

Automated Food Linkage in FoodCASE

RICHFIELDS WP9 Workshop
Brussels, 8th April 2016

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FoodCASE Data Landscape

Food Compilation Application

Food Composition

Food Name
Apple, fresh
Pear, fresh

Component	Value
Protein	0.3g/100g
Vitamin C	5mg/100g

Food Consumption

Person
Person1
Person2

Food	Amount
Apple, fresh	1 piece
Pear, fresh	1 piece

Total Diet Study

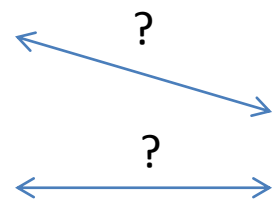
Food Name
Apple, fresh
Pear, fresh

Component	Value
Mercury	0mg/100g
Selenium	0mg/100g

Challenge

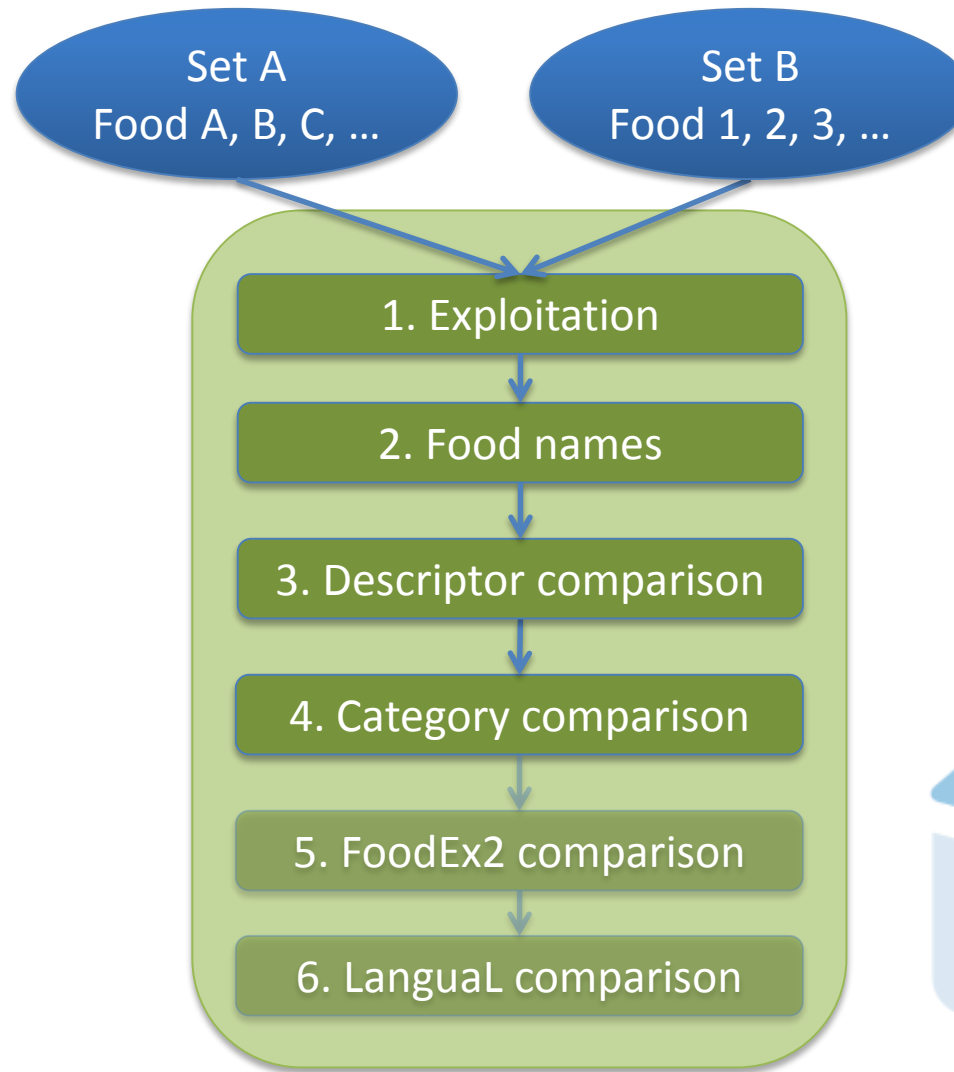


Food Name
Country fries
Cooked potatoes with peel
Potatoe-gnocchi
Potatoes

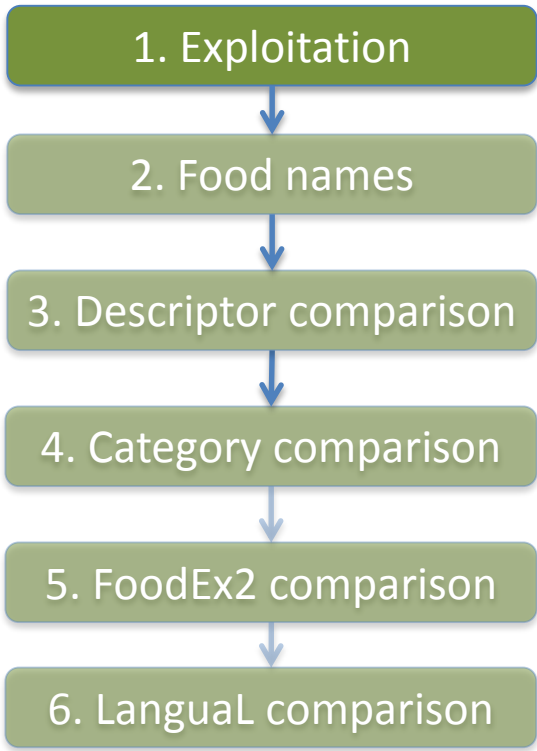


Food Name
Potato chips, paprika (Migros)
Potatoe, peeled, steamed
Potatoe, peeled, cooked
Potato, peeled, raw

Concept Map



Exploitation



Food Composition Version 3

ID	Name
1	Apple, fresh
2	Pear, fresh

Food Consumption Study 2011

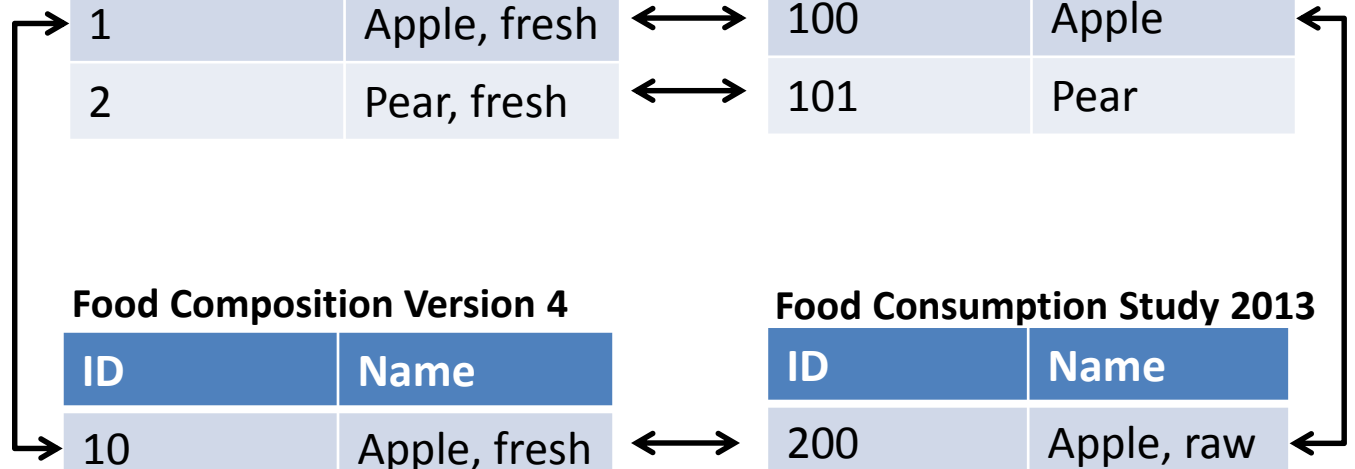
ID	Name
100	Apple
101	Pear

Food Composition Version 4

ID	Name
10	Apple, fresh
11	Pear, fresh

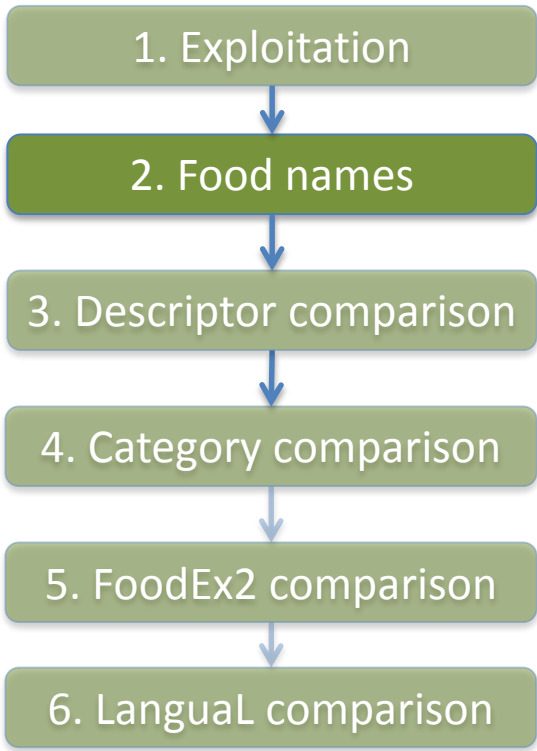
Food Consumption Study 2013

ID	Name
200	Apple, raw
201	Pear, raw



Food Names

Jaccard's approach



Fresh apple

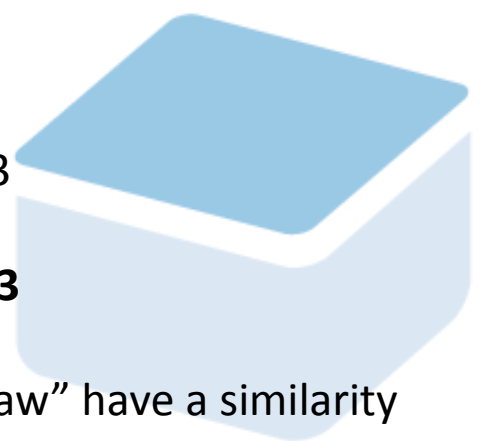
Apple, raw

Fresh apple -> {fre, res, esh, app, ppl, ple}

Apple, raw -> {app, ppl, ple, raw}

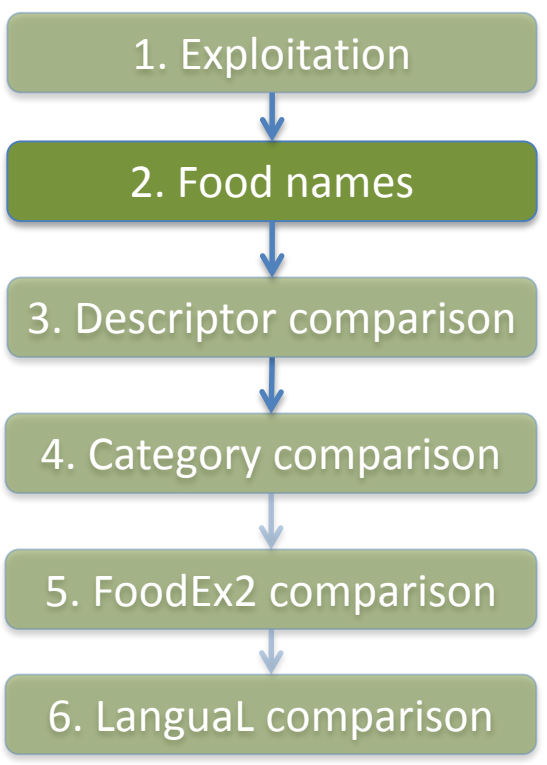
$$J(A, B) = \frac{|A \cap B|}{|A \cup B|}$$

Intersection = 3
Union = 7
Similarity = 0.43

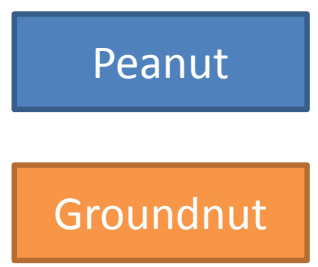


Problem: "Apple pie" and "apple, raw" have a similarity of 0.6

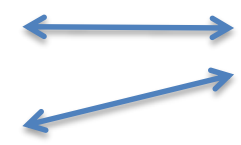
Synonyms Comparison



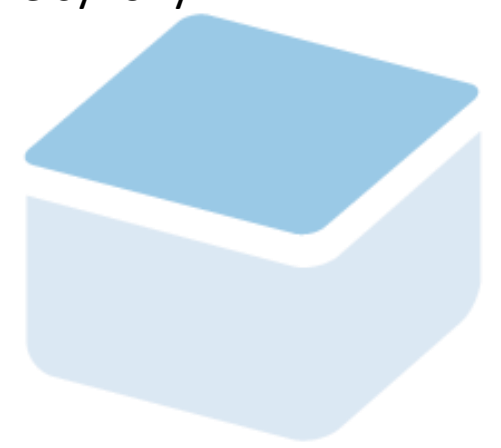
Food consumption



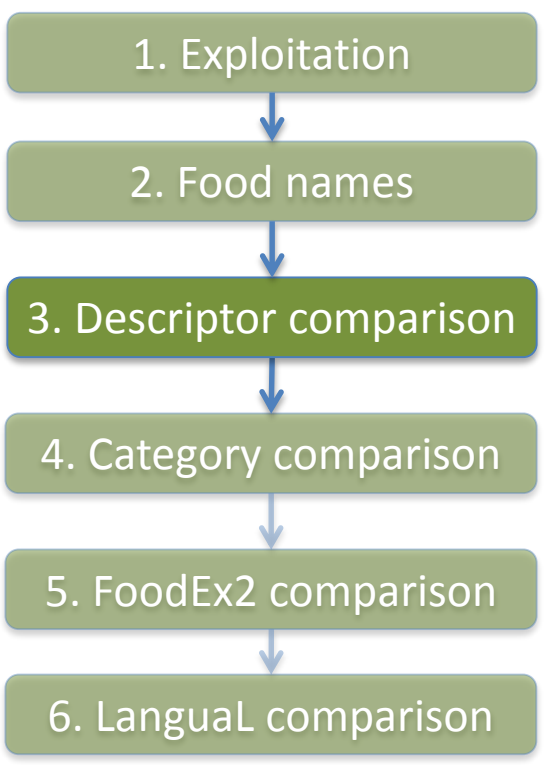
Food composition



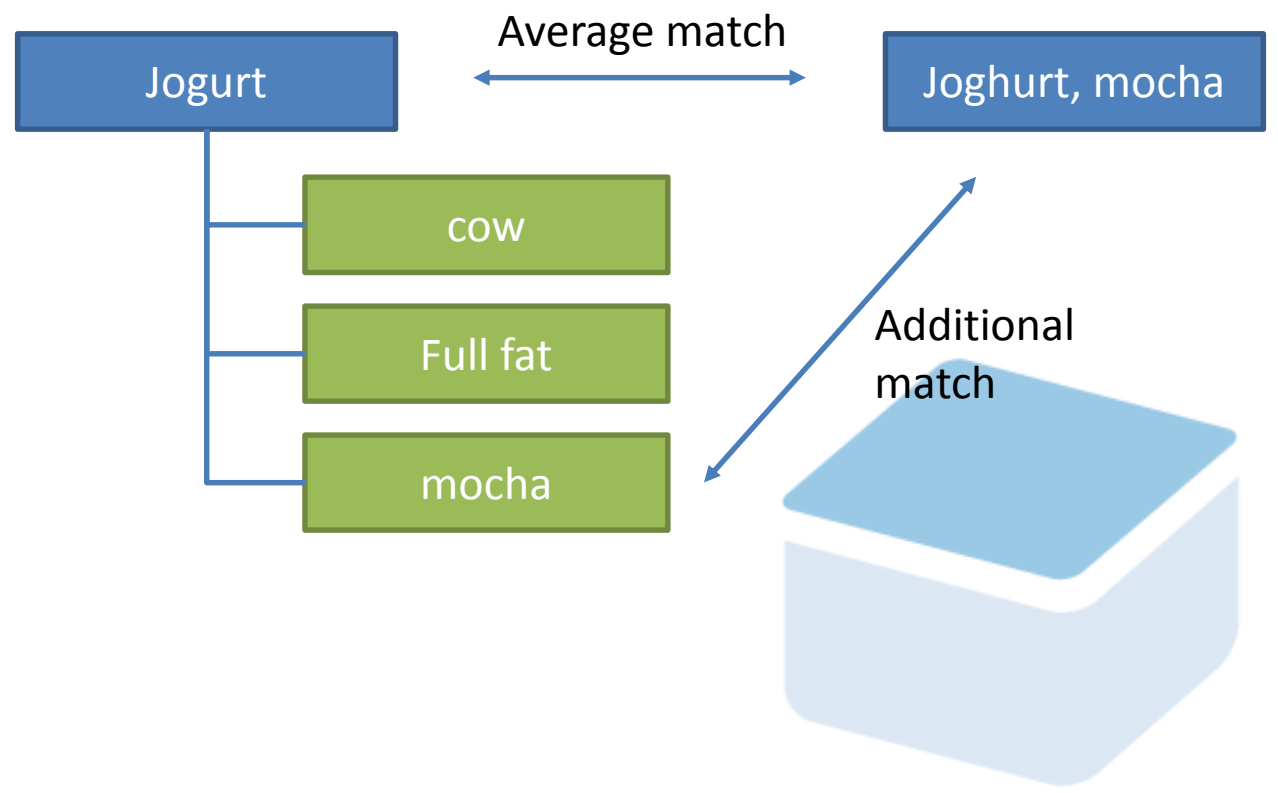
Similarity = 1 because of the synonym



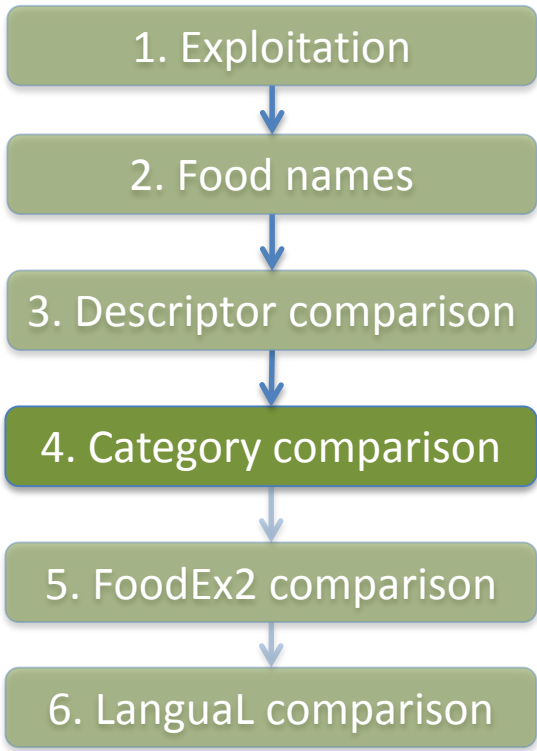
Descriptor Comparison



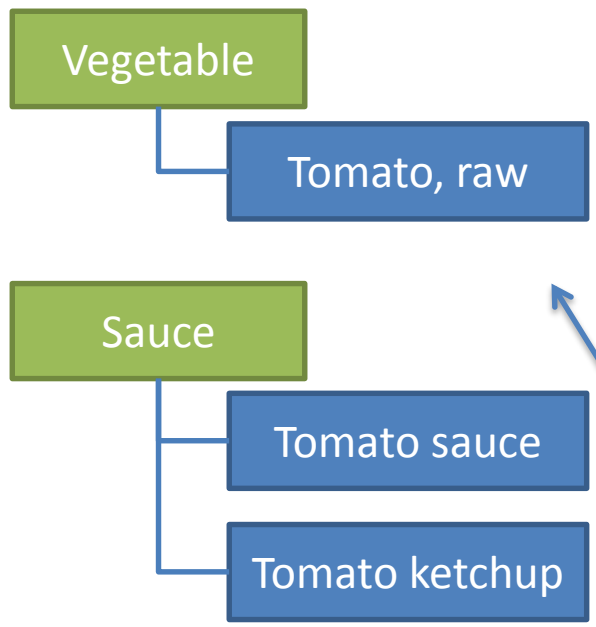
Consumption foods have descriptors, which can be used for matching.



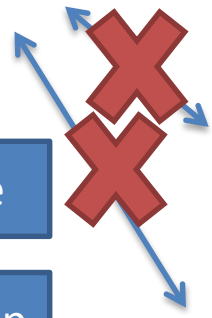
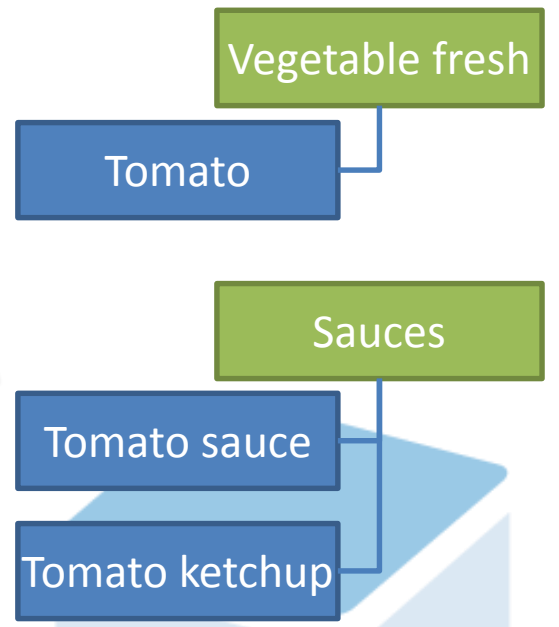
Category comparison



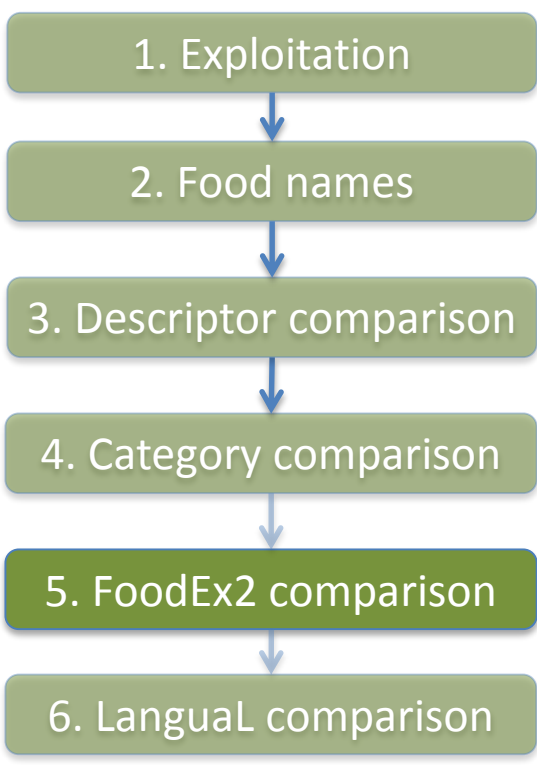
Food consumption



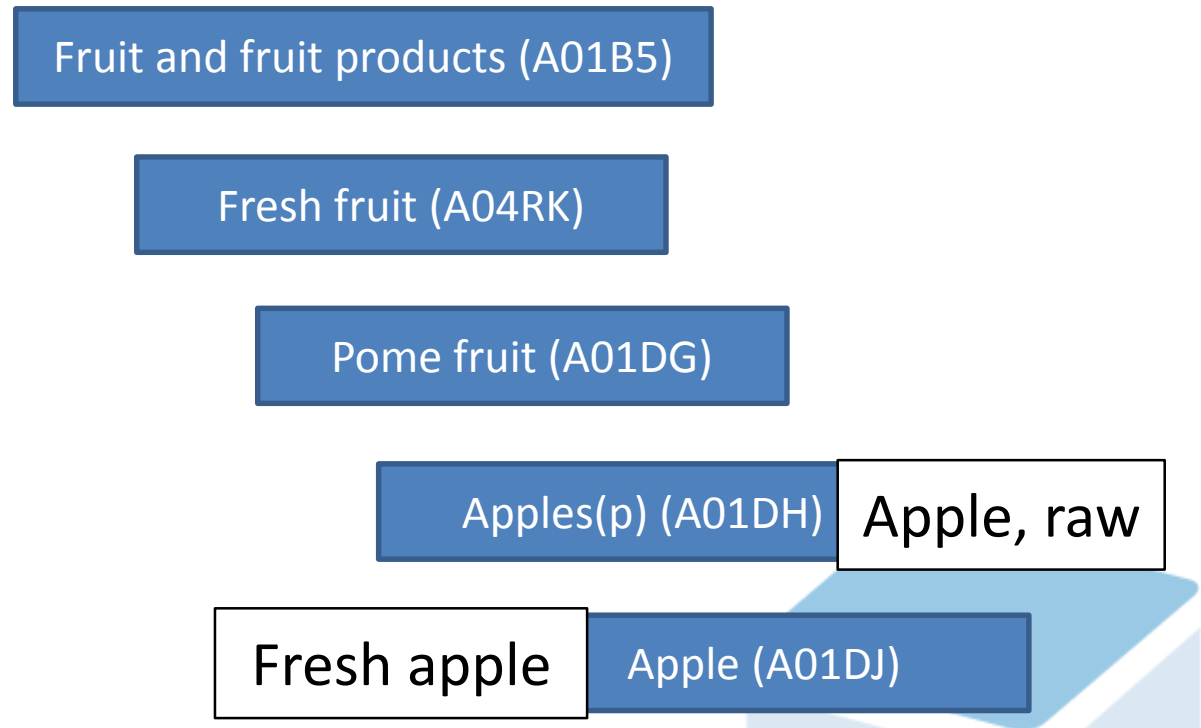
Food composition



FoodEx2 comparison



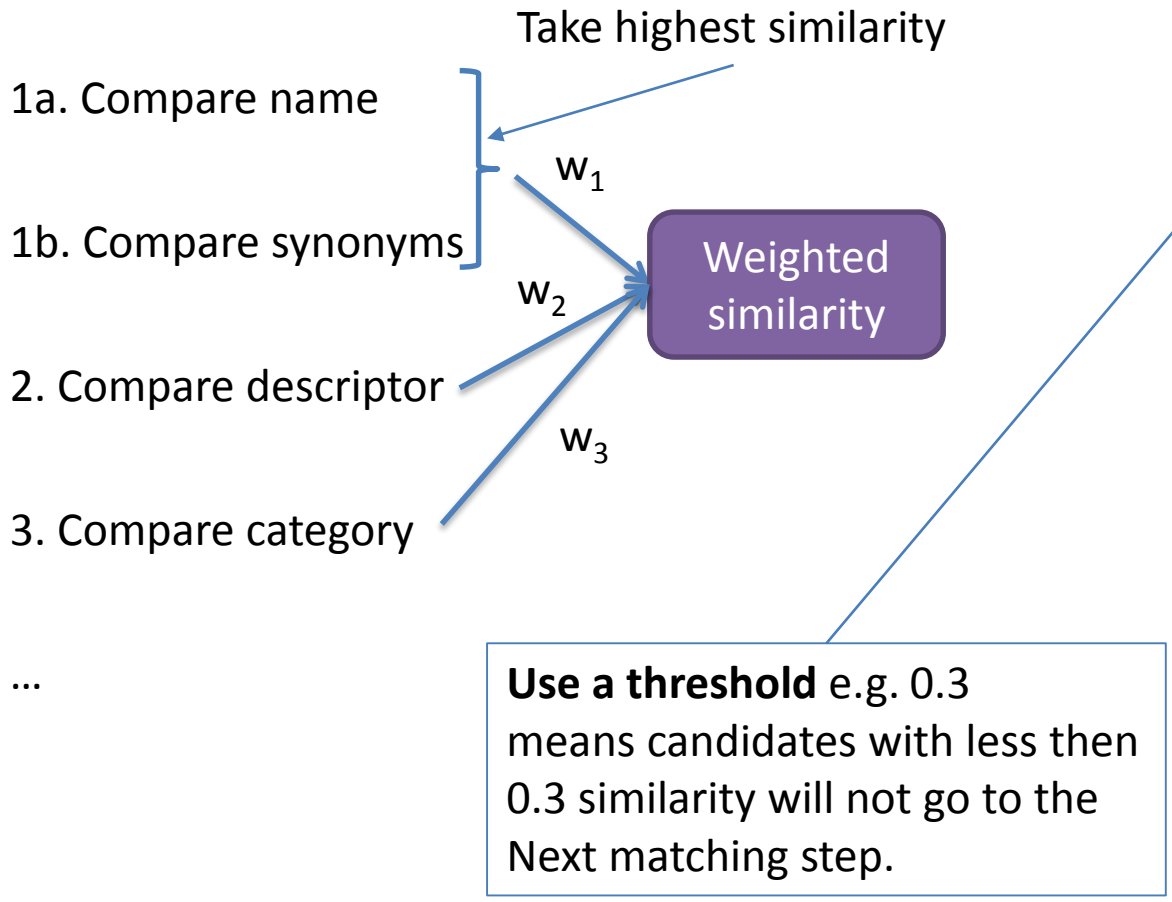
Similarity:



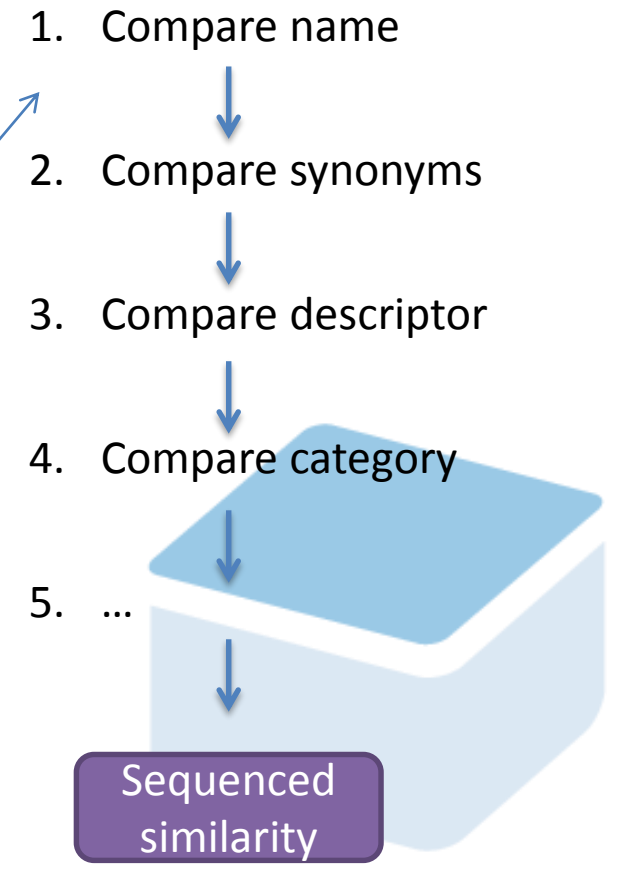
Apple, raw: A01B5-A04RK-A01DG-A01DH
Fresh apple: A01B5-A04RK-A01DG-A01DH-A01DJ
Similarity: 80%

General approach

Weighted approach



Sequence approach



Some Screenshots



Food Matching Results

Food Name	Category*	Matching Food	Confidence	Comment														
Butter, Brat	Butter	Bratbutter (Migros) [Bratbutter (Migros)]																
Butter, Brat: Coop	Butter	Bratbutter (Migros) [Bratbutter (Migros)]																
Butter, Brat: TopCC	Butter	Bratbutter (Migros) [Bratbutter (Migros)]																
Butter, Koch	Butter	Kochbutter [Cooking butter]																
Butter, Kräuter	Butter	Qualité&Prix Kräuterbutter Rolle (Coop) [Qualité&Prix H...]																
Butter, Kräuter	Butter	Naturaplan Bio Kräuterbutter (Coop) [Naturaplan Bio He...]	Medium	Coop gewählt weil k...														
Butter, Kräuter: Coop	Butter	Naturaplan Bio Kräuterbutter (Coop) [Naturaplan Bio He...]	Good															
Butter n.s.	Butter	Kochbutter [Cooking butter]	Low	fehlt Butter durchsc...														
Butter n.s.: fettreduziert/teilentrahmt/li...	Butter	Halbfettbutter [Butter, 40% fat]																
Butter n.s.: fettreduziert/teilentrahmt/li...	Butter	Butter fettreduziert (Migros) [Butter fettreduziert (Migro...]																
Butter n.s.: fettreduziert/teilentrahmt/li...	Butter	Léger Halbfettbutter (Migros) [Léger Halbfettbutter (Mig...]																
Butter n.s.: halbfett, Migros: Léger	Butter	Léger Halbfettbutter (Migros) [Léger Halbfettbutter (Mig...]																
Butter n.s.: vollfett/normal	Butter	Kochbutter [Cooking butter]																
Butter n.s.: vollfett/normal, Coop	Butter	Kochbutter [Cooking butter]																
Butter n.s.: vollfett/normal, Die Butter	Butter	Kochbutter [Cooking butter]																
Butter n.s.: vollfett/normal, Migros	Butter																	
Butter n.s.: vollfett/normal, Molkerei	Butter																	
Butter, Vorzugs	Butter	Vorzugsbutter [Butter of choice]																
Butter, Vorzugs: alpe dal contadino	Butter	Vorzugsbutter [Butter of choice]																
Butter, Vorzugs: artigianale dell'alpe	Butter																	
Butter, Vorzugs: aus der Gegend	Butter	--None--																
Butter, Vorzugs: Campinglädeli	Butter	--None--																
Butter, Vorzugs: Coop	Butter	Vorzugsbutter [Butter of choice] : 1.75																
Butter, Vorzugs: Coop: freefrom	Butter	Vorzugsbutter_X [Butter] : 1.6346154																
Butter, Vorzugs: Coop: Qualité & Prix	Butter	Heidi Vorzugsbutter (Migros) [Heidi Vorzugsbutter (Migr...]																
		Valflora Vorzugsbutter (Migros) [Valflora Vorzugsbutter																
		Kochbutter [Cooking butter] : 1.2307693																
		Bratbutter [Butter, clarified] : 1.2307693																
		Bratbutter_X [Bratbutter_X] : 1.2																

Save Refresh

< Back Save & Close Close

< Back Next > Close

How good is the approach?



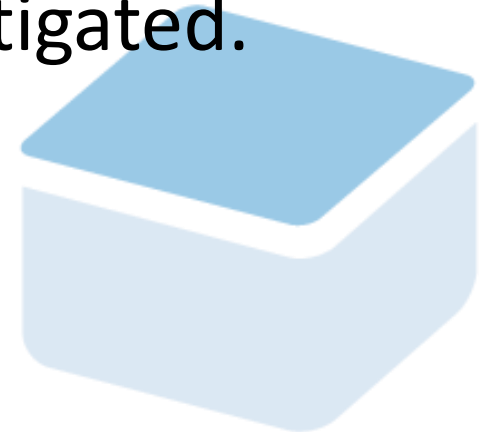
Test Approach

- Consumption foods \leftrightarrow composition foods, including name, synonyms, descriptors and categories
- Food consumption: 4917 foods (pilot study)
- Food composition: 11'067 foods (V5.1)
- Method: Weighted matching
- Weight: 1.0 for all
- Similarity threshold: 0.1



Test Approach

- 5 food categories were chosen: leafy vegetables, fruits, butter, Yoghurt and soft drinks
- From each category 8-10 foods were randomly selected.
- List of candidate foods were investigated.



Test Results

	Best food match is ...			
Category	top candidate	under first 5 candidates	not within first 5 candidates	Average similarity
Leafy vegetables	90%	10%	0%	1.60
Fruits	70%	0%	30%	1.48
Butter	50%	12.5%	37.5%	1.71
Yoghurt	22%	44%	33%	1.44
Soft drinks	87.5%	0%	12.5%	1.51
Average	65%	13%	22%	1.54

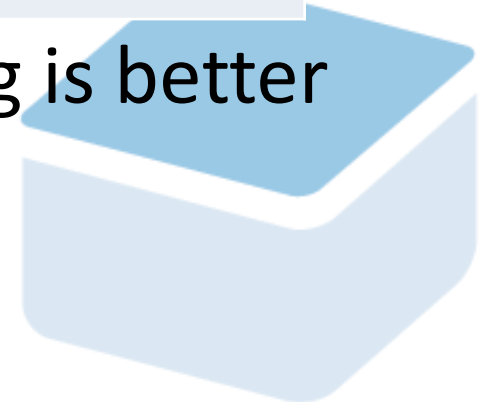


Comments

- Name, weights and thresholds must be adjusted for some categories, e.g. for yoghurt, use name instead of generic name gives

Category	top candidate	under first 5 candidates	not within first 5 candidates
Yoghurt before	22%	44%	33%
Yoghurt after	55%	33%	11%

- Using German names for matching is better than English names.



Thank you for your attention



Other approaches

- NL: about 50% (problems are new food products)
- ESP: about 80% (without giving details, it's a secret)
- PT: Almost 100% (smaller food set -> work with a dictionary is possible)



Select Food Category

FC Food Matching Wizard _ □ ×

Food Matching Wizard

Select categories for which you want to have matching proposals. Click on Next to start food matching calculations.

Existing Categories

- Alkoholfreie Getränke (Matched foods: 0 of 426)
- Alkoholische Getränke (Matched foods: 0 of 76)
- Cakes, Kuchen, Torten, süsse Wähen, Patisserie und Feingebäck
- Diverse Lebensmittel (Matched foods: 0 of 17)
- Eier und Eiprodukte (Matched foods: 0 of 45)
- Fette und Öle (Matched foods: 17 of 84)
 - Andere tierische Fette (inkl. Fischöle) (Matched foods: 0 of 17)
 - Butter (Matched foods: 17 of 34)
 - Margarinen und Kochfette (Matched foods: 0 of 23)
 - Nicht spezifizierte sowie gemischte Fette und Öle (Matched foods: 0 of 44)
 - Pflanzliche Öle (Matched foods: 0 of 12)
- Fische, Meeresfrüchte, Amphibien und Reptilien (Matched foods: 0 of 17)
- Fleisch, Fleischprodukte und Fleischersatz (Matched foods: 0 of 17)
- Früchte, Nüsse und Samen (Matched foods: 0 of 514)
- Gemüse (Matched foods: 5 of 706)
- Getreide, Getreideprodukte und Körner (Matched foods: 28 of 61)
- Hülsenfrüchte (getrocknet) (Matched foods: 16 of 17)
- Kartoffeln und andere stärkehaltige Wurzelknollen (Matched foods: 0 of 17)
- Milch, Milchprodukte und Milchersatzprodukte (Matched foods: 0 of 17)
- Rezepte (Matched foods: 0 of 173)
- Salzige Snacks (Matched foods: 1 of 59)
- Suppen und Bouillons (Matched foods: 19 of 61)
- Würzmittel, Gewürze, Hefen, Kräuter und Saucen (Matched foods: 0 of 17)
- Zucker, Schokolade und Süswaren (Matched foods: 0 of 360)

➔

➔

Selected Categories

- Fette und Öle
 - Butter

< Back
Next >
Close

Matching

FC Food Matching Wizard
_ □ ×

Food Matching Results

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Butter, Brat	Butter	Bratbutter (Migros) [Bratbutter (Migros)]		
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Butter, Brat: TopCC	Butter	Bratbutter (Migros) [Bratbutter (Migros)]		
Butter, Koch	Butter	Kochbutter [Cooking butter]		
Butter, Kräuter	Butter	Qualité&Prix Kräuterbutter Rolle (Coop) [Qualité&Prix H...]		
Butter, Kräuter	Butter	Naturaplan Bio Kräuterbutter (Coop) [Naturaplan Bio He...]	Medium	Coop gewählt weil k...
Butter, Kräuter: Coop	Butter	Naturaplan Bio Kräuterbutter (Coop) [Naturaplan Bio He...]	Good	
Butter n.s.	Butter	Kochbutter [Cooking butter]	Low	fehlt Butter durchsc...
Butter n.s.: fettreduziert/teilentrahmt/li...	Butter	Halbfettbutter [Butter, 40% fat]		
Butter n.s.: fettreduziert/teilentrahmt/li...	Butter	Butter fettreduziert (Migros) [Butter fettreduziert (Migro...]		
Butter n.s.: fettreduziert/teilentrahmt/li...	Butter	Léger Halbfettbutter (Migros) [Léger Halbfettbutter (Mig...]		
Butter n.s.: halbfett, Migros: Léger	Butter	Léger Halbfettbutter (Migros) [Léger Halbfettbutter (Mig...]		
Butter n.s.: vollfett/normal	Butter	Kochbutter [Cooking butter]		
Butter n.s.: vollfett/normal, Coop	Butter	Kochbutter [Cooking butter]		
Butter n.s.: vollfett/normal, Die Butter	Butter	Kochbutter [Cooking butter]		
Butter n.s.: vollfett/normal, Migros	Butter			
Butter n.s.: vollfett/normal, Molkerei	Butter			
Butter, Vorzugs	Butter	Vorzugsbutter [Butter of choice]		
Butter, Vorzugs: alpe dal contadino	Butter	Vorzugsbutter [Butter of choice]		
Butter, Vorzugs: artigianale dell'alpe	Butter			
Butter, Vorzugs: aus der Gegend	Butter	None		
Butter, Vorzugs: Campinglädeli	Butter	--None--		
Butter, Vorzugs: Coop	Butter	Vorzugsbutter [Butter of choice] : 1.75		
Butter, Vorzugs: Coop: freefrom	Butter	Vorzugsbutter_X [Butter] : 1.6346154		
Butter, Vorzugs: Coop: Qualité & Prix	Butter	Heidi Vorzugsbutter (Migros) [Heidi Vorzugsbutter (Migros)] Valflora Vorzugsbutter (Migros) [Valflora Vorzugsbutter (Migros)] Kochbutter [Cooking butter] : 1.2307693 Bratbutter [Butter, clarified] : 1.2307693 Bratbutter_X [Bratbutter_X] : 1.2		