BUS 5100
Introduction
To Business
Analytics
Spring 2021

Avocado Buying Trends In The United States Using SAC

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Overview

I. Introduction

II. Related Work

III. Specifications

IV. Data Analysis

V. Data Visualization

VI. Key Findings

Introduction

- Hass Avocado Board Data From 2015-2020
- https://www.kaggle.com/timmate/avocado-prices-2020
- Dataset Size: 3.37 MB
- File Format: CSV
- Conventional Avocados vs. Organic Avocados
- Pricing Trends
- Geographical Prevalence

Related Work

- **George Washington University**
  - Focuses on the correlation between price and volume sold for conventional and organic avocados
  - Our study extends the trend analysis to the three common avocado and bag sizes purchased throughout the United States.
- **Agronometrics In Charts**
  - The installment tracked the changes in price over 2020 and attributed price anomalies to events
  - Our analysis extends to the end of 2020 and includes a time series and regression analysis

Specifications

Table 1. Avocado Size

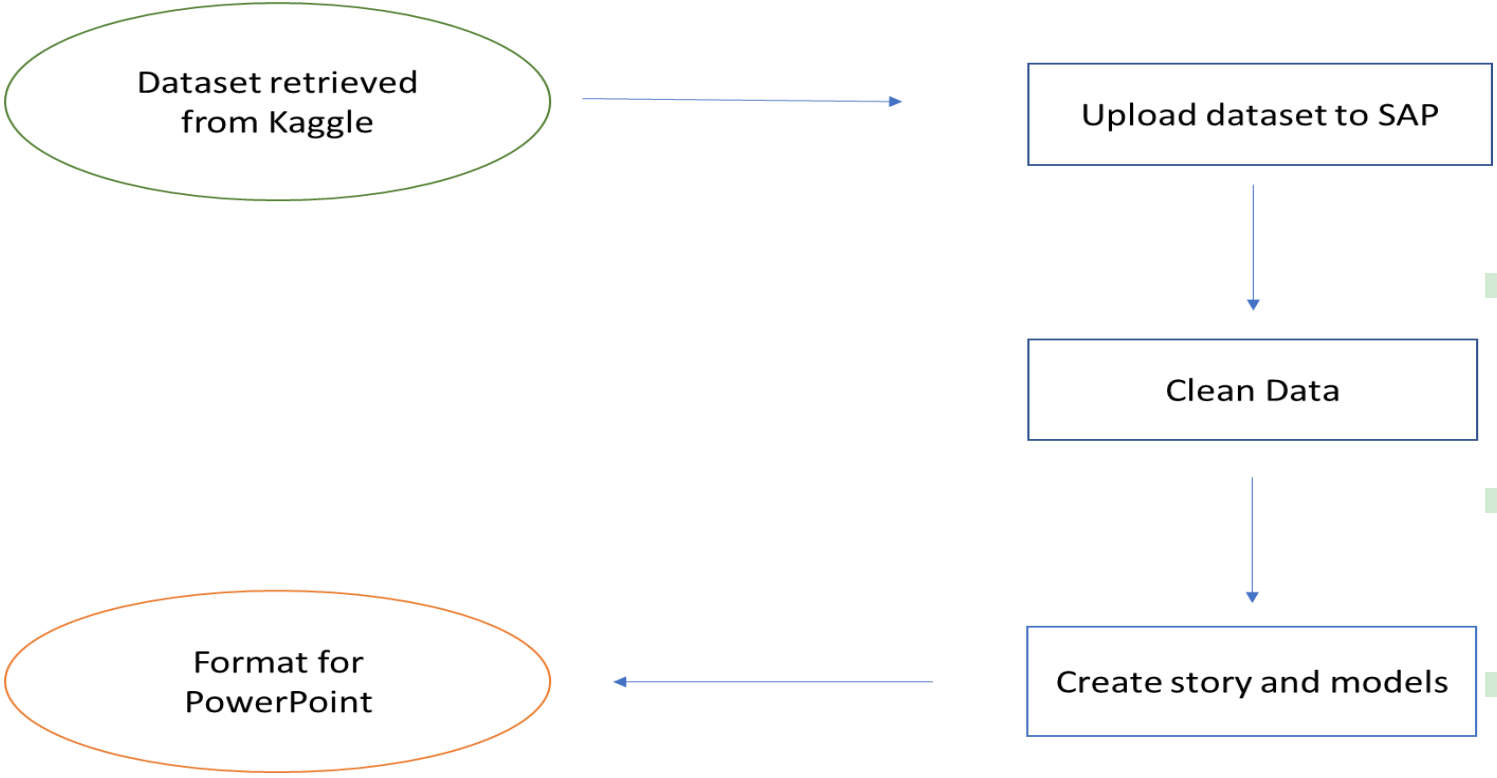
Data Set	Size (Total 3.37 MB)
4046 – Small/Medium Hass Avocado	1688 KB
4225 – Large Hass Avocado	1562 KB
4770 – Extra Large Hass Avocado	120 KB

Table 2. Avocado Bag Size

Data Set	Size (Total 3.37 MB)
small_bags	2312 KB
large_bags	986 KB
xlarge_bags	72 KB

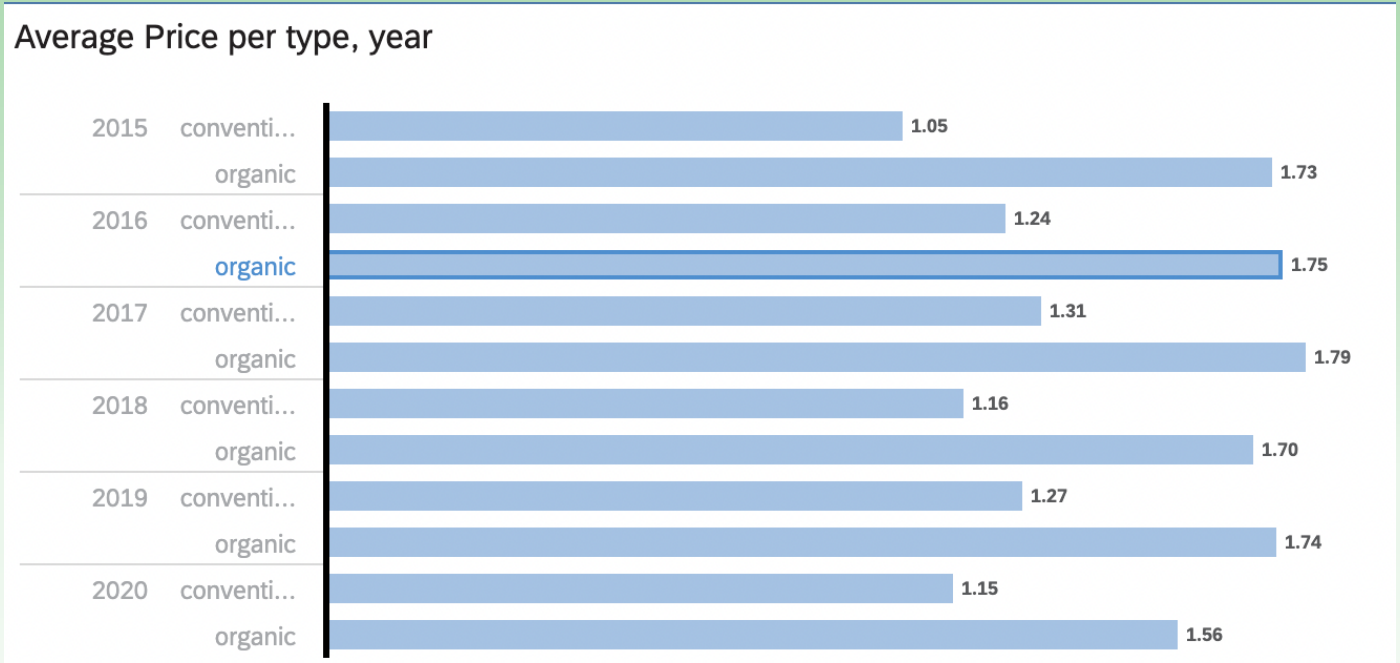
Data Analysis

Implementation Flowchart



Data Visualization

Average Price Per Type & Year



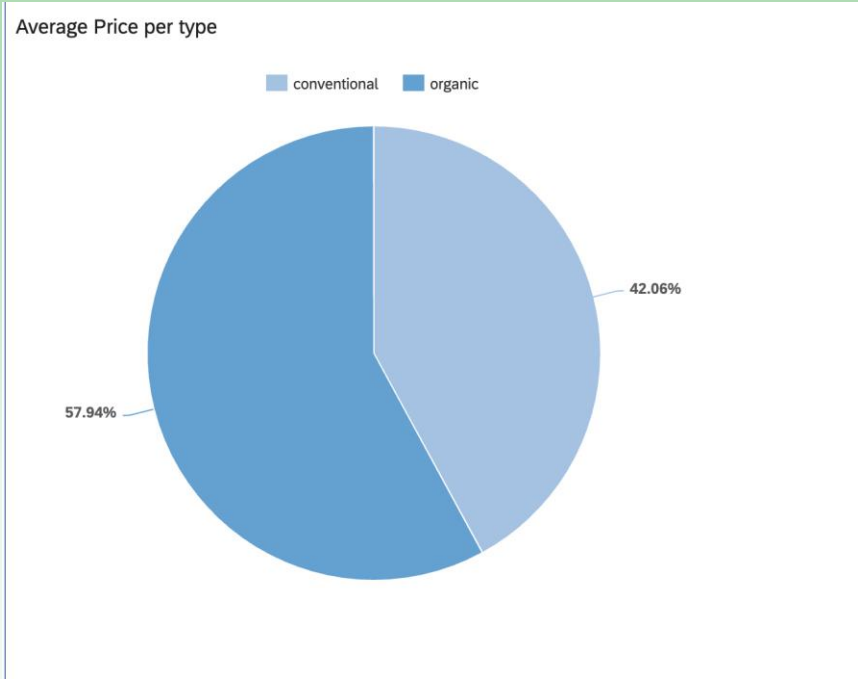
Data Visualization

Average Price Per Type & Year

- Highlights difference in average price per type of avocado (conventional/organic) during the timeline of years 2015-2020
- Conventional increased slightly from $1.05 in 2015 to $1.15 in 2020
- Organic has trended downward from $1.73 in 2015 to $1.56 in 2020

Data Visualization

Average Price Per Type, Conventional & Organic



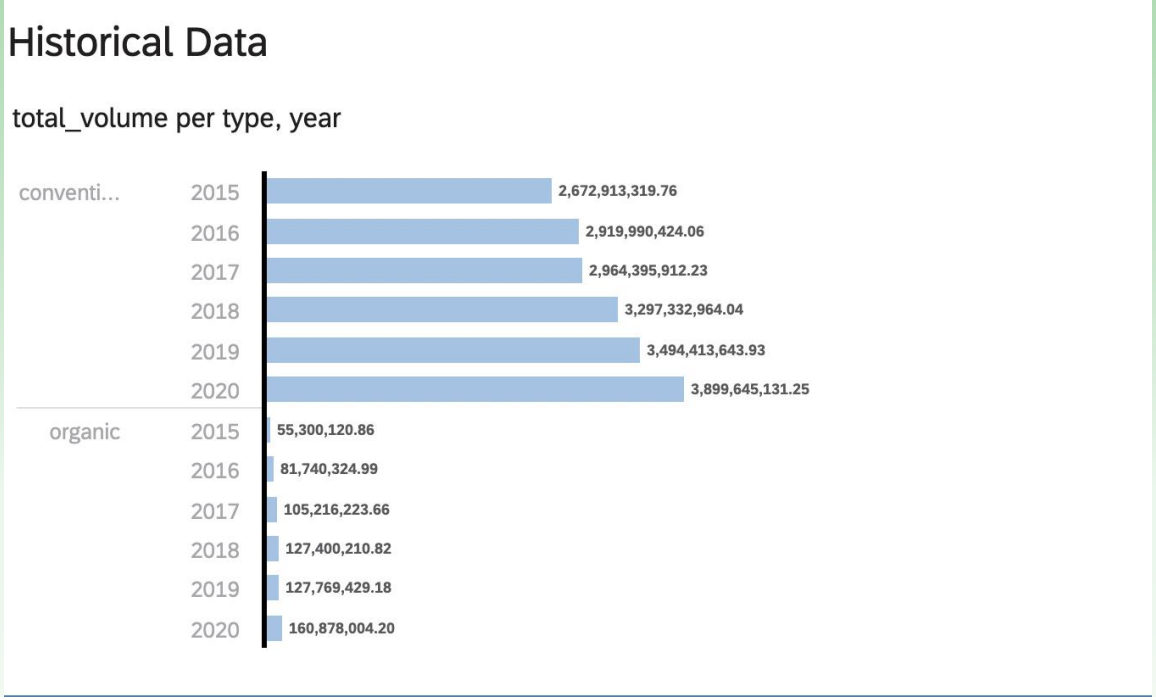
Data Visualization

Average Price Per Type, Conventional & Organic

- Illustrates the average price per type of conventional and organic avocados
- Nearly 58% of organic avocado sales averaged $1.80 per avocado
- Roughly 42% of conventional avocados averaged $1.30 per avocado

Data Visualization

Total Volume Per Type & Year



Data Visualization

Total Volume Per Type & Year

- The total volume output of conventional avocados far outnumbers the total volume output of organic avocados

- The total volume output of both conventional and organic avocados has grown steadily year after year

Data Visualization

Time Series

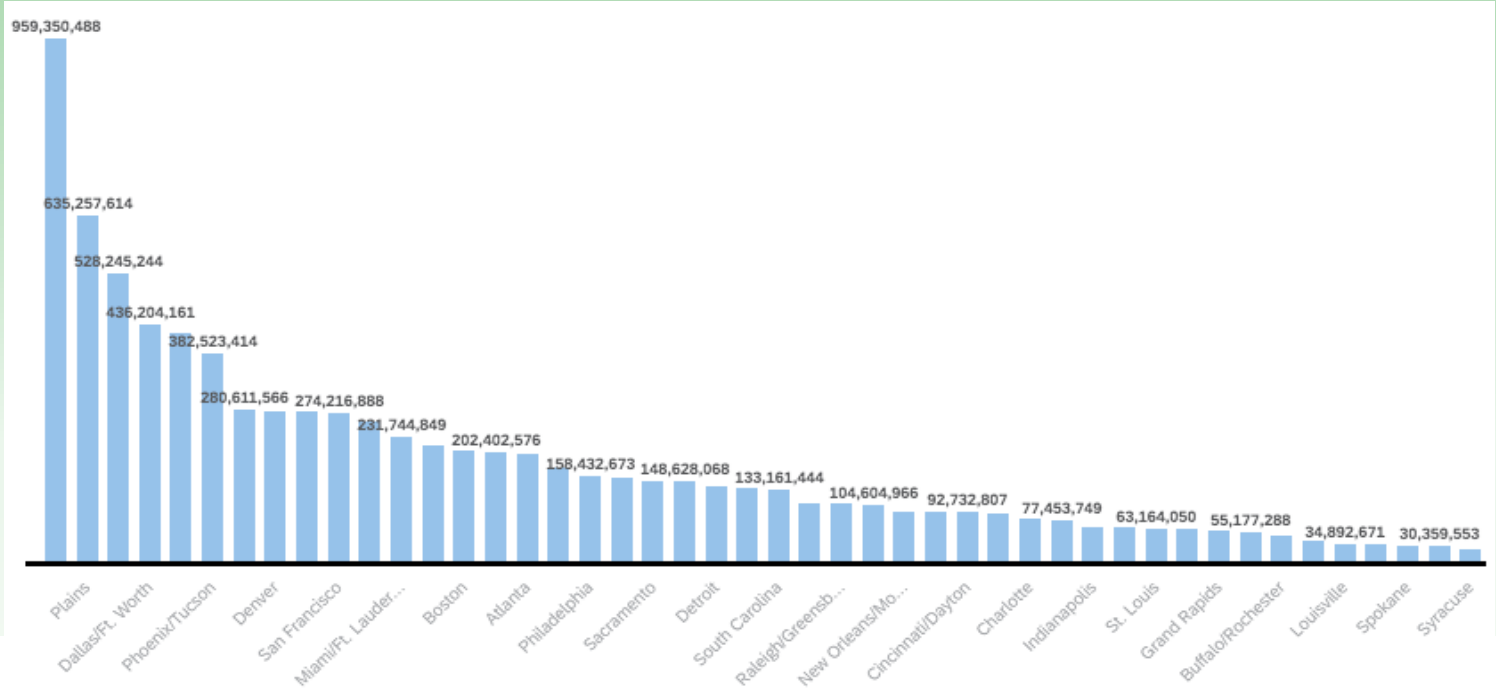
Data Visualization

Time Series

- The time series analysis and forecast of avocado size and total volume purchased over the course of one year
- *4046* represents small/medium Hass avocados, *4225* represents large Hass avocados, and *4770* represents extra-large Hass avocados
- The graph clearly shows a gradual increase in total volume as the year progressed

Data Visualization

Total Volume Purchased By Geography



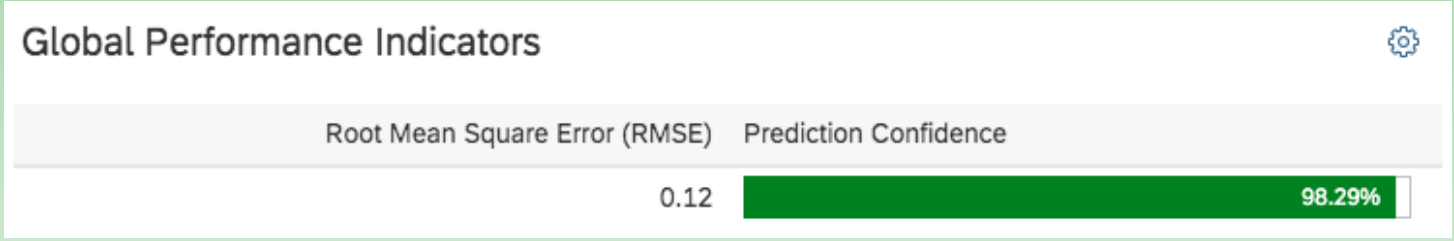
Data Visualization

Total Volume Purchased By Geography

- As the highest-ranking city, Los Angeles contributes significantly with over 959 million purchases
- Land-locked areas with harsher climates were on the lower end of the spectrum as accessibility to the crop is reduced
- Avocado trees do best at moderately warm temperatures (60 F to 85 F) with moderate humidity
- Syracuse, NY, and Boise, ID are the lowest two cities on the chart with approximately 24.1 million and 30.3 million, respectively

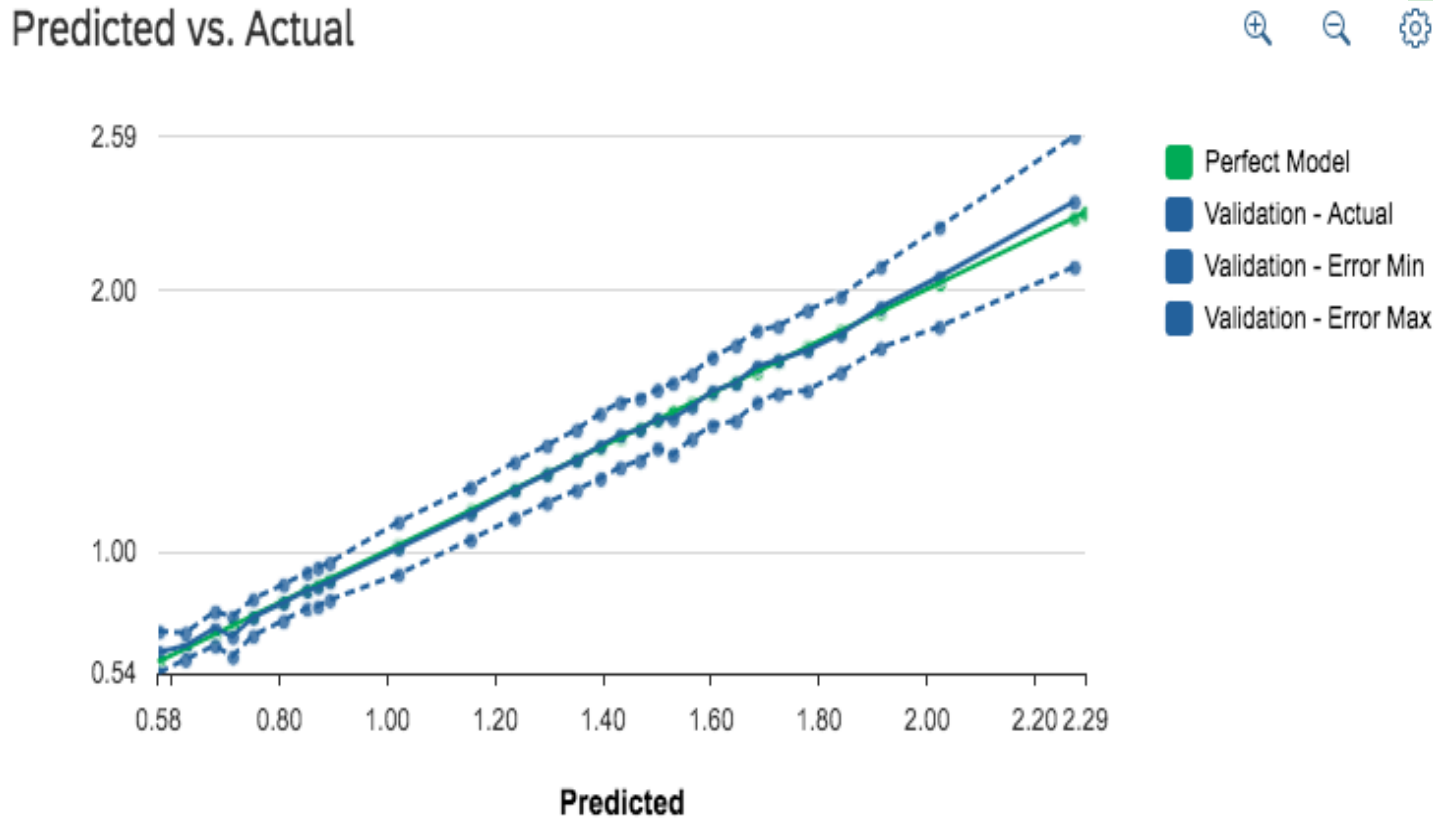
Data Visualization

Predictive Price Model – Regression Analysis



- Predictive Goal = Average Price of Avocados
- RMSE = .12 where the closer to 0, the better the model
- Prediction confidence = 98.29% which measures if the predictive model can do the predictions with the same reliability when new cases arrive [100% is ideal]

Data Visualization



Data Visualization

- Validation – Actual is $2.05 while the Predicted Value is $2.02
- The regression analysis shows a Validation - Error Max of $2.24 and a Validation - Error Min of $1.86
- A Perfect Model would have shown $2.03, so our model's $2.02 prediction is very close

Measure:	Validation - Actual
Predicted:	2.02
Validation - Actual:	2.05

Measure:	Validation - Error Max
Predicted:	2.02
Validation - Error Max:	2.24

Measure:	Validation - Error Min
Predicted:	2.02
Validation - Error Min:	1.86

Measure:	Perfect Model
Predicted:	2.03
Perfect Model:	2.03

Key Findings

- The price of organic avocadoes is on average 35-40% higher than conventional avocadoes.
- The sales volume of conventional avocadoes per year is on average 30 times bigger than that of the organic avocado sales
- Seasonality trends reveal that the highest point of sales take place in early February as well as the first week of May
- Climate and geographical location play a role in avocado buying behaviors

References

[1] Hass Avocado Board (March, 2021) Inside HAB. Retrieved from https://hassavocadoboard.com/inside-hab/

[2] Holland, S. (July, 2019) Towards Data Science: Millennials' Favorite Fruit: Forecasting Avocado Prices with ARIMA Models. https://towardsdatascience.com/millennials-favorite-fruit-forecasting-avocado-prices-with-arima-models-5b46e4e0e914

[3] Colin, F. (June, 2020) Agronometrics in Charts: Avocado prices begin to recover as Mexico winds down. Retrieved from https://www.freshfruitportal.com/news/2020/06/02/agronometrics-in-charts-avocado-prices-begin-to-recover-as-mexico-winds-down/

[4] Kaggle. https://www.kaggle.com/timmate/avocado-prices-2020

THANK YOU