

A photograph of a wine cellar or bar. The background is filled with tall wooden shelves stocked with numerous wine bottles. In the foreground, a dark bar counter is visible, with a cash register and some bottles on it. Three large, round, gold-colored pendant lights hang from the ceiling. On the left, there is a door with a grid pattern and a red 'EXIT' sign above it. The overall atmosphere is warm and sophisticated.

Wine List Recommender Proposal

An opportunity for Wine Spectator

Presented to Marvin Shanken, Chairman – M. Shanken Communications

Overview

- Opportunity
- Methodology
- Analysis
- Recommender Development
- Conclusion/Next Steps



The Opportunity

- \$17.9 billion worth of wine sold on-premise (+1%)
 - Value increased
 - Volume sales declined
- What's working in market? (2019)
 - Imported wine:
 - +2% from last year
 - Growing at a pace 2X faster than domestic wines.
 - Domestic table wine:
 - Growing: Cabernet Sauvignon, Sauvignon Blanc, Rosé
 - Declining: Everything else
 - Sparkling wine:
 - Prosecco and Sparkling Rose outpacing

Sources:

1) Nielsen: <https://www.nielsen.com/us/en/press-releases/2019/nielsen-cga-levels-the-restaurant-analytic-playing-field-with-launch-of-free-benchmarking-platform-restaurantrak/>

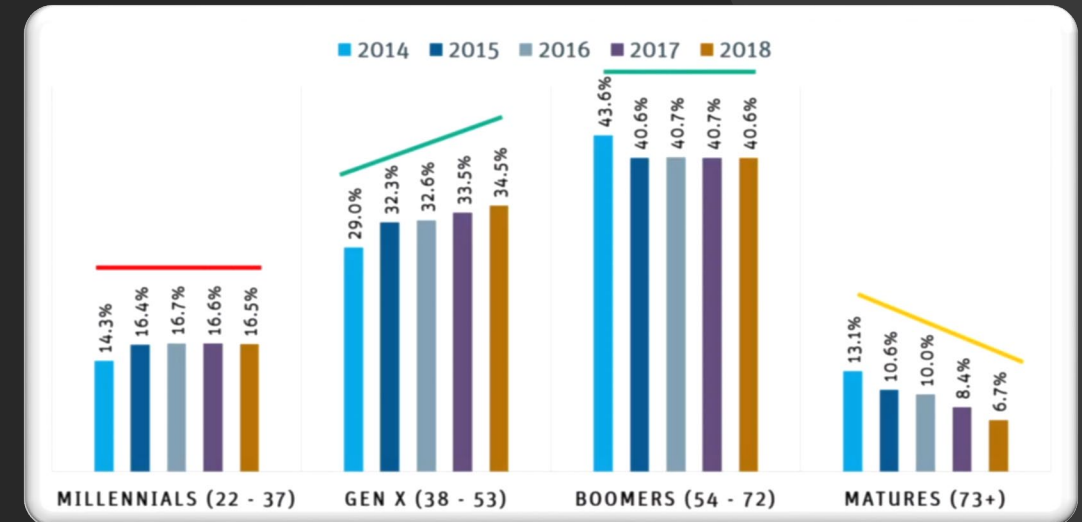
2) Forbes online: "New Wine Market Reports May Not Provide Exact Clarity" - Thomas Pellicchia <https://www.forbes.com/sites/thomaspellicchia/2019/11/05/new-wine-market-reports-may-not-provide-exact-clarity/#c64352d6edd8>



The Opportunity

- Millennials are experimenting
 - Cocktail sales grew by 2.7% over three quarters ending June 2019.
 - The exploratory and premiumization movements drove spirits/cocktail lodging sales +5.2%
- Millennials are still tomorrow's wine consumer:
 - Hyperconnected – Social Searchers/Recommenders
 - Exploring online (Mixology Masterclass)
 - Bringing it home, sharing with friends
 - 50% have a sense of adventure
 - 50% refer to themselves as Foodies
 - 46% more are ordering unique beverage flavors than 2 years ago in other categories (fruit-forward influences)

AVERAGE WINE CONSUMPTION BY AGE GROUP



Sources:

- 1) SVB Annual Wine Conditions Survey 2014-2018
- 2) Nestle Professional Market Research - Millennial Purchase Power

The Opportunity

Wine List Development is now more important than ever!

- Never been one “right way” to design a wine list
- Millennials present an opportunity for growth and change by leveraging:
 - Sense of adventure
 - Interest in new beverage profiles
 - Social Hyperconnectivity
 - Need the education and leadership they are getting from spirits right now

OWNER	PROs	CONs
	Significant Revenue Stream	Time intensive to create, expense to consult expert
	Customer Draw	Carry large inventory
	Reflect the brand of restaurant/bar	Out of stocks tend to disappoint consumers

CONSUMER	PROs	CONs
	Will spend more when out	Wine lists can be intimidating
	Willing to try new. but has favorites	Information varies, Simple to complex
	Will share their experiences	OOS/subpar experience disappoints consumer

The Opportunity

Proposal: Wine List Recommender App

- Streamline the process of creating a wine list
- Provide owners with new consumer driven data about preferred wine brands in market
- Deliver custom recommendations for a more effective, brand-centric and profitable collection
- Engage a hyperconnected millennial community and encourage their interaction and trial



Methodology

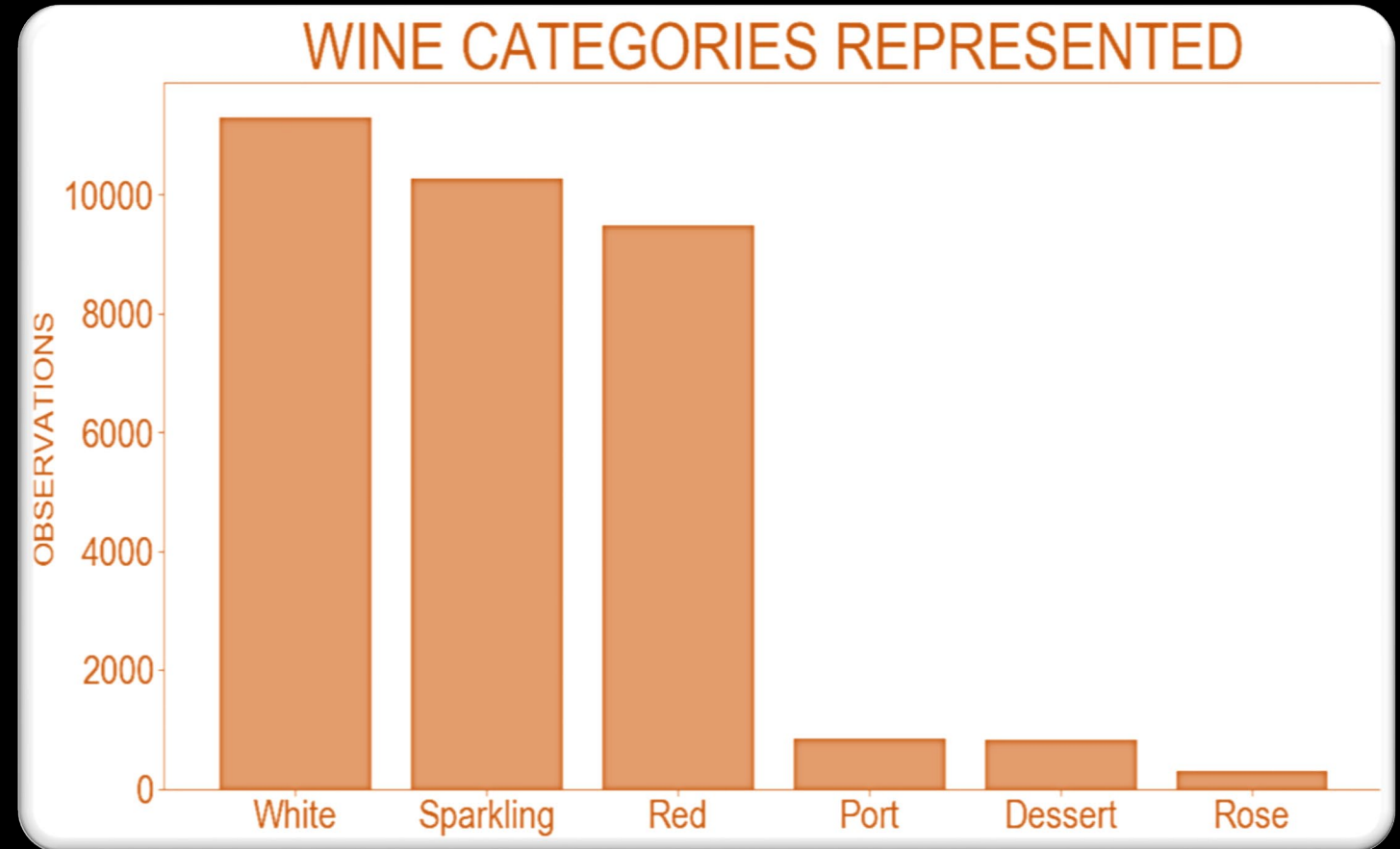
- Obtain data for development
 - Vivino.com (via Selenium web scrape)
 - Winery, Wine, User Ratings, Location
- Compile master wine catalog
 - Exploratory Data Analysis
 - Feature Engineering
- Compile user profiles
 - Simulated user ratings
 - Constructed off collected ratings
- Build Phase 1 Recommender Prototype



Analysis

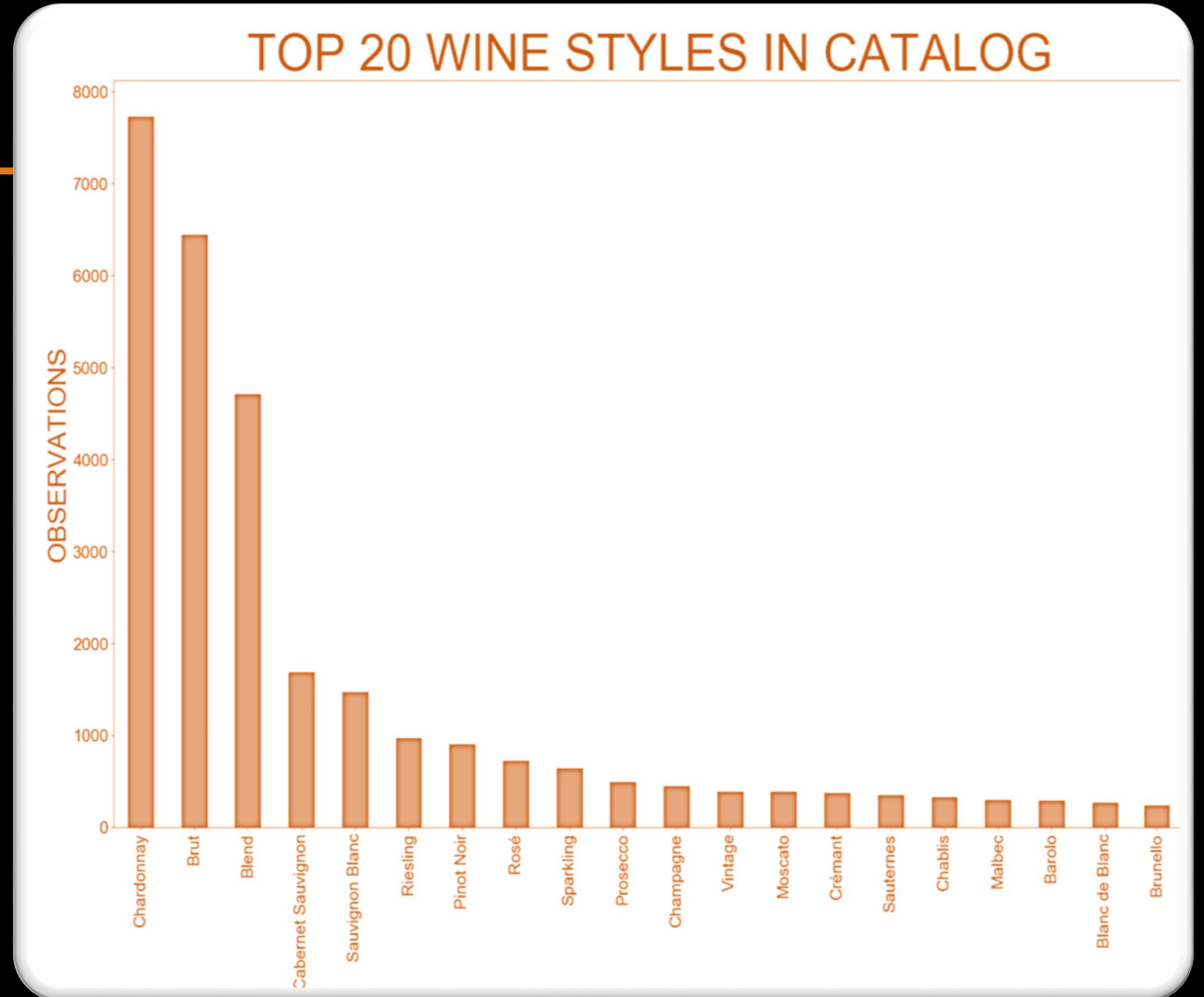
About the Dataset

- 33,163 individual wine observations
- Top 5 Regions
 - Champagne
 - Napa Valley
 - Marlborough, NZ
 - Porto
 - Cava
- Top 5 Countries
 - France
 - United States
 - Italy
 - Spain
 - Portugal



Analysis

- 100 Wine Styles captured
- Top 10 mirror overall trends of current consumer market demand



Analysis

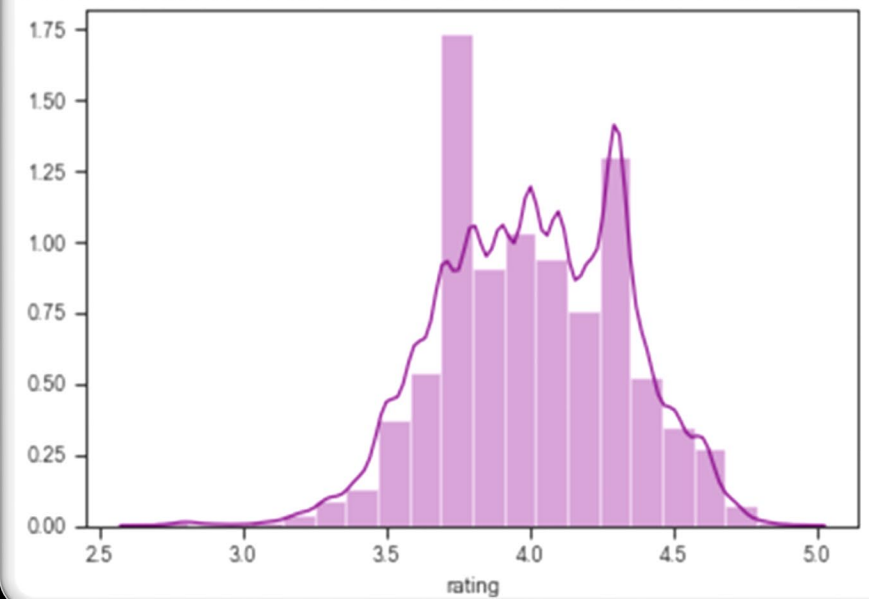
Ratings:

- Vivino's user ratings are based on a 1 to 5 scale, with increments of .5
- Distribution of ratings are symmetrically centered around 4 and approaching normal, with two prominent peaks at 3.7 and 4.3

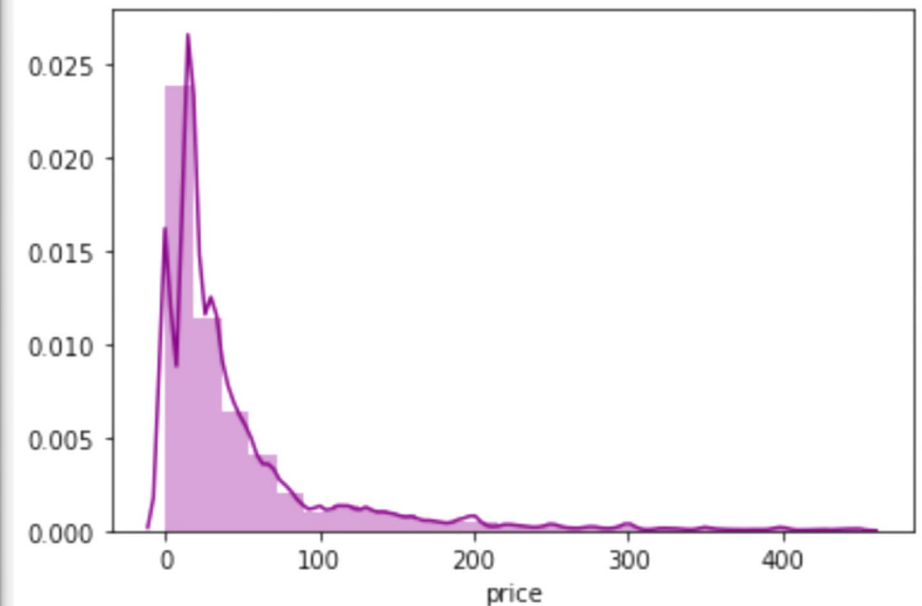
Pricing:

- Skewed left, with the majority of pricing reflected under \$100 a bottle

DISTRIBUTION OF USER WINE RATINGS



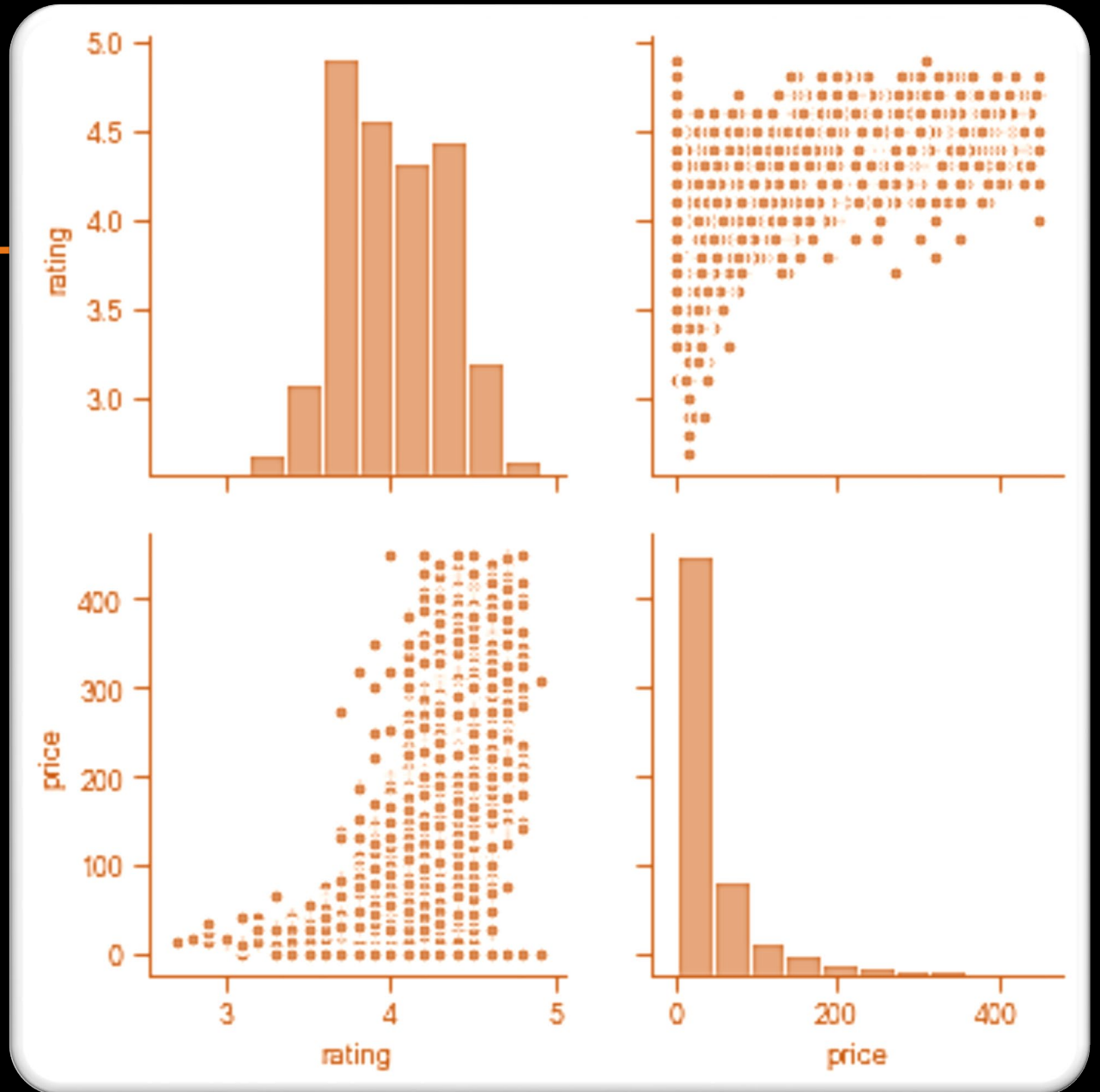
DISTRIBUTION OF WINE PRICING



Analysis

Ratings and Pricing

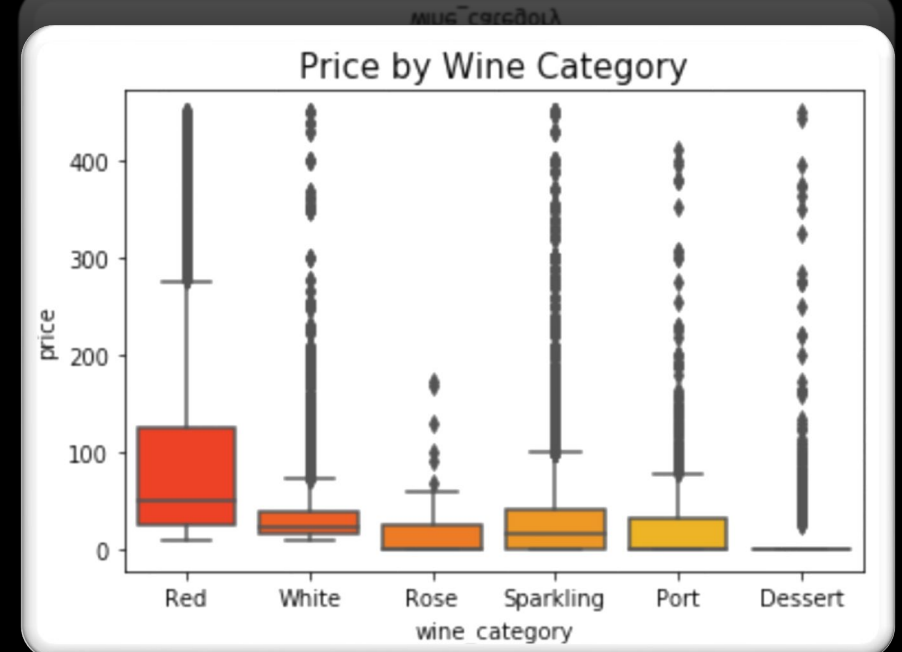
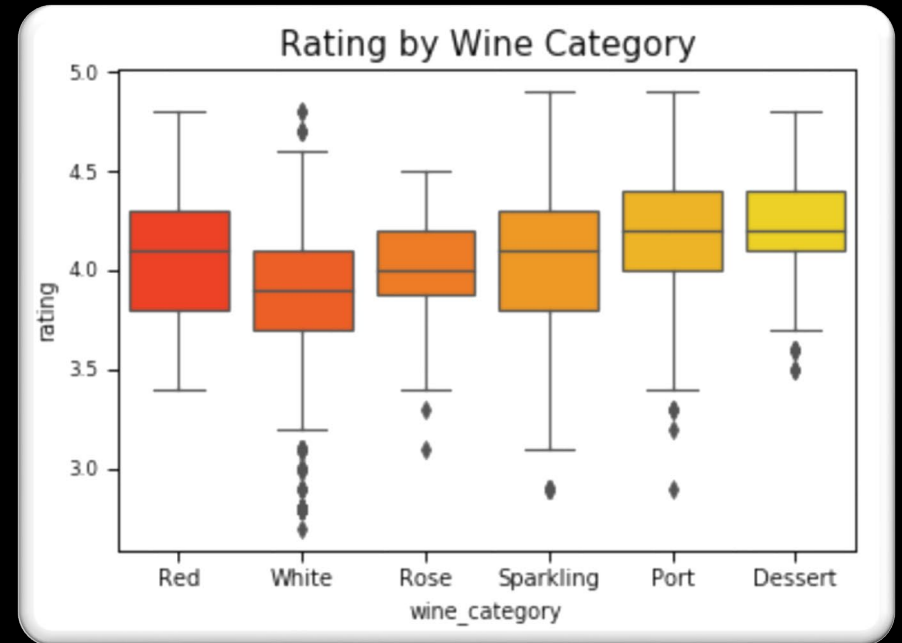
- 4.7 to 4.9
 - Mostly above \$120
- 4.1 to 4.6
 - Ratings prevalent across all price points
- 3.7 and lower
 - Common below \$100



Analysis

Review of each individual wine category reflects a similar dynamic:

- Majority of ratings are centered around 4.0
- Majority of price points are below \$100
- Our highest correlation between ratings and price in wine categories occurs among red and white at the highest pricepoints. (\$120 - \$315)
- Each category does have outliers, which would be reflective of a typical wine list



Recommender Development

- Wine Catalog: what would be reflected on wine list
- Pair with a 1000 user rating simulated dataset
- Phase 1 : Item Based Collaborative Recommender
 - Creates a matrix based on the wine and ratings
 - Measure similarity between two items in matrix



Recommender Development

Phase 1

- Enter label
- Returns 10 “closest”

```
In [55]: 1 wine_catalog.loc[27945]
```

```
Out[55]: winery          Taittinger
         wine          Comtes de Champagne Blanc de Blancs 1983
         rating          4.9
         wine_style      Blanc de Blanc
         wine_category    Sparkling
         vintage          1983
         region          Champagne
         country          France
         price            0
         contact_for_price contact
         wine_style_code    8
         wine_category_code 4
         region_code        192
         country_code       12
         Name: 30520, dtype: object
```

```
In [28]: 1 search = 'Comtes de Champagne Blanc de Blancs 1983'
         2
         3 for wine_label in wine.loc[wine['wine_label'].str.contains(search), 'wine_label']:
         4     print(' ')
         5     print('Average rating', pivot.loc[wine_label, :].mean())
         6     print('Number of ratings', pivot.T[wine_label].count())
         7     print('')
         8     print('10 closest wine labels')
         9     print('')
        10     print(recommender_df[wine_label].sort_values()[1:11])
        11     print('')
        12     print('*****')
        13     print('')
```

```
Average rating 4.9025222816399285
Number of ratings 935
```

```
10 closest wine labels
```

```
wine_label
Gavi 2017          0.033330
Lighea N.V.        0.033335
La Combe Pilate 2016 0.033372
Rutherford Cabernet Sauvignon 2014 0.033375
Cabernet Sauvignon (Signature) 2016 0.033390
Crémant de Loire Brut N.V. 0.033396
Old Vines White 2018 0.033396
O.R. 1735 Brut Champagne 2004 0.033413
Dijon Clones Chardonnay 2014 0.033418
Village Chardonnay 2017 0.033419
```

```
Name: Comtes de Champagne Blanc de Blancs 1983, dtype: float64
```

Recommender Development

Average rating 4.819496855345906

Number of ratings 477

10 closest wine labels

wine_label

Shiraz 2018 0.308251

Reserve Cabernet Sauvignon N.V. 0.308425

Châteauneuf-du-Pape Blanc N.V. 0.308543

Vintage Port 1963 0.308611

Red N.V. 0.308675

Saint-Estèphe (Grand Cru Classé) 2005 0.308689

Sparkling Brut N.V. 0.308753

Sauternes (Premier Grand Cru Classé) 2010 0.308766

Prosecco Treviso Brut N.V. 0.308796

Corton-Charlemagne Grand Cru 2015 0.308817

Name: Cabernet Sauvignon RBS Beckstoffer To Kalon Vineyard 2016, dtype: float64

Average rating 4.093283582089557

Number of ratings 536

10 closest wine labels

wine_label

Amarone della Valpolicella N.V. 0.267119

Saint-Julien (Grand Cru Classé) 2015 0.267260

Reserva Tinto 2016 0.267343

Cuvée Brut Champagne N.V. 0.267468

Saint-Estèphe (Grand Cru Classé) 2005 0.267523

Soave Classico N.V. 0.267568

Brut Premier Champagne N.V. 0.267582

Vintage Port 1977 0.267590

Blanc de Noirs N.V. 0.267845

Brut Champagne 1998 0.267860

Name: Naissance Sauvignon Blanc 2017, dtype: float64

In early testing, the recommended list on the left was more acceptable than the one on the right. While the labels produced were somewhat similar, they could be improved upon.

Recommender Development

Average rating 4.400389863547752

Number of ratings 513

10 closest wine labels

wine_label

Valdobbiadene Prosecco Superiore Brut N.V. 0.282534

Pessac-Léognan Blanc (Grand Cru Classé de Graves) 2015 0.282629

Brut Champagne 1998 0.283008

Pauillac (Grand Cru Classé) 2014 0.283430

Vouvray Brut N.V. 0.283451

Gran Reserva Serie Riberas Cabernet Sauvignon 2017 0.283489

Russian River Valley Chardonnay 2016 0.283511

Cava Brut Reserva N.V. 0.283522

Sparkling N.V. 0.283587

Langhe Rosso N.V. 0.283696

Name: Rioja Gran Reserva 1996, dtype: float64

Average rating 4.101902100270997

Number of ratings 984

10 closest wine labels

wine_label

Sin Zin Zinfandel N.V. 0.008484

Nuit Blanche Champagne N.V. 0.008651

Les Deux Albion 'Principaute d'Orange' Vaucluse Blanc 2016 0.008652

Champ Cain Brut Champagne Grand Cru 'Avize' 2004 0.008656

Blanco 2014 0.008657

Family Crest Chardonnay 2016 0.008658

Cuvée Joséphine Brut Champagne 2008 0.008660

Dragon's Tooth 2016 0.008662

Puligny-Montrachet 2017 0.008663

Terroirs Blanc de Blancs Extra Brut Champagne Grand Cru 'Avize' 2010 0.008663

Name: Rioja Gran Reserva 2011, dtype: float64

A search for Rioja Gran Reserva showed that the Recommender was able to account for vintages when specified in order to produce recommendations for each vintage of the same varietal

Conclusion/Next Steps

- Recommender shows progress but requires further development
- Five key areas of concentration:
 - 1) Obtain a more robust user profile dataset
 - 2) Move to a Collaborative Filtering Recommender System (kNN) as a foundation
 - 3) Leverage Feature Weighting as in a Content Based Recommender System (more dimensions)
 - 4) Build a HYBRID Recommender
 - 5) Consider adding a front-end filter to direct the data for a degree of customization for owners



Why a partnership with Wine Spectator?

- Long time partnerships with restaurant community
 - Annual restaurant awards
 - Culinary school program
- Provides an opportunity to create an asset for the Wine Spectator portfolio that engages
 - Restaurant owners
 - Today's wine consumers
 - Millennials
- Creates a new community and a new stream of data for the operation while evolving the messaging and the space
- Helps WS compete with Vivino while lending credibility to restaurant owners/wine list creators





Cheers!

