3M: Data-Driven Decision Making.

Objectives

- Perform data-driven analysis
- Present relevant visualizations
- Propose advice to help make decisions

The Challenge

The client “Fritz & Franz” manages beverage vending machines on train platforms.

An employee comes by once a week to refill the machines. This employee regularly indicates that the machine was empty, but does not specify which products are empty. **The customer would like to estimate the loss of profit (when there is a stock out), and asks you for a detailed analysis. He would like advice on whether or not it is cost-effective to send the employee to refill the machines twice a week rather than just once.**

To do this, he provides you with the automatic log extraction of the 4 beverage vending machines of the concerned station. Each machine records each sale or technician's visit with a time stamp.

The Challenge

You get this basic information:

- The travel of an employee costs 50 euros to go to the station + 20 euros per machine. The 4 machines are in the same station.
- The **sales price** of the drinks is 1 euro for a coffee; 1.60 euros for a soda; 1.80 euros for an nrj drink.
- The **cost** of the drinks is 30 cts the coffee; 60 cts the soda; 80 cts the nrj drink.
- Each machine has a maximum capacity of 280 doses of coffee; 120 cans of soda; 60 bottles of nrj drink.
- The station is closed to the public for part of the night.
- The cost of renting the location for each machine is 150 euros per month.
- The maintenance cost of each machine is 1200 euros per year.

(all amounts are exclusive of tax, so you don't have to take into account taxes in this analysis)

Technical Sidenotes

- To solve this challenge you will have to deal with time in pandas. For example, you will have to analyse cycles (do Mondays look the same? Are mornings different from evenings?), rather than continuous data. You might want to read about how pandas handles times and dates.

- Try to use heatmaps for the visual representation of days and times (beware, not all drinks are sold with the same frequency...). You can make them with pivot tables using the heatmap function of seaborn.

- You can either do the analysis visually, or calculate the out-of-stock times (**you will then be more precise in the calculation, but not necessarily in the final advice !**). For the latter option, it is best to use the `groupby` and `cumcount` functions.
  1. start by calculating the cumulative sales quantities for each product and each machine
  2. Add a column with the maximum stock for each drink.
  3. Calculate by difference the remaining stock. Be careful, use the modulo (the remainder of a Euclidean division `%`) to take into account the refill.

Deliverables

Perform the requested analysis, with explanatory visualizations, and offer advice to the company.

You will find the **sales journal here**.

It's up to you to answer in your own way. Creativity, intuition and the ability to imagine yourself in the customer's shoes are very important skills in our business.

On Friday, you have to present your analysis and advice to Fritz & Franz Head of Sales

- Use a good looking presentation to show your findings
- Have a Jupyter Notebook with the analysis ready in case there are further questions

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Good Luck!