Capstone Fall 2023 - Brainstorming

* Forecasting Analysis
* Time Series Analysis
* More Client and Team collaboration
* Revenue Prediction Project

**Information Shared on Class:**

**Description and main goal:** Provide daily forecasting for a new store during the period of one year.

**Rationale**: Having accurate forecasts will help us put together our financial plan mor effectively and will help create more accurate initial ROI documents.

**Data**: Qualitative data will be provided from recent new stores and their first few years of sales. – A network wide seasonality pattern will also be given. Multiple sales metrics will be provided. We will need to provide forecasts for the different sales metrics.

**Desired Outcome:** Final deliverable will be a model that produces a daily level forecast, considering seasonality for each of the sales metrics, in which the model will update the forecasts as new data comes in for the site, always ensuring the most accurate forecasts.

They are more concerned with the early values being correct, however they want to reach the weekly and daily level of granularity.

**About Maverik:** Maverik fuels adventures in more than 380 locations across 12 western states, making it the largest independent fuel marketer in the Intermountain West. We're known for our premium BonFire™ food — made fresh in every Maverik, every day — and awesome values on fuel, drinks and snacks.  Maverik tends to be more conservative in their estimates.

**Possible Challenges with model**:

1 - How to forecast taking into account that stores will grow in revenue since opening and how to make sure seasonality and cyclical trends are being taken into consideration.

2 - We want to make sure we are creating the model based on what day of the year it is, for example “ the first Friday of the year, etc. – Make sure to account the holidays and which week of the year it will be – Like 50th week of the year for Christmas. Also taken into account weekends. Currently Maverik is using a Naïve Baies Model in which they use week days instead of date in order to make the analysis, for example, the first Monday of the year, the 32 Wednesday of the year, etc.

3 – Focus on what is the average percentage of contribution for total annual revenue and ROI.

**Things to Remember / Focus for project:**

* Identify which variables are more important in the creation of the revenue forecast.
* Focus on the seasonality and patterns of sales by season/ day of the week, month. Semester, fiscal week, etc.
* Using start date - current date – calculate which day of the year we are locating and use it as predictor to identify sales for that day specifically.
* Focus if the residual plot is removing event seasonality.
* Challenge: how do you fit a model based on a set of stores and expect it to apply in a new store?
* Averages for the day of the week and averages for the fiscal week of the year.
* Forecasting model will never change because the input data will always remain the same.
* Create AR Model – using Lag Data to predict.
* Also use Qualitative data to improve model accuracy.

**Outline and Ideas for Business Problem Statement:**

⦁     **Intro** about Maverik

⦁     **Business Problem Description**: What is the problem?

⦁     **Benefit of a solution**. How will the business benefit from a solution?

⦁     The **purpose** of the proposed project

⦁     **Analytics Approach**. What is the general character of the analytics approach when solving issue?

⦁     **Scope**: What is the Main Deliverable what will be out of scope? What might be added later?

⦁     **Success Metrics.** How will stakeholders judge whether the project was a success?

⦁     **Details**: Who is going to execute the project? When will the project be finished? Are there important project milestones?

**Approach**

Predictive analytics model focused on forecasting analysis in which historical revenue data will be used over a particular set of time periods (i.e. months, quarters, or years) in order to forecast revenue for a possible new Maverick store, while also identifying recurring or possible seasonal variations, cyclical trends, and  random market fluctuations with our model.

**Possible Analytical Approaches:**

* Basic Time Series Analysis
* Linear Regression
* Weighed moving average
* VAR
* LSTM
* ARIMA model:  stands for: autoregressive integrated moving average, or ARIMA, is a statistical analysis model that uses time-series data to better understand the data set or predict future trends

**Benefits:**

Benefits of Revenue Forecasting  
Accurate Budgeting, Better Resource Allocation

**Extra Resources:**

<https://www.analyticsvidhya.com/blog/2018/08/auto-arima-time-series-modeling-python-r/#h-methods-for-time-series-forecasting>

<https://www.simplilearn.com/tutorials/data-science-tutorial/time-series-forecasting-in-r#time_series_forecasting_methods>

<https://www.xactlycorp.com/blog/4-revenue-forecasting-models-should-try>

**Resources presented in Canvas:**

Applied Predictive Modeling (APM)

[Forecasting: Principles and Practice](https://otexts.com/fpp3/)

A screenshot of a computer

Description automatically generated

A screenshot of a computer

Description automatically generated

A screenshot of a computer

Description automatically generated