Analyzing Liquor Sale Trends in Iowa

Group 4

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Motivation & Overview

Interest & Motivation

Exploring the Retail Industry

Maximum profits and sustainable business practices

Assist Retailers, Distributors and Manufacturers in making data-driven decisions

Focus from the retailers perspective

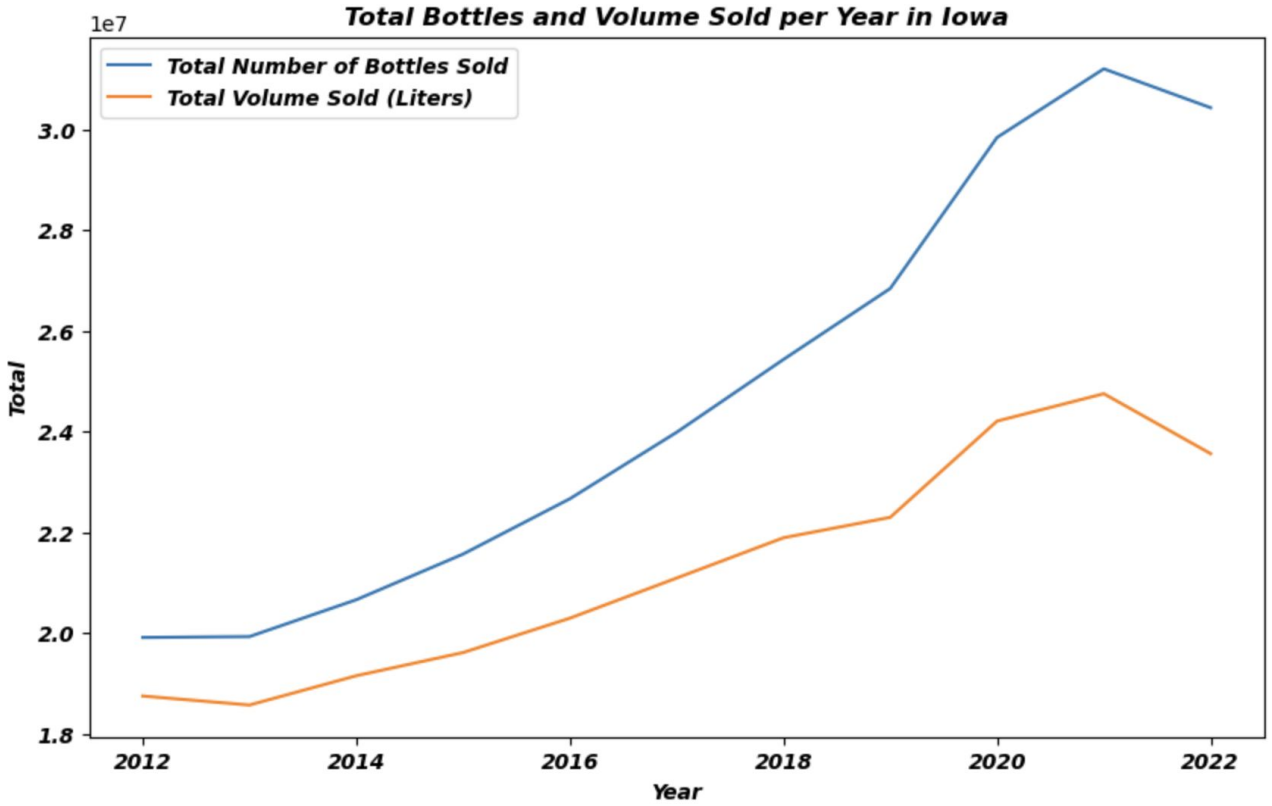
Dataset Overview

- 25,939,367 rows and 24 columns
- Dropped ‘county_number', 'category', 'vendor_number', 'item_number', 'volume_sold_gallons
- Assessment of Duplicates
- 'bottle_volume_ml' to bottle_volume_liters'
- Limited Date Range (2012-2022)

column names	description	dtype	comment
Invoice/Item Number	Unique Transaction ID of sale	string	**object**
Date	day, month and year of transaction	date	**date**
Year	Year of transaction	int	**numeric**
Month	Month of transaction	int	**numeric**
Store Number	Unique Number of Each Store	int	**numeric**
Store Name	Name of Each Liquor Store	string	**object**
Address	Address of Each Store	string	**object**
City	City of the Store	string	**object**
Zip Code	Zip code of Store	string	**object**
Store Location	Latitude and Longitude of Store	string	**object**
County Number	Unique Number of County	int	**numeric**
County	County Name	string	**object**
Category	Category of Liquor	int	**numeric**
Category Name	Name of Liquor Category	string	**object**
Vendor Number	Unique Number of Each Vendor/Wholesaler	int	**numeric**
Vendor Name	Name of Vendor/Wholesaler	string	**object**
Item Number	Number of Liquor Item	int	**numeric**
Item Description	Name of Liquor	string	**object**
Pack	Pack Size	int	**numeric** Size of Pack bought by retailer
Bottle Volume (ml)	Volume of Liquor Bottle in ml	int	**numeric**
State Bottle Cost	Cost of Liquor	float	**numeric** Cost of Liquor Bottle to Retailer
State Bottle Retail	Selling Price of Liquor	float	**numeric**
Bottles Sold	Number of Bottles	int	**numeric** Bottles sold of each liquor per transaction
Sale (Dollars)	Revenue	float	**numeric** Revenue generated by Retailer per transaction
Volume Sold (Liters)	Volumne Sold in Liters	float	**numeric**
Volume Sold (Gallons)	Volumne Sold in Gallons	float	**numeric**

Exploratory Data Analysis

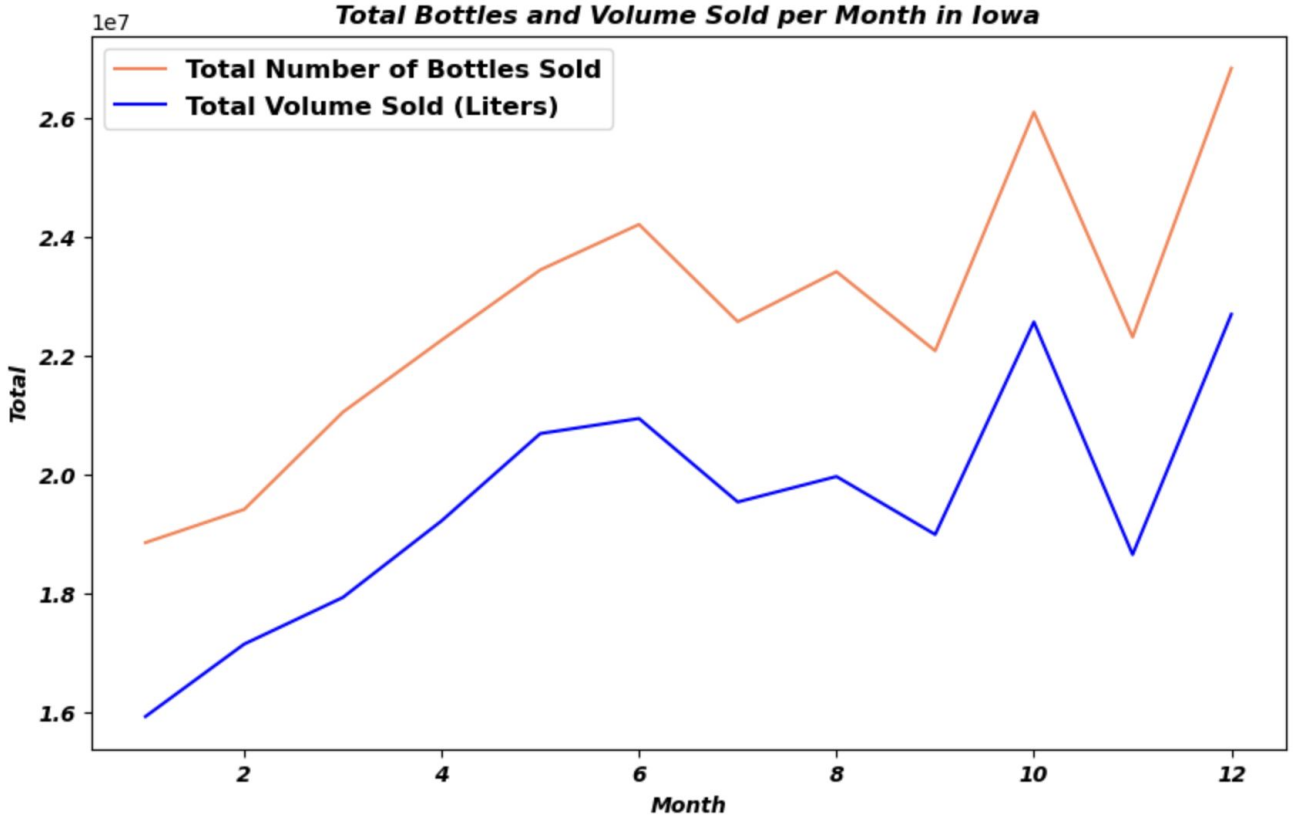
Analyzing Year-to-Year Liquor Sale Trend



Total Bottles sold & volume sold has been increasing exponentially as we move over the years (2012 - 2021)

One interesting insights - Liquor sale dropped relatively in 2022; Potential reason can be the effect of Covid-19

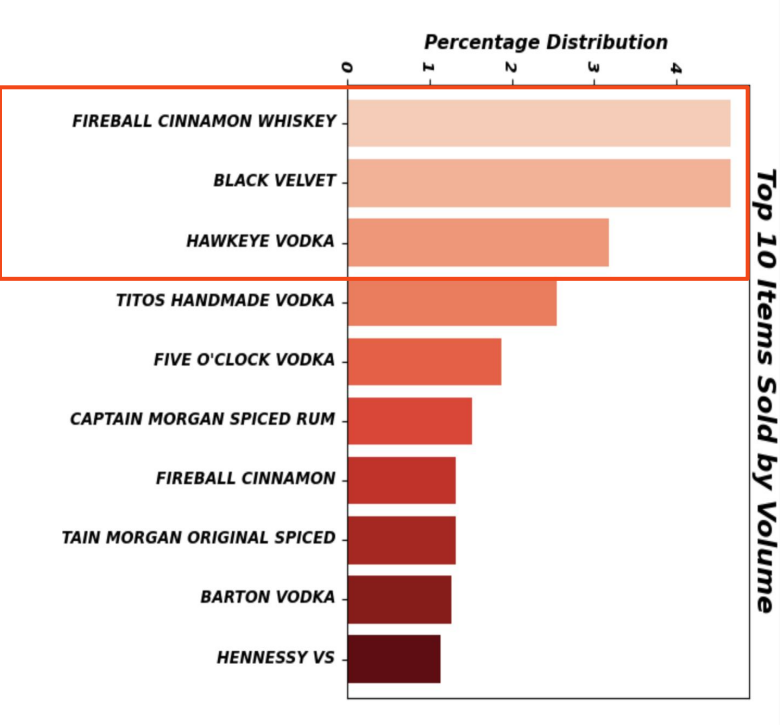
Analyzing Month-to-Month Liquor Sale Trend



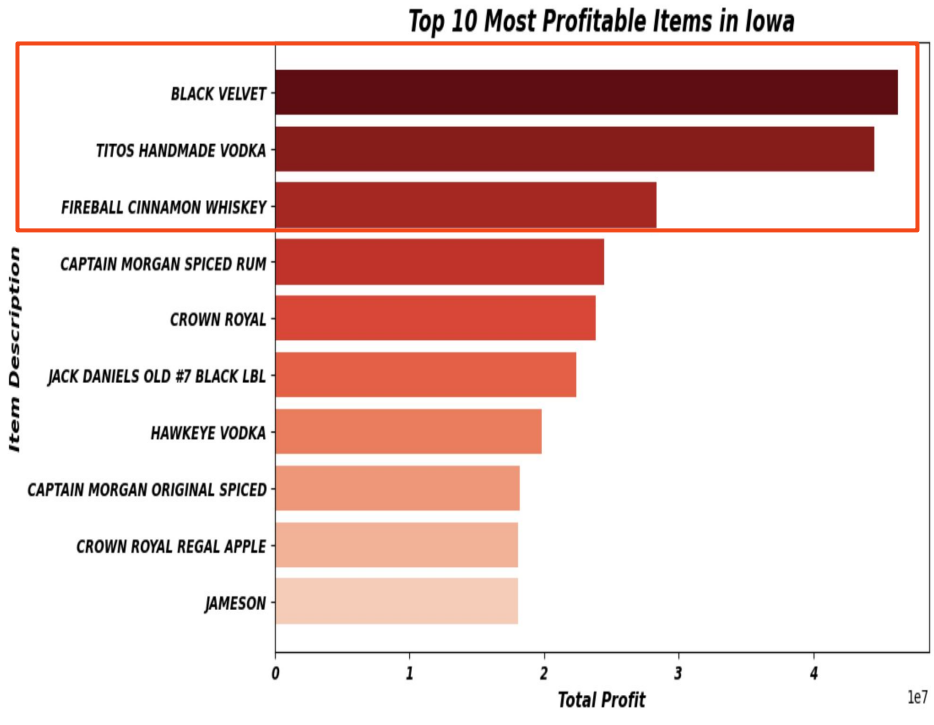
Total Bottles sold & volume sold on a month-to-month basis, on average, has been highest in the month of December, followed by October!

Analyzing Liquor Data in Iowa

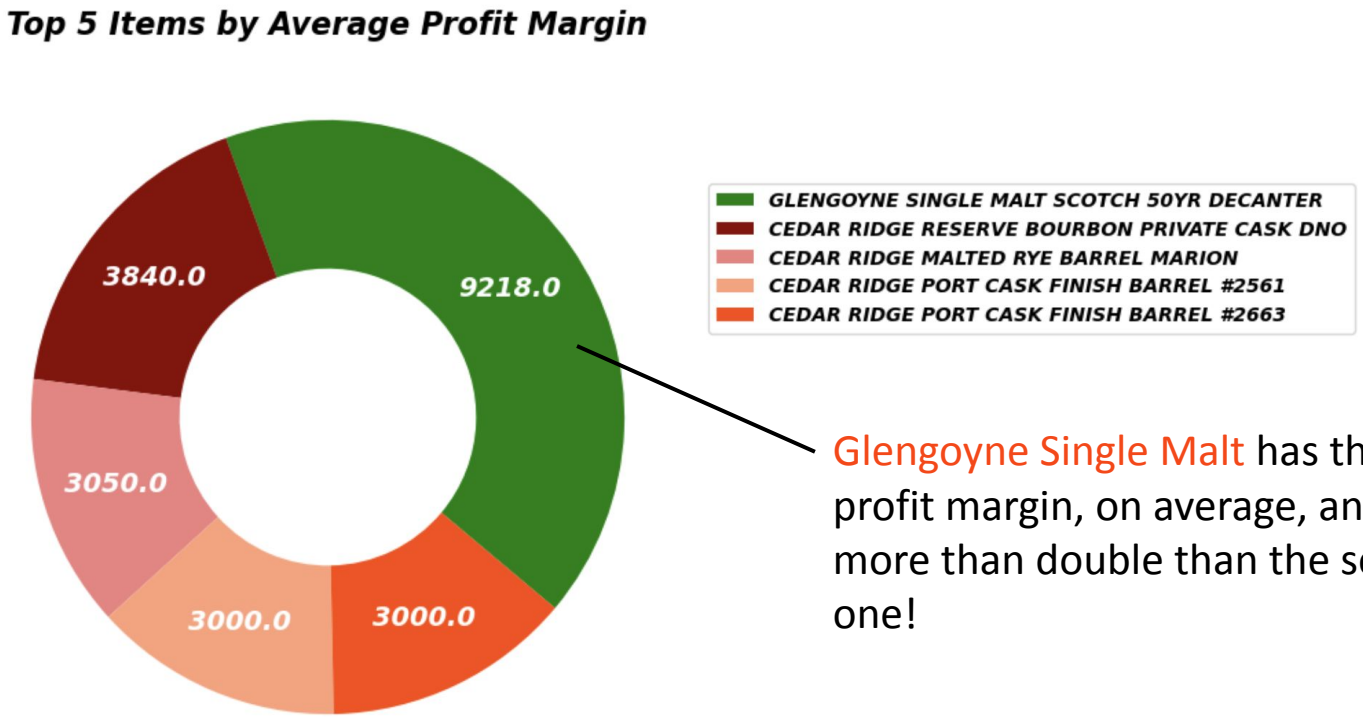
Top-Selling Liquor By Volume



Most Profitable Liquor Items

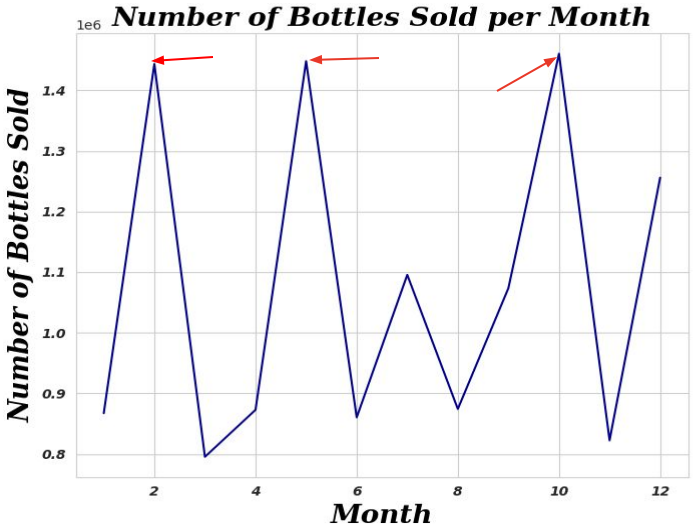


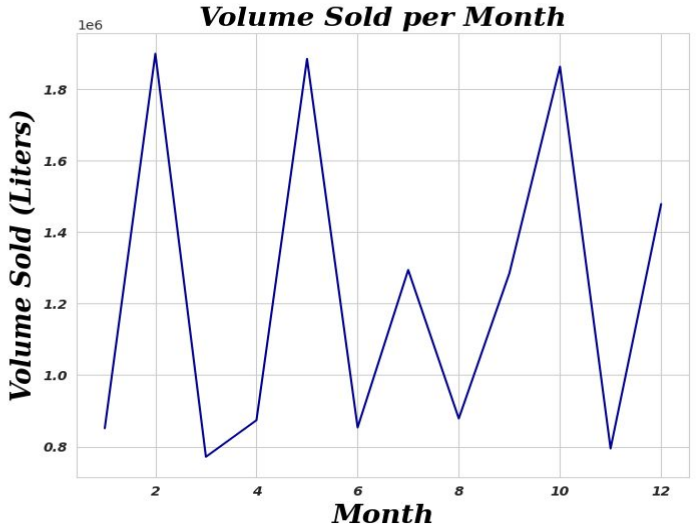
Analyzing Liquor Data in Iowa



Glengoyne Single Malt has the highest profit margin, on average, and even more than double than the second one!

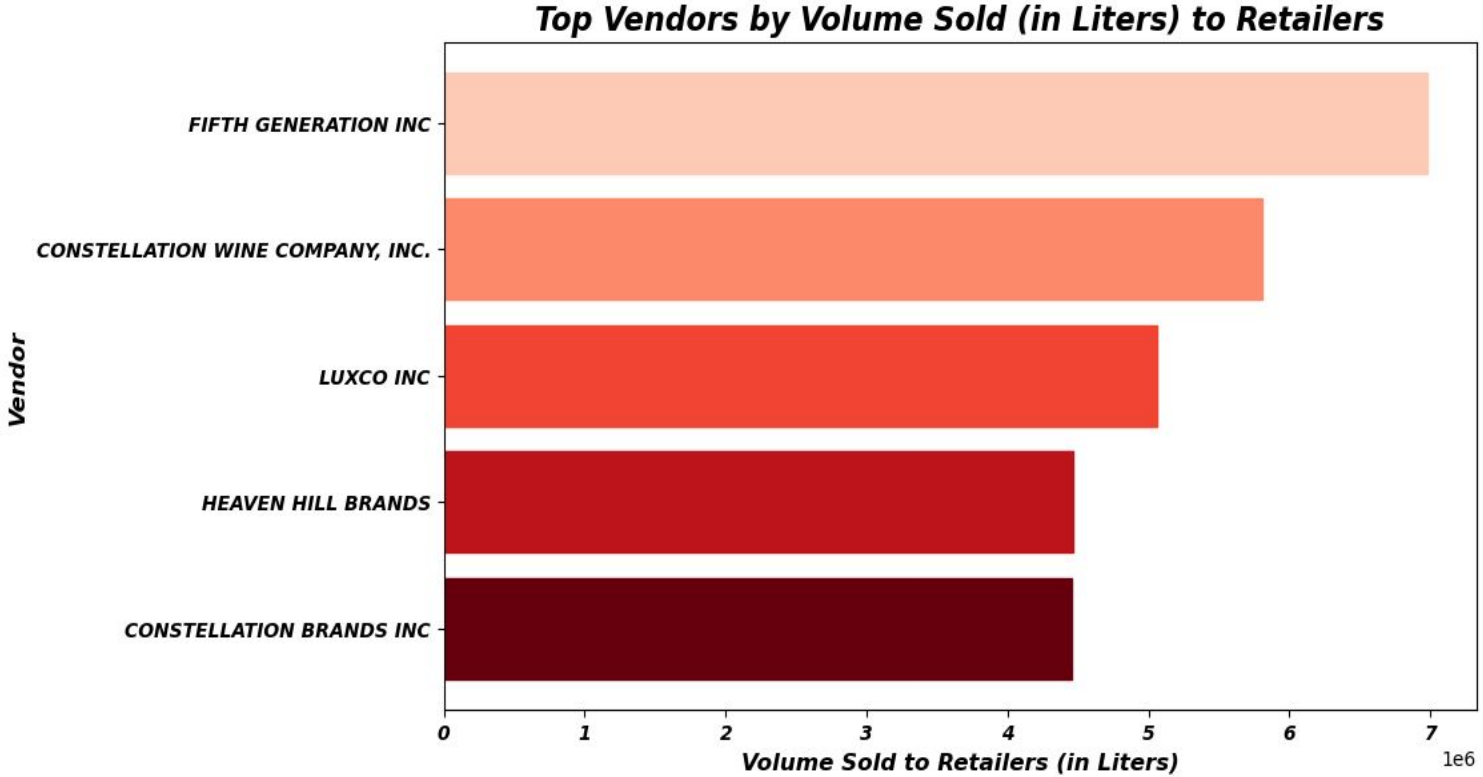
Forecasting Demand Based on Historical Data



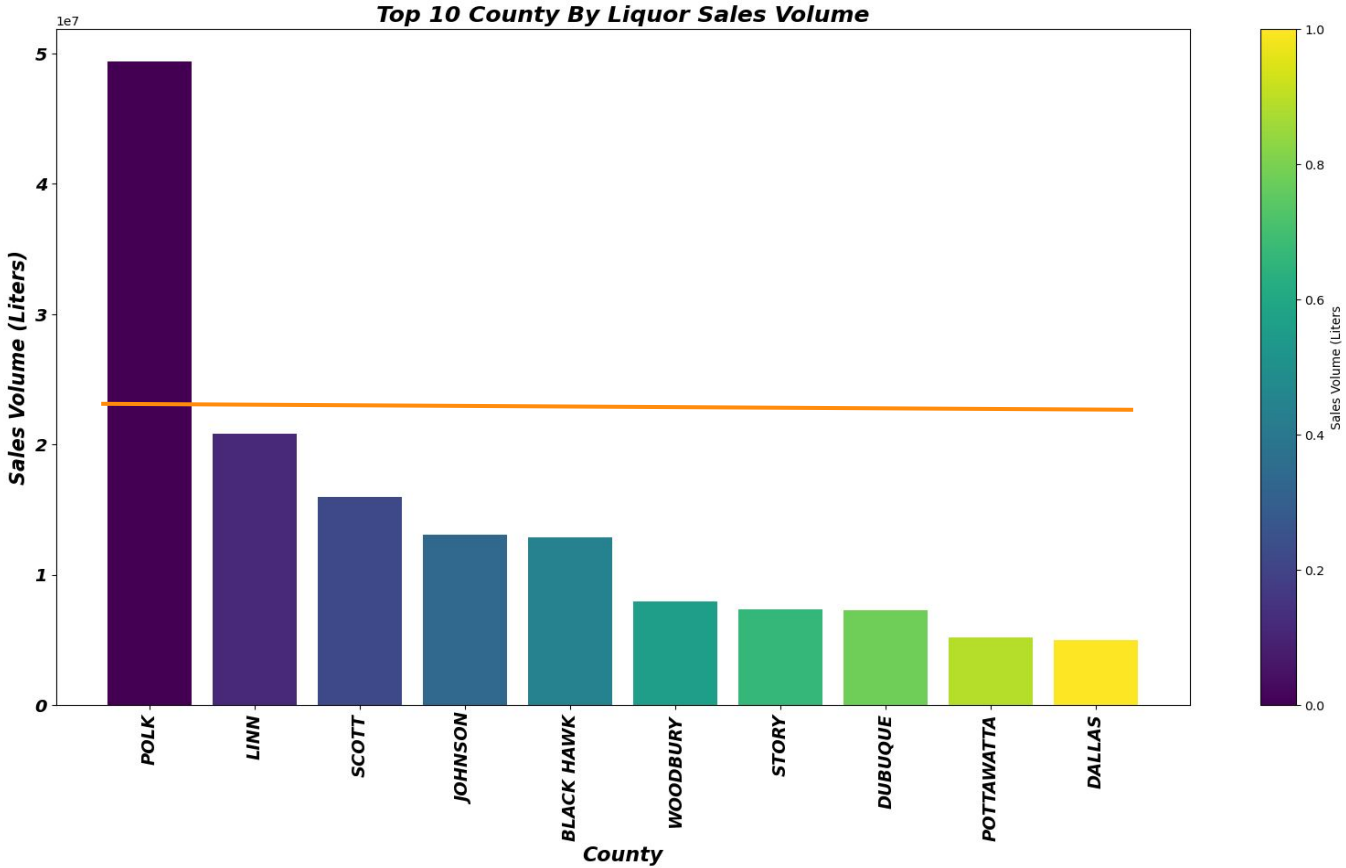


The highest bottles sold of Black Velvet based on actual historic data is during the months of February, May, and October.

Top Vendors by Liquor Volume sold (in Liters) to Retail Stores



Counties with Highest Liquor Sales



Machine Learning

Predictive Modeling

Scope of Improving Efficiency

Train Data	Test Data
16.92	18.20

Generalisation

Feature Engineering

- Encoding Categorical Variables
- Scaling/Normalisation
- Interaction Terms
- Polynomial Features

Hyperparameter Tuning

- Grid/Random Search
- \+
- k-fold Cross Validation

Conclusion & Future Scope

Conclusion

Profitable Liquors

Black Velvet, Tito's Vodka, & Fireball Cinnamon Whiskey

Profitable Month

December & October

Top Counties

Polk, followed by Linn, and Scott

Top Store

HY-VEE #3/BDI/Des Moines

Exponential Liquor Sales Growth (2012-2021); Drop in 2022

Future Scope

Additional Data for Further Analysis

Streamlining the Liquor Business in Iowa

Exploring Pricing Decisions

THANK YOU

Questions?

Do you think that doing alcohol is cool?