

Case Based Reasoning System for Cocktail Recommendations

Supervised and Experiential Learning

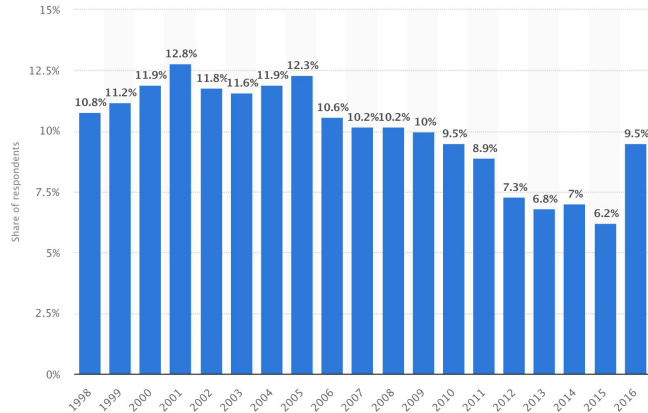
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Introduction

- Application domain: cocktail recommender
- 108 different cocktail recipes

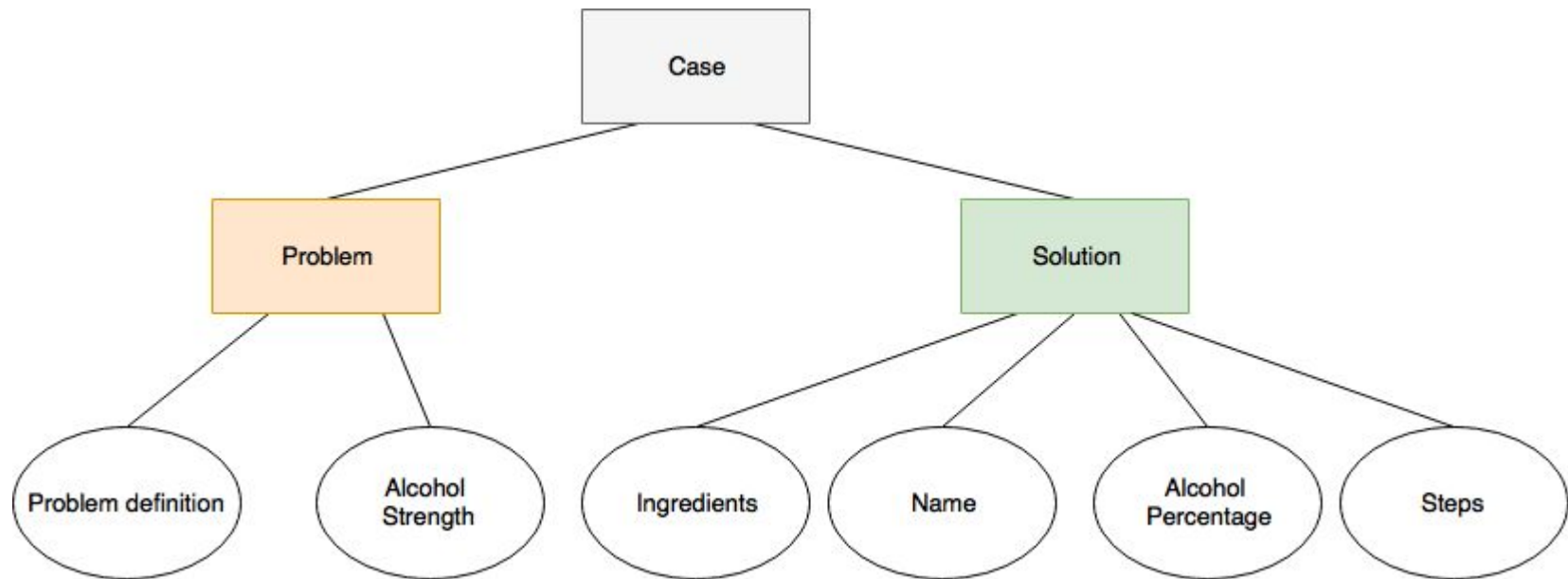




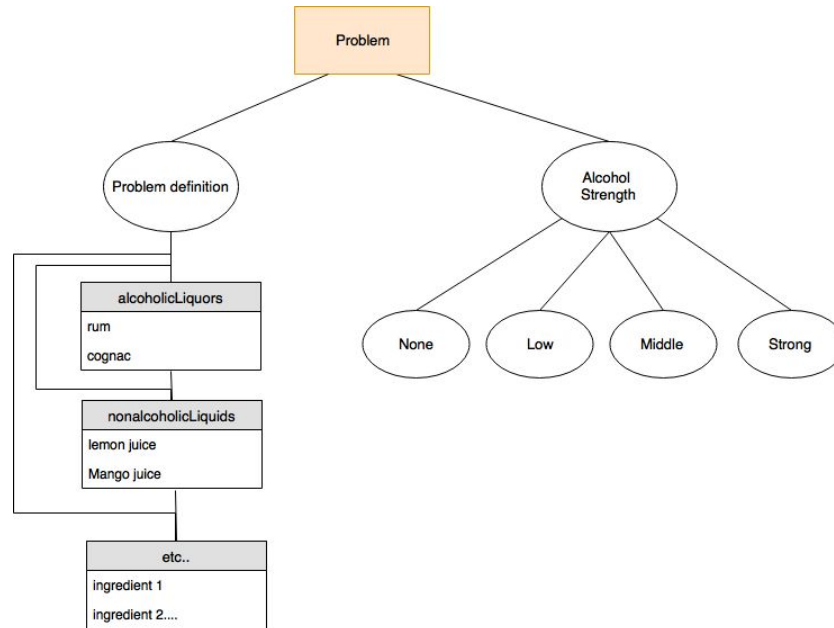
Dataset creation

- Existing source
- Correction of inconsistency (adding missing similarities)
- Information increase (alcohol percentage / alcoholic strength)

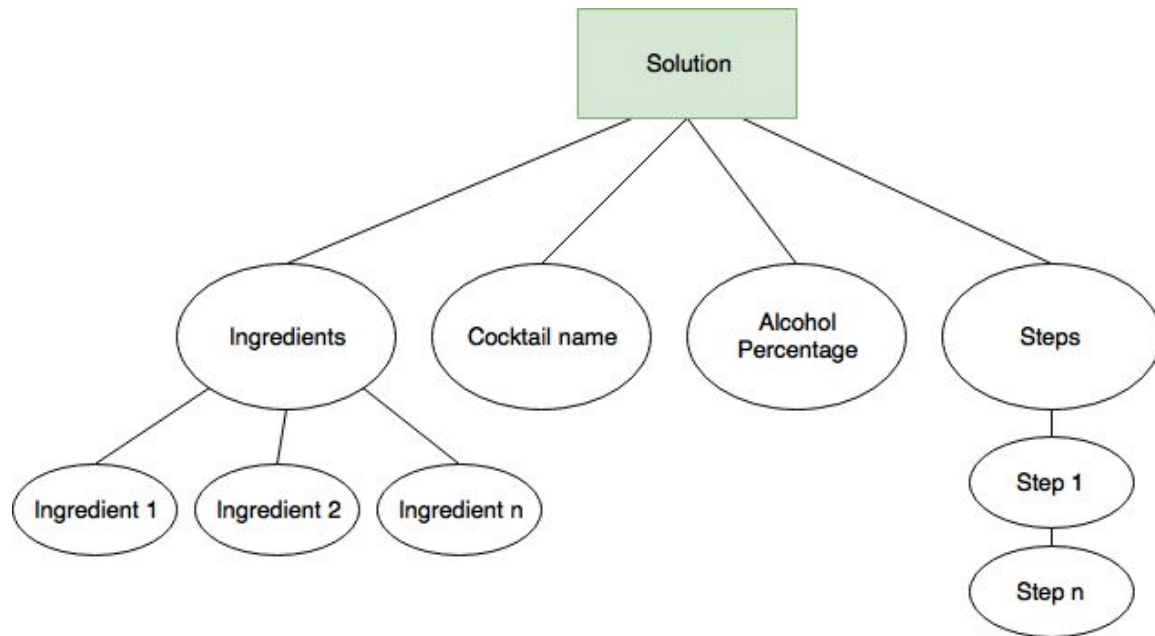
Case



Problem

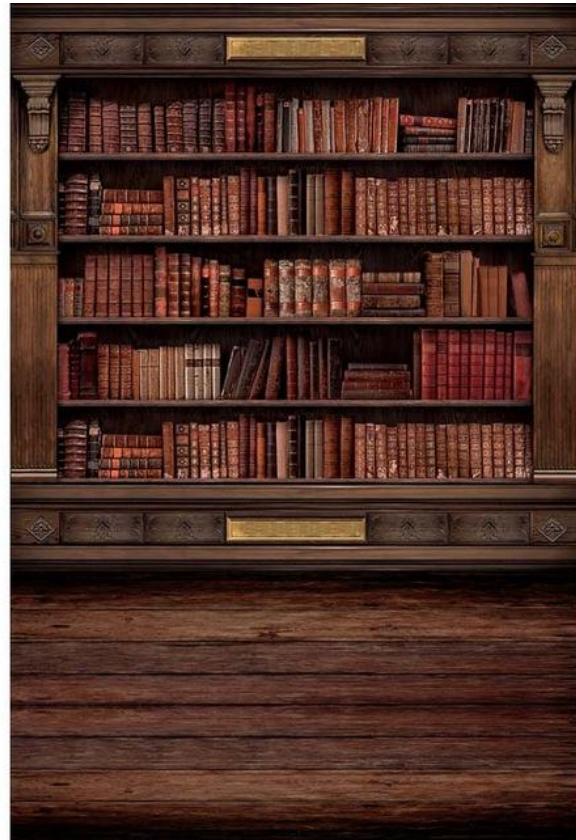


Solution

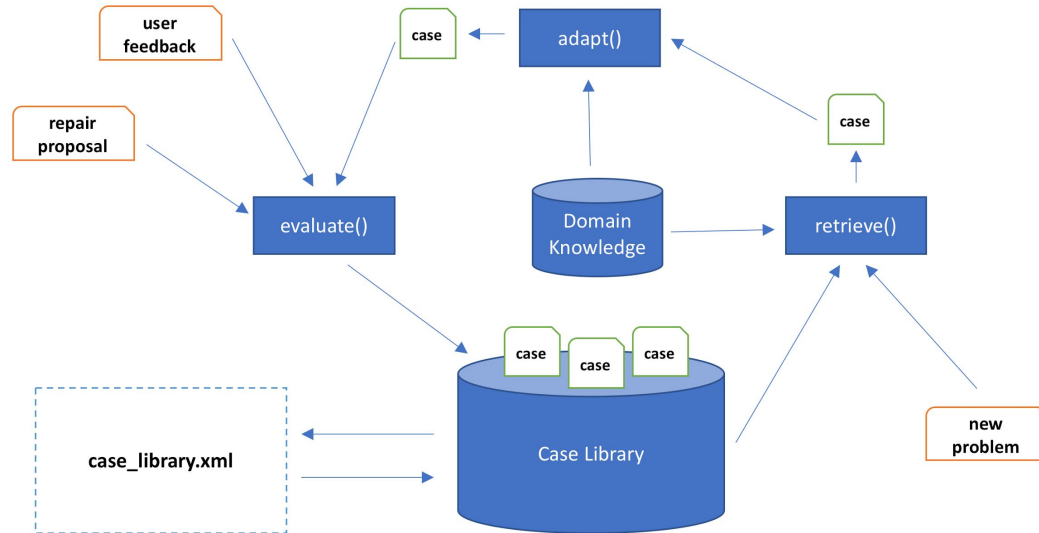


Case library

- Implementation in python
- Flat memory organization
- 108 initial cases



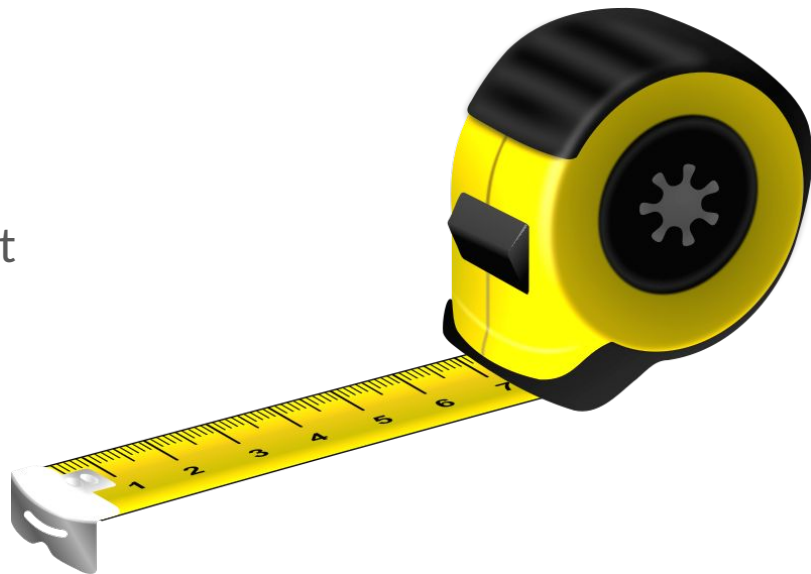
Functional Architecture



Retrieval (1)

- Distance function
- Gower's General Similarity Coefficient

$$s_{i,j} := s(x_i, x_j) = \frac{\sum_{k=1}^d w_k s_{ijk} \delta_{ijk}}{\sum_{k=1}^d w_k \delta_{ijk}}, x_i, x_j \in X$$





Retrieval (2)

- Basic function for comparing two lists

```
p1 = {"problem_definition": {"fruits": ["orange", "lemon"], "vegetables": ["cucumber"]}}
```

```
p2 = {"problem_definition": {"fruits": ["orange"], "vegetables": ["tomato"]}}
```



Retrieval (3)

- Weights adjustment

`['fruit', 'vegetables', 'alcoholicLiqueurs', 'nonalcoholicLiqueurs', 'tasteEnhancers', 'other']`

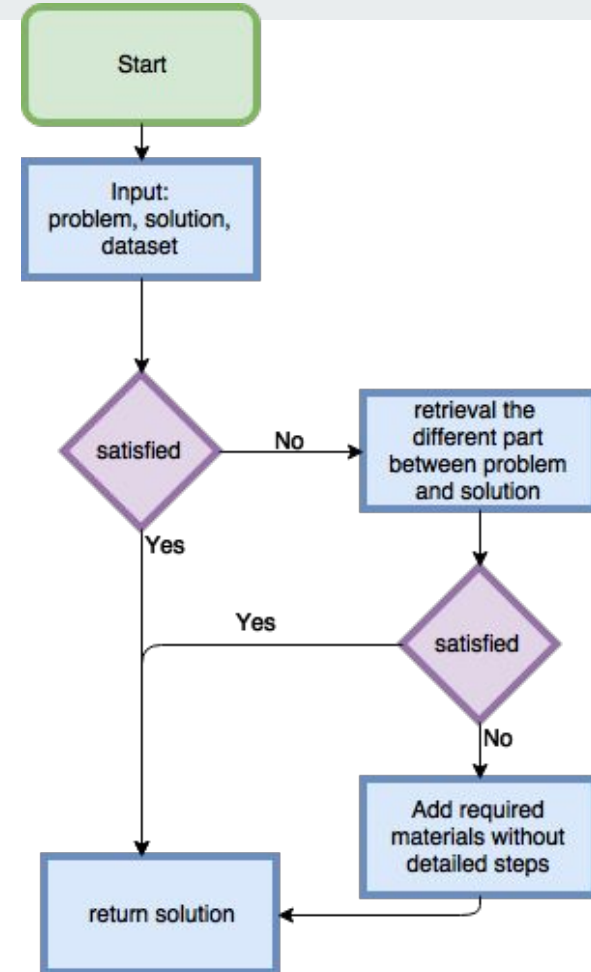
`[2, 1, 5, 5, 2, 1]`

- Support measure

Adaptation

After retrieval

- Compare the current result solution with problem
- Search the different part again
- The component either merge different solution
- Or add ingredients directly without steps





Evaluation

After adapting, solution is presented to the user. We evaluate three criteria:

- Utility of final (adapted) solution
- Utility of adapting
- Proposal for repairing / improvement

Test set with 10 real examples



Learning

Storing new cases:

- Only if evaluation was positive and
- Case does not already exist

Removing cases:

- Based on statistics about frequency of finding a case and its utility



Live Demo

```
1. python3.6
Welcome to our cocktail recommender system!
We will ask you for some of the ingredients you'd like in your drink now.
How strong do you want your cocktail to be?
Options: None, Low, Medium, Strong
> Low
You have chosen: Low
-----
It looks like you would like some alcohol in your drink. Which ones do you like?
The options are:
['white rum', 'rum', 'dark rum', 'malibu rum', 'amber rum', 'kirsch', 'calvados', 'benedictine', 'cognac', 'plum brandy', 'c
remant', 'champagne', 'noilly_prat', 'porto', 'cava', 'vermouth', 'sparkling wine', 'prosecco', 'white wine', 'rice wine', '
red martini', 'vodka', 'white martini', 'martini', 'whiskey', 'pastis spirit', 'dry white wine', 'campari', 'creme de cafe',
'cachaca', 'angostura bitter', 'pisang ambon', 'lemon liqueur', 'triple sec']

Add as many as you want. Type "X" when you're done
> cognac
Added to your list of alcholols. Type "X" when you're done.
> x
You have chosen:
['cognac']
-----
Now, would you like any non-alcoholic liquids?
The options are:
['syrup', 'apple juice', 'banana juice', 'strawberry juice', 'creme de cassis', 'hard cider', 'coconut milk', 'apple cider',
'orgeat syrup', 'lemonade', 'lime juice', 'orange juice', 'pineapple juice', 'blue curacao', 'cointreau', 'grand marnier',
'lichi juice', 'cranberry juice', 'apricot juice', 'grenadine', 'apricot liqueur', 'worcestershine sauce', 'berry juice',
currant syrup', 'tamarin juice', 'mango juice', 'passion fruit syrup', 'passion fruit juice', 'rice milk', 'grapefruit juice
', 'coffee liqueur', 'coffee', 'lemon juice']
```



Conclusion & Outlook

Overall very good results with real users

Used data set to initialize our case base contains many inconsistencies and missing ingredients

Thank you for the attention

PROST !

Salute !

谢谢 !

Наздраве !

