Korean Food Ontology

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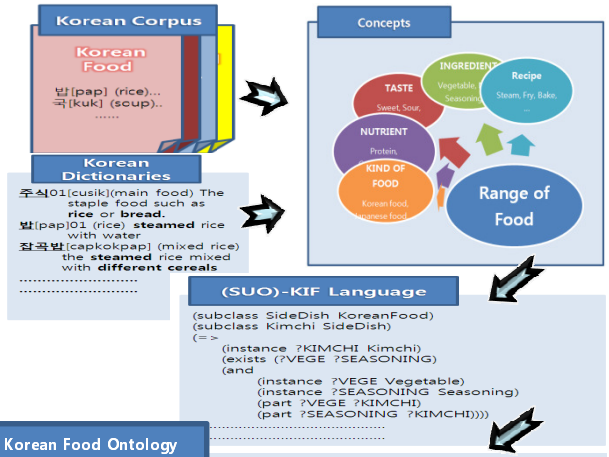
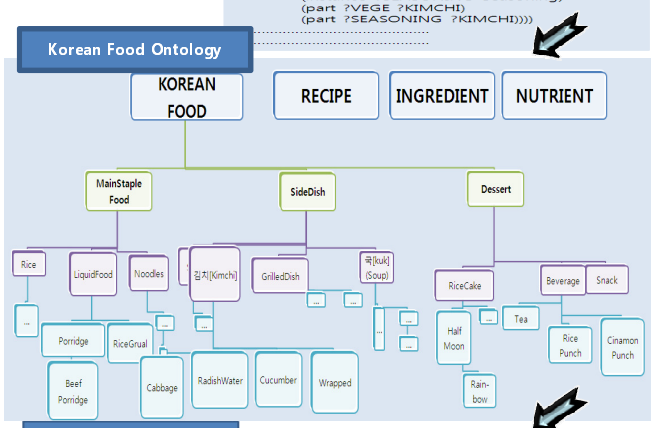
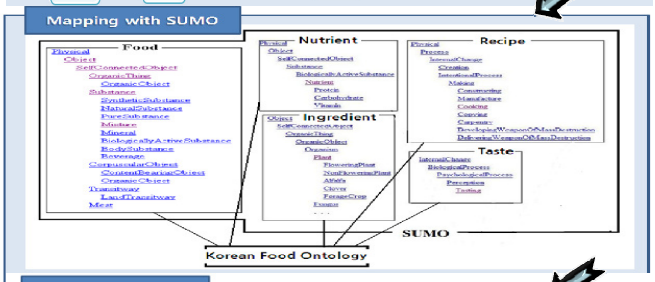
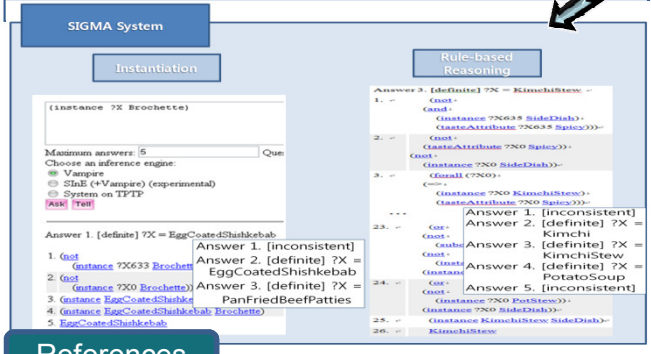
Introduction

- The need for ontologies has increased in computer science or information science recently.
- **Food** is one of the **important factors** to understand the country. Because it is closely related to the **culture** and the **lifestyle**.
- There are various kinds of information about the Korean food such as **name, recipe, ingredients, stuff**, etc. But, These are not used systematically.
- This paper describes the **Korean Food Ontology** I designed for **sharing** and **reconciliation** of Knowledge.
- Especially, this is focused on the **construction method** of the Ontology and the **inference** performed on it.









Procedure

Step 1. Collect the nouns related to the food from the Korean cookbooks and dictionaries
Step 2. Extract the relevant information from the definitions of the dictionaries
Step 3. Classify the Korean food terms to the concepts:
- Top-down development process
- names, recipes, nutrients, food stuffs, tastes

Step 4. Express the information by using (SUO-)KIF language
- Define the classes and the class hierarchy, properties, facets, individuals

Step 5. Connect to the top-level ontology SUMO
Step 6. Perform the Reasoning within the SIGMA system

Components of Ontology

A. CONCEPT
- 5 types of upper classes in Korean Food (food names, nutrients, ingredients,...)
- Hierarchical structure (subclasses)

ex) (subclass CookedFood (**FoodForFn** Human))
(subclass CookedFood Object)
(subclass **MainStapleFood** CookedFood)
(subclass **SideDish** CookedFood)
(subclass **Dessert** CookedFood)

B. PROPERTY
- Tastes of food, form(solid/liquid), calories, ...

ex) (subclass Beverage Dessert)
(=>
(instance ?BEVERAGE Beverage)
(**attribute** ?BEVERAGE **Liquid**))

ex) (subclass RedPepper Seasoning)
(=>
(instance ?REDPP RedPepper)
(**tasteAttribute** ?REDPP **Spicy**))

C. INSTANCE
- Individuals Korean foods are contained
- More than 100 types

ex) (subclass SteamedDishes SideDish)
(instance SeasonedAndSimmeredChicken SteamedDishes)
(instance BraisedPareripsSteamedDishes)

- Translation English terms into Korean 'termformat'

ex) (termFormat SteamedDishes KoreanLanguage "Ccim")
(termFormat SeasonedAndSimmeredChicken KoreanLanguage "Talkccim")

D. RELATION
- Child-parents relations(is-a/kind-of)
- Part-whole relations(part of)
- Equal relations
- Cause and effect relations(result)
- Active and passive relations(resource/patient)

ex) (subclass Kimchi SideDish)
(=>
(instance ?KIMCHI Kimchi)
(exists (?VEGE ?SEASONING)
(and
(instance ?VEGE Vegetable)
(instance ?SEASONING Seasoning)
(**part** ?VEGE ?KIMCHI)
(**part** ?SEASONING ?KIMCHI))))

Methods of Inference

A. SIGMA system
- Automated theorem prover
- Consistency check, instantiation, realization, retrieval

B. Reasoning for Korean Food Ontology
- Subsumption

ex) Assertion: What is a subclass of CookedFood?
Query: (subclass ?X CookedFood)

- Instantiation

ex) Assertion: what is a instance of Brochette?
Query: (instance ?X Brochette)

- Rule-based Reasoning with axioms

ex) Assertion: what is a spicy sidedish?
Query: (and (instance ?X SideDish)
(tasteAttribute ?X Spicy))

References

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