

A top-down view of several avocados on a white surface. Some are whole with dark, bumpy skin, while others are sliced in half, revealing a bright green flesh and a large, reddish-brown pit. The text is overlaid in the center.

Measuring Avocado Prices Across Time, Type, & Region

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Business Understanding

- Predicting and analyzing avocado sales across time and across different geographical regions within the U.S.

MOTIVATION:

- Our goal is to help producers and farmers understand the profit potential of avocados depending on the growth method (conventional or organic) and to understand the market growth/potential for each type.
- Through use of Rapidminer and Tableau visualizations we hope to reveal how...
 - Average prices of avocados have varied based on growing region/time of year/type
 - Volume of avocados sold varies in accordance with rise/fall of average prices of avocados

Who are the main stakeholders?

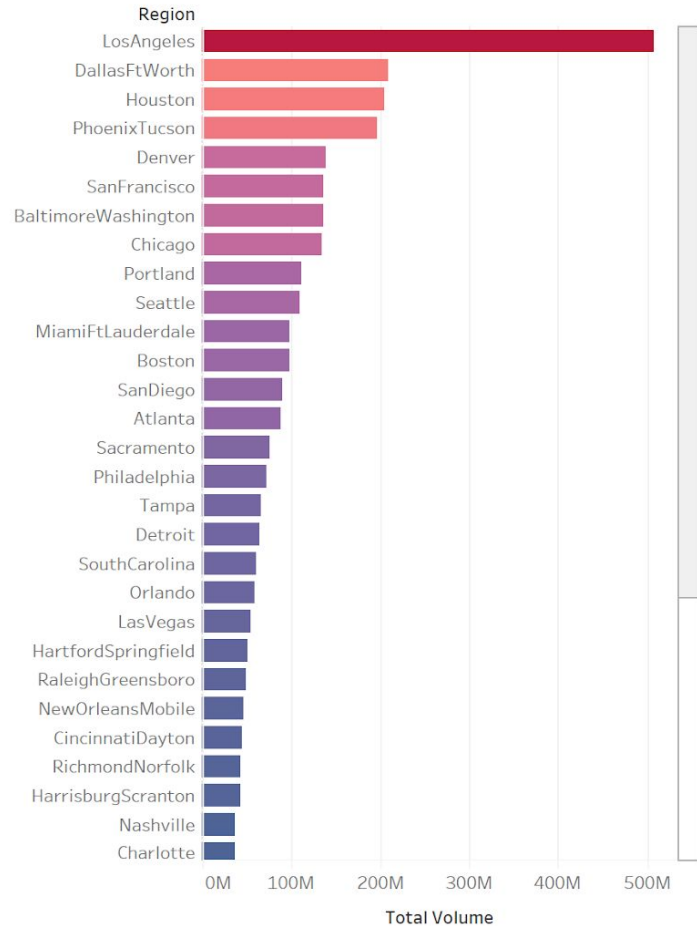
- Avocado farmers and retailers at a local and commercial level will be directly impacted by these results
 - Can utilize these results to maximize profit potential and adopt a competitive business strategy (investing in either conventional or organic avocados)



Data Preparation and Understanding

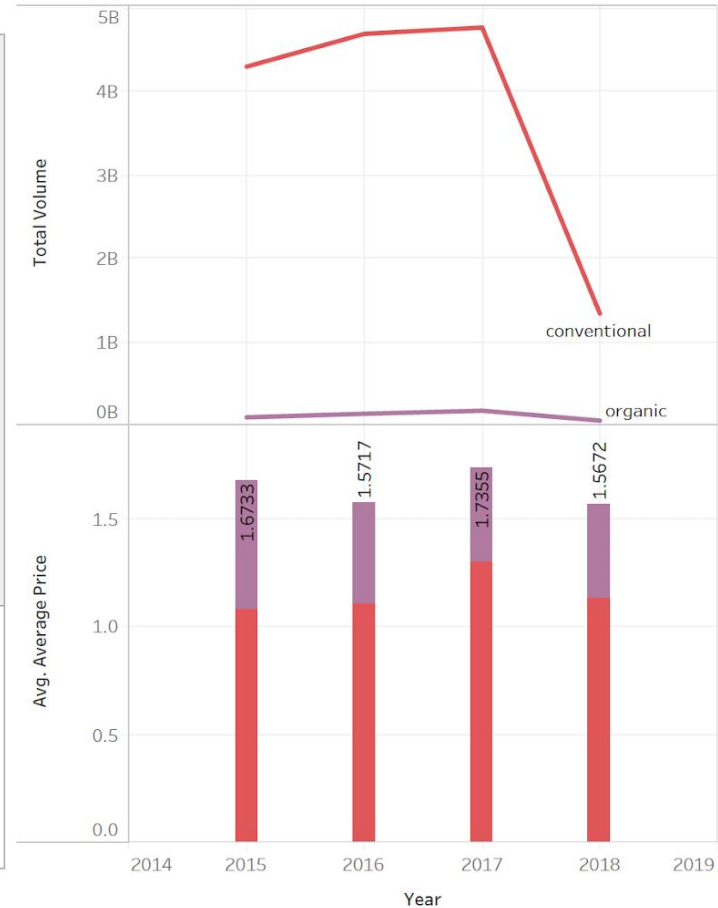
- Data taken from Hass Avocado Board
 - “Weekly 2018 retail scan for National retail volume (units) and price”
- No data preparations were done as the avocados data set was clean.
- The dataset contains 18,250 rows and 10 columns.
- The features (variables) included in the dataset include average price, type (conventional/organic), year, region, total volume (total number of avocados sold), 4046 (Total number of avocados with PLU 4046 sold), 4225 (total number of avocados with PLU 4225) and 4770 (number of avocados sold with PLU 4770).
 - Target Variable - Average Price of Avocados
 - Predictor Variables - Type of Avocado (Conventional/Organic), Year, Volume, Region
- EDA visualizations made on Tableau
 - (see next slides)

Volume by City



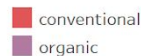
This graph shows total volume by city. We have observed that Los Angeles is the largest consumer of avocados, nearly 2.5x the amount of Dallas.

Volume and Price by Year



This graph shows total volume and average price by year. We've observed that between 2017 and 2018 there was a significant drop in volume, as well as a drop in average price for both organic and conventional avocados.

■ conventional
■ organic



■ conventional
■ organic

Avg. Price

1.0479 1.8186



Avg. Price

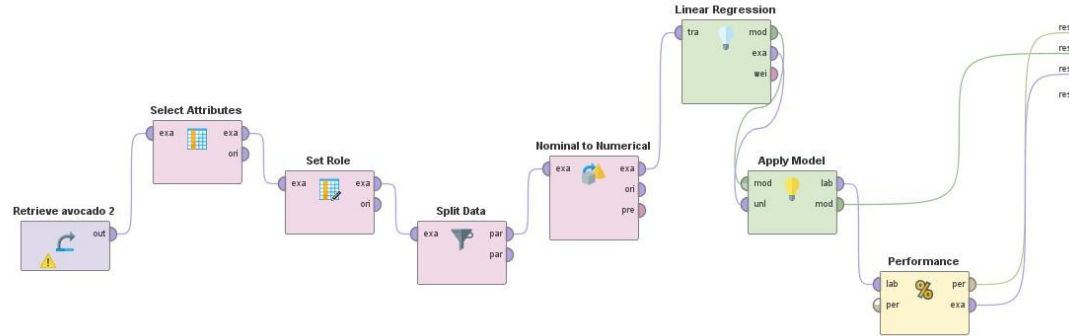
1.0479 1.8186



Modeling

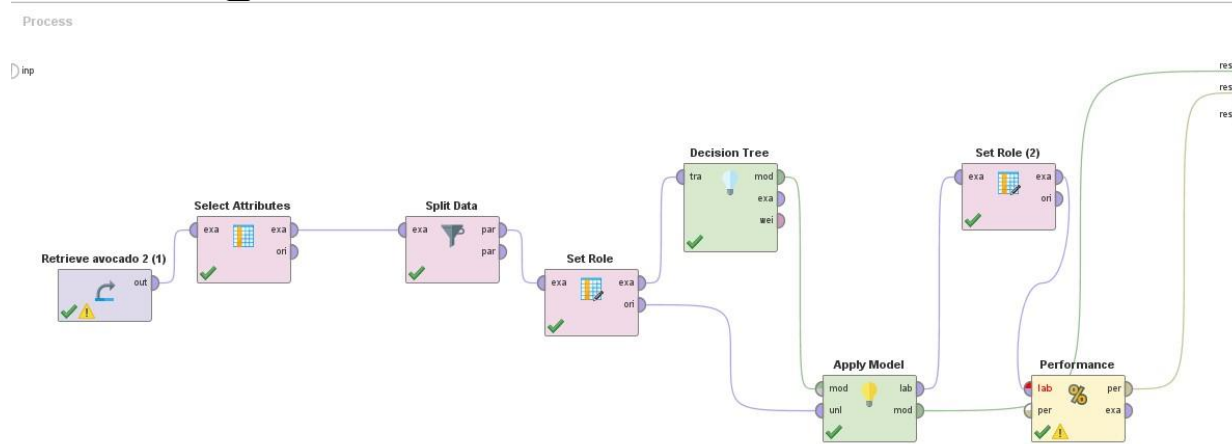
Process

inp



Multiple Linear Regression Model

Modeling



Decision Tree Modeling



Results and Evaluation

Multiple Linear Regression Model:

- Best predictors are type and year
- P-values were both 0
- Coefficient of year = 0.041
- Coefficient of conventional avocado = -0.249
- Coefficient of organic avocado = 0.249

Decision Tree Model:

- Accuracy of 80.76% with high percentage in recall and precision
- Most organic avocados were priced higher
- Very rare situations organic and conventional avocados were equally priced



Results and Evaluation

Comparison:

- Multiple linear regression would be more suitable to predict average price of avocados.
- Decision tree model is suitable as a support to the variable type and year.
- The decision tree showed the ratio of conventional to organic amount and the prices they are priced at in each year.
- Decision tree helps to predict the type of avocado to plant.



Recommendations

Avocado farmers and growers must consider their region in the world, and the volume potential of their land/area to help decide which sector of the avocado market to capitalize on.

- Organic Avocados:
 - Small farming capacity and low output volume (compared to conventional)
 - Greater profit potential (Higher sale price, balanced with slightly higher operational cost)
- Conventional Avocados
 - A steady, majority portion of the avocado market
 - Large farming capacity and high output volume
 - Steady, reliable profit potential (Lower sales price with slightly lower operational cost)

Farmers and growers can capitalize on analysis of regional consumption of avocados, indicating that coastal cities make up the largest consumer markets for avocados.