



AI Boot Camp **Project 3**

Wine and Food Pairing Recommendation System

Team Members:

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Project Overview

Project Purpose / Description

Project Overview: This project aims to develop a personalized wine recommendation system that helps users select wines based on their past preferences, taste attributes, and ideal food pairings. The system will leverage a structured database, integrate user feedback, and provide dynamic suggestions using rule-based algorithms or potential machine learning models.

Goal: To create a functional and user-friendly wine recommendation system that allows users to explore and receive personalized wine and food pairing recommendations, making wine selection easier and more enjoyable.



Project Overview

Goals/Problem to be solved

- How can user preferences be effectively captured and translated into personalized wine recommendations?
- What characteristics (body, acidity, tannins, etc.) in the judge's descriptions are most important in user wine selection?
- What machine learning or rule-based algorithms can enhance the accuracy of recommendations?



Project Overview

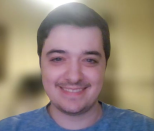
Overview of data collection, cleanup and exploration process

Dataset Collection

1. [Portugueses Wine Dataset](#) - Portuguese Wine Reviews Dataset from "BlogOsVinhos" - dataset by loliveira1999.
2. [Wine Searcher](#) - Wine and Food Pairing.

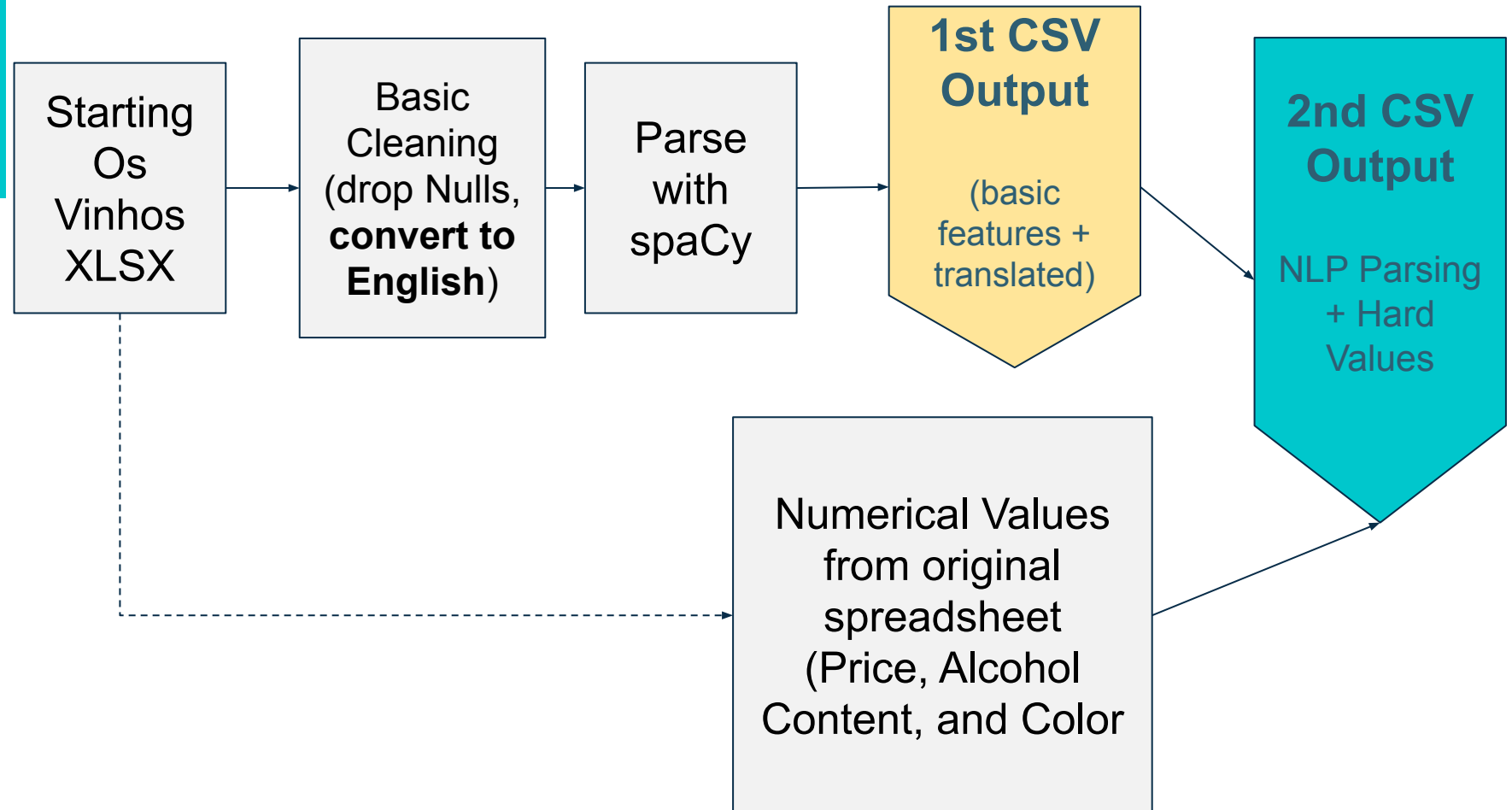
Dataset Exploration

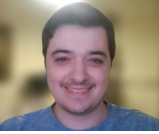
1. Dataset data was reviewed by the team to insure we had an adequate amount of data for use by the LLM.



Project Overview

Overview of data cleanup





Project
Overview

Internal CSV Output Values

Filtered Data from Os Vinhos

Name	Color	Alch Percent	Price	Judge Rating	Review_Notes	Wine_Bottle_Label	Web URL
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NLP Data from spaCy parsing

color	aroma	flavors	finish	mouthfeel
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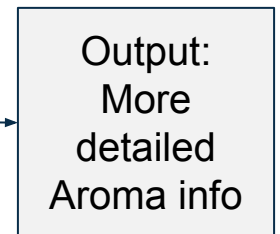
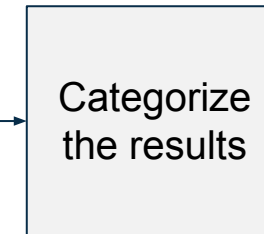
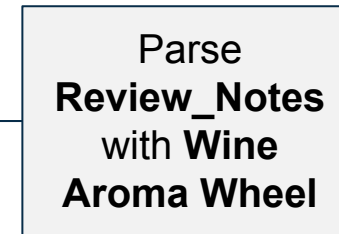
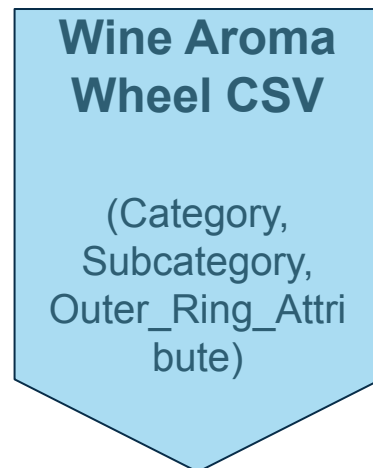
Expanded Aroma Feature:

aromas_aroma	categories	subcategories	outer_ring_attributes
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Project Overview

Improving Aromas



Null Values before

Aromas	652
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Null Values after

Aromas_aroma	7
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99% Reduction!

BlogOsVinhosTranslated_With_WinePro
file.csv



Project Overview

Approach taken to achieve goals

- Langchain
- Gemini AI
- Generative AI
- Google Translate
- spaCy
- Gradio Interface
- Natural Language Processing



Result/Conclusion 1

How can user preferences be effectively captured and translated into personalized wine recommendations?

- Balance Ease of User Input with Many Variables
- Simplify Reviewer Notes
- Farming Key Attributes
- Allow Some Wiggle Room

Wine Recommendation & Food Pairing App

Wine to Food

Food to Wine

Wine Color

Red

Aroma

'high intensity'

Flavor

Red Floral

Body

light_bodied

Alcohol

Moderate (10% - 12%)

Price

Mid-Range (\$20 - \$50)



Result/Conclusion 1

User Interface Wine Attribute Selection

- Color (Primary)
- Aroma
- Flavor
- Body
- Alcohol Content (Select Your Buzz)

Wine to Food

Food to Wine

Wine Color

Red

Aroma

'oaky'

Flavor

Red Bold

Body

medium_bodied

Alcohol

Moderate (10% - 12%)

Price

Wine Recommendation

Closest Wine Match: Chaminé 2008 (Score: 0.59)

Description: I'm sorry, I cannot provide a full description for this wine as the exact match was not found. You may want to try searching for the wine using different keywords or filters.

More info: <https://osvinhos.blogspot.com/2011/08/1878-chamine-2008-tinto.html>

Food Pairing Recommendation

1 large bone in, skin on chicken (about 4 pounds)

- * 1 head of asparagus, trimmed
- * 1 lemon, zested and juiced
- * 1/2 cup olive oil
- * 2 tablespoons dried oregano
- * 2 tablespoons dried thyme
- * 1 tablespoon salt
- * 1/2 teaspoon black pepper

Recipe:

1. Preheat oven to 400°F (200°C).

2. In a large bowl, combine the chicken, olive oil, lemon zest, oregano, thyme, salt, and pepper. Toss to coat.

3. Place the chicken in a roasting pan fitted with a wire rack. Add the asparagus spears around the chicken.

4. Roast for 60-75 minutes, or until the chicken is cooked through and the internal temperature reaches 165°F (74°C).

5. Remove the chicken from the oven and let rest for 10 minutes before carving. Serve immediately with the roasted asparagus.

Wine Pairing Notes:

This meal is a perfect match for white wines with bright, crisp acidity and mineral notes. Consider Sauvignon Blanc, Pinot Grigio, or Albariño. These wines will complement the freshness of the lemon and herbs, while the mineral notes will enhance the flavors of the chicken and asparagus.

Get Wine Recommendation

Get Food Pairing Recommendation

Result/Conclusion 1

User Interface Food Selection

- Complete Freedom
- Generative AI Recommendation
- Delicious Results

Wine Recommendation & Food Pairing App

Wine to Food

Food to Wine

Food to Wine Recommendation

Enter a Food Preference

Grilled Chicken with mashed potatoes

Wine Recommendation for Your Food

****Wine Recommendation:**** Pinot Noir

****Color:**** Red

****Description:****

Pinot Noir is a light- to medium-bodied red wine known for its elegant flavors and moderate tannins. Its delicate nuances complement the subtle flavors of grilled chicken without overpowering them. The earthy and fruity notes of Pinot Noir, such as cherry, raspberry, and mushroom, create a harmonious balance with the savory grilled chicken. Additionally, the wine's soft tannins provide a smooth and velvety texture that pairs well with the creamy richness of mashed potatoes.

Pinot Noir's relatively high acidity also complements the creamy texture of mashed potatoes, cutting through the richness and enhancing the overall balance of the dish. Its subtle oak aging, if any, adds a touch of complexity and warmth that further complements the grilled chicken.

Overall, Pinot Noir's elegant flavors, moderate tannins, and acidity make it an ideal pairing for grilled chicken with mashed potatoes, providing a harmonious and enjoyable culinary experience.

Get Wine Recommendation for Food



Result/Conclusion 3

What machine learning or rule-based algorithms can enhance the accuracy of recommendations?

- Rule-Based Filtering
- Collaborative Filtering
- Content-Based Filtering
- Hybrid (ML + Rules)
- K-Means Clustering
- Neural Networks (Deep Learning)

Approach	Pros	Cons	When to Use
Rule-Based Filtering	Explainable, Fast	Hard to scale	When logical constraints are needed (e.g., avoid white wine for steak)
Collaborative Filtering	Personalized	Needs user history	When user behavior data is available
Content-Based Filtering	Good for new users	Requires feature engineering	When user has specific preferences
Hybrid (ML + Rules)	Best balance	Harder to implement	When optimizing both rules and personalization
K-Means Clustering	Finds natural wine groups	Hard to interpret	When discovering new wine categories
Neural Networks (Deep Learning)	Learns user patterns	Needs a lot of data	When building a long-term personalized recommendation system



Summary

The goal of this project was to create a functional and user-friendly wine recommendation system that allows users to explore and receive personalized wine and food pairing recommendations, making wine selection easier and more enjoyable.

Users are able to:

- Search for wines based on attributes (e.g., sweetness, body, acidity)
- Get food pairing recommendations
- Get food pairing cooking instructions, and shopping list
- Receive wine recommendations based on their preferences



Problems Encountered

- **Finding the best dataset** that contains both wine characteristics and food pairings.
- **Balancing rule-based recommendations with potential machine learning approaches** (i.e., should we use collaborative filtering or a predefined expert-driven approach?).
- **Developing an intuitive UI** that effectively presents recommendations without overwhelming users.
- Lack of **subject matter experts** on the team. (except Nathan)



Future Considerations



The Wine Recommendation and Food Pairing App bridges the gap between wine enthusiasts and culinary delights. By combining data science, AI, and an intuitive interface, this app enhances the dining experience for users worldwide. We look forward to future iterations that refine and expand its capabilities.

- Amending the wine list and notes
- Saving of user wine preferences for repeat users
- Rate wines to refine future recommendations

Any Questions?

Thank You!