Ramen Shop Sales Analysis

Section: 52745

Group Number: 30

Student Name: Fidel Otero

Student UT EID: fco229

Student Name: Ryan Mehendale

Student UT EID: ram3273

Date: Nov 6th, 2023

Design Phase

Goal

Previously, in the analysis portion we introduced the sales data from a local ramen shop. To reiterate, we hope to uncover patterns in consumer behavior. Then, we hope to develop a cohesive visual story that allows those patterns to turn into actionable insights for the restaurant. In addition to forecasting sales, we believe that this information could help to optimize a broad range of strategic decisions, from scheduling to marketing strategies. Ultimately, we hope to use data and transform it into useful and understandable visuals and conclusions that can improve the business in a variety of ways which will be described below.

Visualization Tools

The visualization tools we will use are Plotly, Altair, and Matplotlib/Seaborn. We will use Plotly for its interactive, rich, and diverse visualizations. This will be helpful in tracking product popularity over time, among other things. Plotly is also the backbone of Dash, which will be helpful outside of class where we will aim to create a web-based application for viewing the data. We will use Altair for its declarative, interactive, and elegant visualizations. Finally, we will use Matplotlib/Seaborn for the simpler visualizations that do not require interactivity.

Arguments

Our data analytics work will be useful because…

- **It will help us understand their customer preferences.**
  Visualization: For this we will create an Altair layered bar chart that will showcase the total number of sales for each day of the week, with the layers being the different categories of products. Thus, on the x-axis will be the day of the week. On the y-axis will be the total amount sold. We will also have a tool tip that will give us the specific contribution of a total for a specific category, as well as a slider that will change the view from week to week. Finally, the choice of colors will be based on the different categories of ramen.

- **It will help us optimize product placement on the menus.**
  Visualization: Here we can make a Matplotlib/Seaborn pie chart that tells us an aggregation of the total amount of products sold for each product. From there the colors will be for each different category of product. There will also be a tooltip that will tell us the percentage or total amount of product sold.

- **It will help forecast sales.**
  Visualization: For this we will create an interactive Altair chart that will forecast sales using the ARIMA method. On the x-axis we will have time, on the y-axis we will have sales. On the chart we will have three lines that will represent the train, test, and prediction data which will each have a different color. The interactivity will be zooming and panning, which Altair does well.

- **It will improve operational efficiency in terms of scheduling to reduce labor costs.**
  Visualization: For this, we will create an interactive chart that will allow us to measure how busy the restaurant is by measuring the number of orders per day since opening. For this we will benefit from linked interactions. First, we will have a bar chart that shows the total amount of sales for each individual day of the week. Then we will include an interaction, where if you select the bar for a particular day, a histogram will be shown beneath that shows the number of orders for the selected day of the week for every week

since opening. Then we will have a hover function on that histogram that will give us the exact amount. With this we will be able to see if a particular day of the week has experienced increases or decreases in the number of orders. With this visualization, they will be able to visually infer how to efficiently schedule people in the coming weeks. There will only be two colors, one for the top chart and another for the bottom.

- **It will allow us to uncover financial insights to see how well the business is doing.** Visualization: For this argument we can have multiple Altair/Plotly charts that can, for example, show the changes in gross revenue over time with an interactivity that involves a slider that focuses in on a particular period. We can also visualize the general sales data and interpolate to see the growth over time in sales. We can also have a chart that showcases a cumulative sum of the total sales. All of these will have an x-axis of time and a y-axis of the number of sales in $USD. There will just be one color for these since we only have two variables.