

**Use Case Name:** Beer Advisor

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## Beer Advisor

### Summary

Beer is said to be one of the oldest alcoholic drinks created by humans. In fact, we have been creating different types of beers for millennia and, hence, due to the wide variety of beers with different flavor profiles and styles, choosing a beer is not a simple matter. There are also many people who are picky about what they drink, as they may not like certain styles of beer. There can also be the concerns of alcohol content and brewery location, as people want to support their local beer scene. In this context, the Beer Advisor helps people in the difficult task which is finding the perfect beer. The application combines information from different databases in order to find the perfect beer match considering the user's requests.

### Goal

The goal of this application is to provide users with beer recommendations by matching their preferences with attributes of commercially available beers.

### Requirements

- The system must be able to differ beers between styles, alcohol content, and other key factors.
- It will return a listing of beers with all the information the system can provide on them.
- It will have an extensive catalog of beers obtained from trustworthy data sources.

## **Scope**

The application will only recommend beers and will not include other alcohols such as spirits or wines.

The beer selection and beer attributes used for recommendation will be limited to those provided by the application's data sources: beer.db and opendatasoft.

The application will recommend beers based on location, alcohol content, style, IBU, color, original gravity (OG), season and basic ingredients and will not include any additional attributes such as "mouthfeel". Of course, the characteristics on which the recommendation depends will be used if the information that is available in our resources.

The application does not guarantee recommendations for all combinations. For example, finding an IPA with a low alcohol content may not be feasible. In this scenario, the ontology will recommend similar beverages based upon a set hierarchy, which the user can manipulate if they wish.

Users will have the ability to compare their searches to other similar results that the system has stored.

## **Stakeholders**

- Customers/ Beer drinker.
- Beer distributors.
- Beer stores.
- Breweries.
- Bars.
- Beer Databases.

## **Actors**

Primary: Customer/Beer drinker – This is the person that will benefit directly from the ontology. For them, the ontology will assist in finding beer that they desire in a more efficient manner.

Primary: Beer Store – Owners of beer stores could use the ontology as a way to get more information of beers in their area they may not know about, to further widen their selection.

Primary: Bars – Bars have a similar interaction to that of beer stores, using the ontology to expand their selection.

Secondary: OpenBeerDB

Secondary: beer.db

Secondary: opendatasoft

Secondary: beerkb - An ontology provided to us by Elisa Kendall that we will be reusing in our ontology.

Secondary: brewery – While breweries won't be accessing the ontology for purchases, the beers they make will affect what beers are stored inside the ontology.

Secondary: beer distributors – This is similar to breweries, as the beers that are shipped by distributors will also affect the ontologies database.

## **Triggers**

The trigger to this application is the user launching the Beer Advisor application and performing a search for a beer with a determined set of characteristics. Examples of triggers are listed below.

- A customer is unsure of what beers are available in their local area, or what local breweries there are.
- A customer wants to find a new style of beer to try.
- A customer wants to find a new brand of a style they already drink.
- A bar is looking for new brands to expand their current selection.
- A store is looking for new brands to expand their current selection.

## Pre-conditions

It is assumed that the user specifies the type of beer and for that the user will need to provide the characteristics he is looking for, such as beer type, alcohol content, season and location.

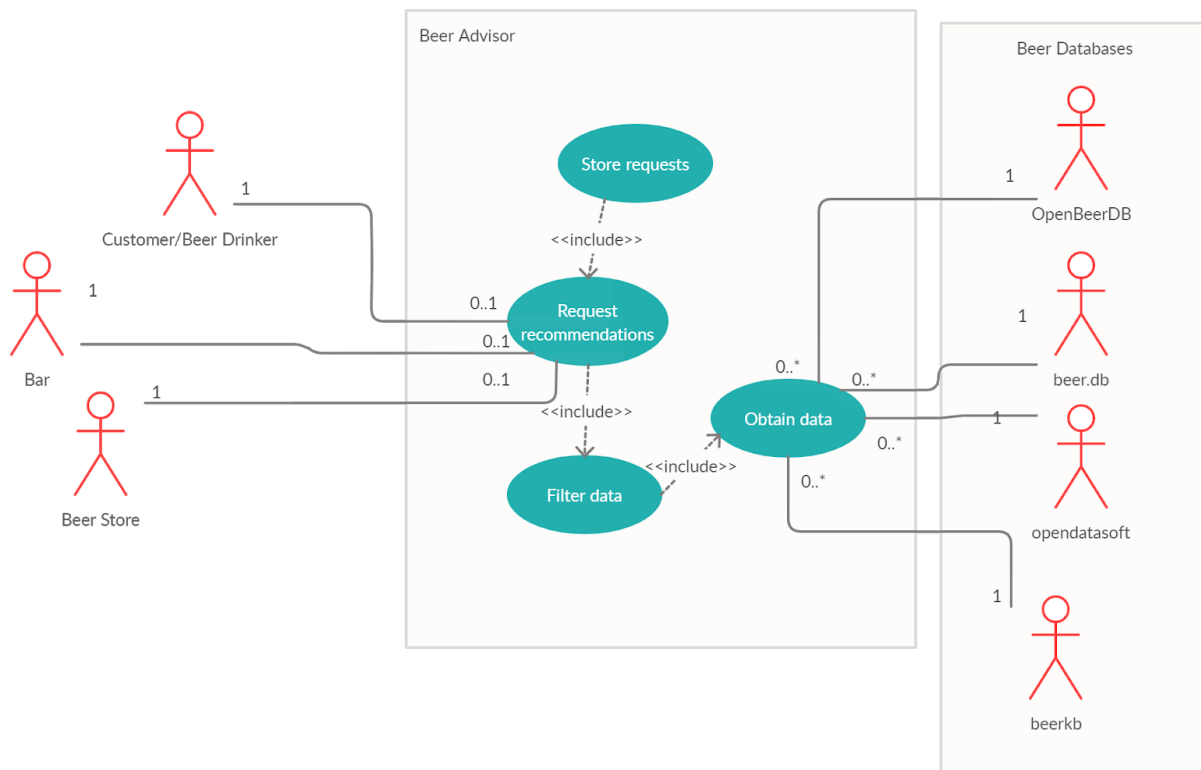
The application should be web-based and, therefore, accessible from any device.

It is also assumed that the application can perform access to beer and breweries databases.

## Post-conditions

The ontology will contain a plethora of different beers differentiated by type, alcohol content, location, and more. Users will be able to query the ontology for what they desire but a primary actor will have no permanent effect on the system. Therefore, there is no need to save information after the user is satisfied with the recommendation provided by the tool.

## Use Case Diagram



This diagram is meant to be an overview of how the system for beer advisor works. Inside of our subject, essence of beer advisor, are the two main operations the system will have. The first operation is the ability to request recommendations. Each user will submit one recommendation based upon our guidelines, which will provide them with a list of beers. These recommendations will be completed by one of these actors, who are our primary actors.

The second action that can be completed is on the back end, obtaining data from our different databases. In this scenario, we will obtain 0 or many different beers from these databases, while for the purpose of this ontology we will only be accessing the data from each database once. This diagram shows a rough draft of what we believe our ontology will look like.

Inside of this are two new actions. The first is the ability to store requests, which can later be used inside of request recommendations. After a user has their results returned, they can ask for a list of similar requests to plug into the system, which come from the stored requests.

The second feature is the connection between requesting recommendations and obtaining data, filtering the data. Inside of this will be a set of rules and requests for look up, but also providing information in the case of poor query results, i.e. if the system is unable to return a satisfactory list without using similar to relationships.

## Usage Scenarios

### **Scenario 1**

A man has just moved to Troy and is looking for a new beer. However he's a little picky on what he likes. He looks for beers locally, as he wants to support local microbrews, and mainly drinks american lagers and pilsners. He loads up Beer Advisor to help him look for a new beer to drink. He looks through the types and selects american lagers first. He then selects pilsners as his second choice. He then moves onto the location, and selects Troy, New York. After selecting both of his options he enters his search and is provided a list of different lagers and pilsners from troy breweries. Now he knows what options he has and can purchase the beer he wants.

### **Scenario 2**

A bar in Pittsburgh is looking to expand it's selection of beers, and wants to know what local brands there are. However he wants a selection of winter beers, which are usually darker beers, and wants to cap the alcohol content at 7%. He opens Beer Advisor and begins the selection process. He first selects his region, Northeast, and then selects the season he is looking for. After this, he selects beers that have an alcohol content from 5% to 6% and 6% to 7%. After this, the Beer Advisor provides him the names and locations of the beers, as well as the names of the breweries so he can contact them for direct distribution.

### **Scenario 3**

A user has just finished his search on Beer Advisor, and has found a nice list of beers to go and try out. However, he feels he may have limited his search a bit too much, and wants to see how he can expand his list. He notices that Beer Advisor can offer him a new set of queries, from prior users, that can expand his selection. He goes through the suggestions, adding more styles and adding a new location to expand his current selection. From this modification he comes out with a much larger selection of beer, and feels much happier with his results.

### **Scenario 4**

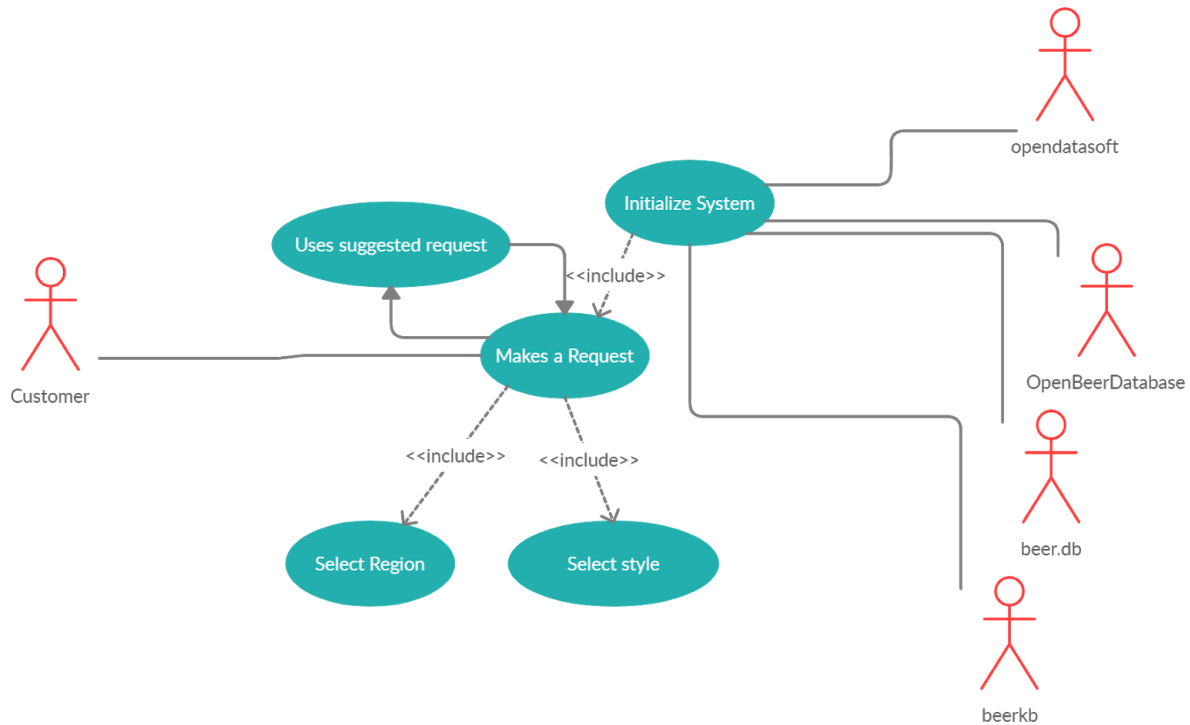
A user lives in a rural area populated with small towns and doesn't know of any local breweries. However they still want to try and stay close to home with their selection, so they load up Beer Advisor and search for breweries close to their hometown. After entering their query, Beer Advisor starts to search. Seeing how there are no breweries in their selected location, it expands its search to the entire state, and finds a multitude of breweries. It returns a list of beers with these breweries to the user, who can now find local breweries they may not have known about.

## Flow of Events

### **Basic Flow of Events**

1. User loads up Beer Advisor.
2. User selects a region.
3. User inputs a city.
4. User inputs a season.
5. User inputs a type.
6. System takes these criteria and searches for appropriate items.
7. First the system eliminates any regions that don't match.
8. Then the system eliminates cities that don't match.
9. Next it eliminates seasons that don't match.
10. Finally it narrows down the search to the specific type of beer.
11. System returns items in a list with all information available.

### **Basic Flow Diagram:**



This diagram represents our secondary basic flow. In this diagram, after the system has initialized, a user will make their request, eliminating the beer by style and region. After this the system will return a list and prompt the user to see if they want to make a new request based off of a suggested request. This will then do another query, and add this to the user's current list. This will continue until the user feels satisfied with their choices and leaves the system.

#### Alternate flow 1

1. User loads up Beer Advisor.
2. User selects a region.
3. User inputs a season.
4. User inputs a type.
5. System takes these criteria and searches for appropriate items.
6. First the system eliminates any regions that don't match.
7. Then the system eliminates cities that don't match.
8. Next it eliminates seasons that don't match.
9. Finally it narrows down the search to the specific type of beer.
10. System returns items in a list with all information available.
11. User requests a list of related searches
12. User selects new request
13. System adds beers from new request to previous list
14. Repeat 12-14 until user is satisfied with their list
15. User exits the system

## Alternate flow 2

1. User loads up Beer Advisor
2. User inputs a type
3. User inputs an alcohol content
4. The specific combination of type and alcohol content is impossible, so the beer cannot be found
5. The system searches for similar beers.
6. The system returns a message saying that no beers exist but presents the user with the list of similar beers.
7. The system then prompts the user for a new query
8. The user exits the system

## Alternative flow 3

1. User loads up Beer Advisor
2. User selects a region
3. User inputs a type
4. User inputs an alcohol content
5. The specific combination of type and alcohol content cannot be found for that location
6. The system searches for combination in similar locations
7. The system returns a message saying that no beers exist but presents the user with the list of beers from similar locations
8. The system then prompts the user for a new query
9. The user exits the system

## Preliminary Competency Questions

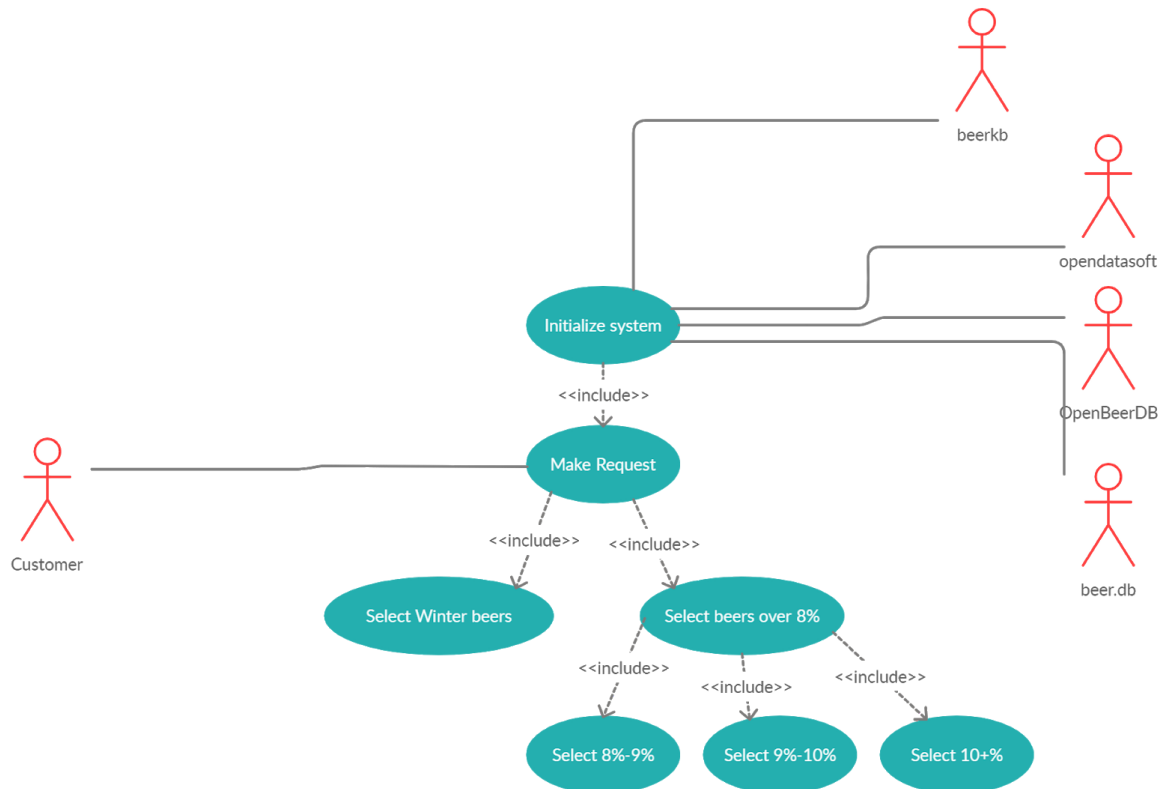
### Question 1: What are types of winter beers that are under 8% alcohol content?

- **Priority 2: Supplementary**
- Sample answer:
  - Ales, stouts, and porters. Winter beers are darker beers with fuller flavor and malted styles.
- Terms used:
  - season, beer, alcohol by volume, stout, ale, porter, color, malt, flavor, ibu
- Semantic Processes:
  - Simple lookup to find seasonal beers that are under 8% (for now?)
- Usage scenario covered:
  - A bar in Pittsburgh is looking to expand it's selection of beers, and wants to know what local brands there are.
- Description/Description + Ontology Usage:
  - The ontology will be leveraged in this case to first sort beers into their correct categories based upon certain aspects. For example, while some beers have their popular seasons explicitly stated, for others the seasons that they are popular in depends upon certain characteristics, such as style, color, and malts,



so these characteristics can be used to infer a season. If it can complete this task, then it should be able to make this kind of inference for every season. Alcohol by volume can also be used in a similar manner, as we plan on making this a series of different brackets with cutoffs in between. If the ontology can infer which beers fall under which categories based on these ABV ranges, then it should be able to recreate this process for all beers in our ontology.

- Diagram:

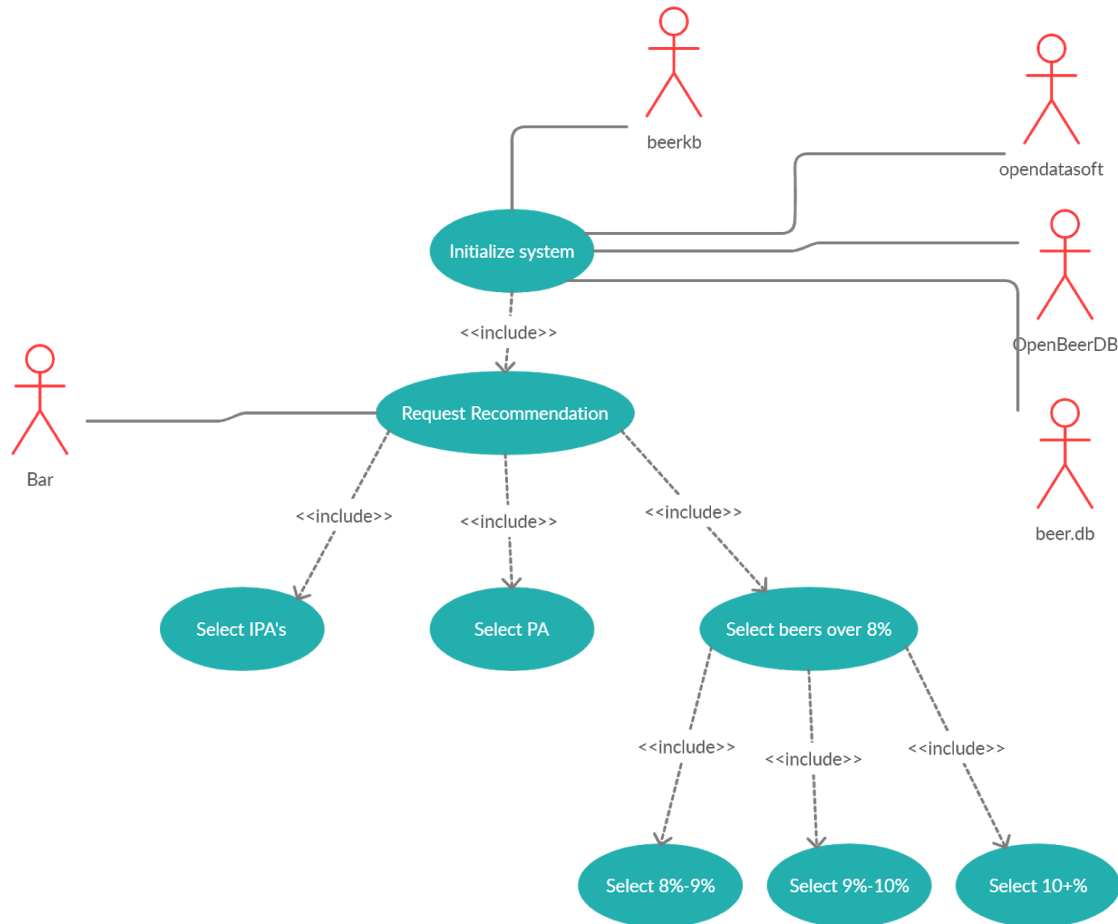


## Question 2: What is a brewery in Pennsylvania that makes IPAs under 8%?

- **Priority 1: Active**
- Sample answer:
  - Helltown Brewing
- Terms used:
  - brewery, india pale ale, alcohol by volume, alcohol content
- Semantic Processes:
  - Simple lookup to find beers that are under 8%, from Pennsylvania, and are IPAs
- Usage scenario covered:
  - A Pennsylvanian citizen wants to support breweries within their state. Their favorite style of beer is IPAs but the alcohol content should be below 8% ABV.
- Description/Description + Ontology Usage:
  - When you move to a new area you may not have any idea what breweries are located there and what kinds of beer they make. This question is aimed at

targeting that part of the ontology. By combining information from different databases, the ontology-enabled application should be able to select beers by the location and region first, then the application would be able to select beers of the requested type based on the classification made by the ontology. There will be minimal usage of the ontology for scenarios like this one, as it can essentially be accomplished through a simple look up that utilizes the brewery address class of our ontology. However it is still important to consider examples such as these because they are still a valid possible usage.

- Diagram:



### Question 3: What is an IPA that is 5% ABV or below?

- **Priority 1: Active**
- **Sample answer:**
  - No results found. Similar styles to your request: Pale Ales, Session IPAs
- **Terms used:**
  - india pale ale, pale ale, session india pale ale, ale, similarTo (Beer), alcohol by volume, alcohol content
- **Semantic Processes:**
  - Simple look up to attempt to find beers with requested attributes. Failure to find a specific beer with specified characteristics. Reasoning using similarTo property to

infer beers there are similar to the initial request based on the characteristics of the requested beer.

- Usage scenario covered:
  - An individual has recently started drinking IPAs. However, all of the IPAs they have seen in stores have a higher ABV than they would like, so they search for recommendations that have an ABV no higher than 5%.
- Description/Description + Ontology Usage:
  - The goal for this example is to highlight the ontology's capacity to draw comparisons between beers using its similarTo property. As in previous examples, the ontology-enabled application combines the information from its different databases and selects only IPAs. Next, it will try to select from the IPAs those that have an ABV of 5% or less. As there are no IPAs with the requested ABV it will not be able to return any. On finding that it was not able to find any qualifying beers, it will begin to use the ontology to identify beers that are similarTo IPAs that are within the correct ABV range. In a case like this one, the characteristic from the original request, ABV, will be prioritized when establishing similarTo. Beyond ABV, the characteristics will be prioritized by user preferences as determined by their profile

#### **Question 4: I really like New Belgium's IPA's, what other beers have people searched for from New Belgium?**

- **Priority 1: Active**
- Sample answer:
  - Fat Tire Amber Ale, Fat Tire Belgian White, Glutiny Pale Ale, Voodoo Ranger American Haze .
- Terms used:
  - brewery, similarTo (search), search history
- Semantic Processes:
  - A search focusing upon relating searches found in a user's profile to other users' searches.
- Usage scenario covered:
  - A user wishes to expand their selection of beers with the selections of other users'.
- Description/Description + Ontology Usage:
  - The goal of this search is to utilize a relationship, similarTo, to relate a user's searches to those of other users. In order to do this, the ontology-enabled application must do two things. The application should be able to differentiate whether we are asking for similar searches, or similar beers. This differentiation should happen at the user interface, allowing the user to choose which they would like to view. Then, the application should apply the correct hierarchy scheme that will allow it to prioritize the results of similar searches, which are provided by the ontology. Users will be able to modify this hierarchy, but the function should remain the same. In this scenario, the hierarchy is prioritizing beer styles, so it lists styles that are either super classes, such as pale ale and

ale, or within the same level subclass, such as session IPA, and will return these classes. If the ontology is able to make these inferences, then we should be able to apply this to the entire ontology.

**Question 5: Is there a stout made by a local brewery in Idyllwild, California?**

- **Priority 3: Future**
- Sample Answer:
  - This may not be available at Idyllwild, but Stone Brewing company nearby makes a stout.
- Terms used:
  - address, stout, brewery, nearTo, brewpub
- Semantic Process:
  - A search that utilizes a planned proximity search relative to the user specified location. .
- Usage scenario covered:
  - A user wishes to find the availability of beers near them.
- Description/Description + Ontology Usage:
  - In order to do this, the ontology will be leveraging it's nearTo relationship and the addresses that are stored. While we are not entirely sure of the implementation of this right now, the goal will be that the ontology should be able to provide users with beer availability near to them. One of the obstacles that makes this particularly challenging is, we would need to find a way to integrate data from an application such as Google Maps, in order to establish geographic locations to compare for similarity and distance.

**Resources**

Data	Type	Characteristics	Description	Owner	Source
OpenBeerDB	Open Database		Open database containing information on available beer		<a href="https://openbeerdb.com/">https://openbeerdb.com/</a>
beer.db	Web Service	Open public domain beer database	Beer based database that is open to public domain	beer.db	<a href="https://openbeer.github.io/">https://openbeer.github.io/</a>
Open beer database	Web API		A database containing beers by style, category, country, brewer,	opendatasoft	<a href="https://data.opendatasoft.com/explore/d">https://data.opendatasoft.com/explore/d</a>

			and address		<a href="#">dataset/open-beer-database%40public-us/table/</a>
beerkb	Beer ontology		Existing beer database with	Elisa Kendell	<a href="http://www.cs.umd.edu/projects/plus/SHE/onts/beer1.0.html">http://www.cs.umd.edu/projects/plus/SHE/onts/beer1.0.html</a>

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