NIBIOHN 国立研究開発法人 医薬基盤・健康・栄養研究所 National Institutes of Biomedical Innovation, Health and Nutrition

NBDC National Bioscience Database Center

Japanese Food Ontology

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Motivation

Nutrition is a very important for health. Scientific research is trying to answer many questions such as:

- Is the nutrition adequate (quantity and quality) ?
- What is the impact of population nutritional trend and habits on their health?
- What are the individual differences related to food that can affect a person's health, such as allergy.

- Well designed Nutritional research requires unified terminology and adequate food description to make reliable and comparable results.
  - Food is affected by culture, geographic area and available resources. Hence, it is difficult to unify the terminology.
  - No appropriate ontology for food common in Japanese culture.
  - There are multiple resources produced for specific purposes (not complete and not unified).
  - This data is not easily accessible as they are not well organized and not machine readable
- In this work we are aiming to produce a unified food ontology the solve these issues and cover Japanese food culture and habits.

Food groups Used for the National Health and Nutrition Survey (FGNHNS)

- National Health and Nutrition Survey (NHNS)
  - Purpose: to assess nutritional intake and style to facilitate health promotion
  - Participants: 3412 households in 300 districts.
  - Data collected: physical measurements as well as blood tests.
  - Food was categorized, the amount of intake was assessed.
- FGNHNS
  - Hierarchical classification of foods into three levels of large, medium, and small for 1630 of Japanese foods
  - Large group
    - 17 categories: Cereals, Pulses, Vegetables, Fruits, Algae, Meats, Milks etc.
  - Medium group
    - 33 categories: Rice and Rice products, Wheat flour and Wheat products etc.
  - Small group
    - 98 categories: Rice, Rice products, Wheat flour, Breads (except Japanese buns) etc.

Why we choose FGNHNS?

- It has a hierarchical structure of large group, medium group, and small group.
- Food names conform to the Japanese Standard Commodity Classification by the Ministry of Internal Affairs and Communications.
- But there are some Issue.
  - We have to consider the vocabulary variation in Japanese language.
    - Ex) Donut is ドーナッツ but ドーナツ are more widespread than it.
      - If the average person does a normal search, there are no hits.
      - Synonym is required.

What have we done

- We converted the FGNHNS classification to a proper ontology.
- Included the three hierarchy levels to facilitate using it in research.
- Add labels in Japanese as well as English languages.
- Use the required labels and URI schema to produce RDF structure.

FGNHNS alpha version was published on BioPortal

Large classification

rdfs:label
“Cerials”@en ,
“穀類”@ja .

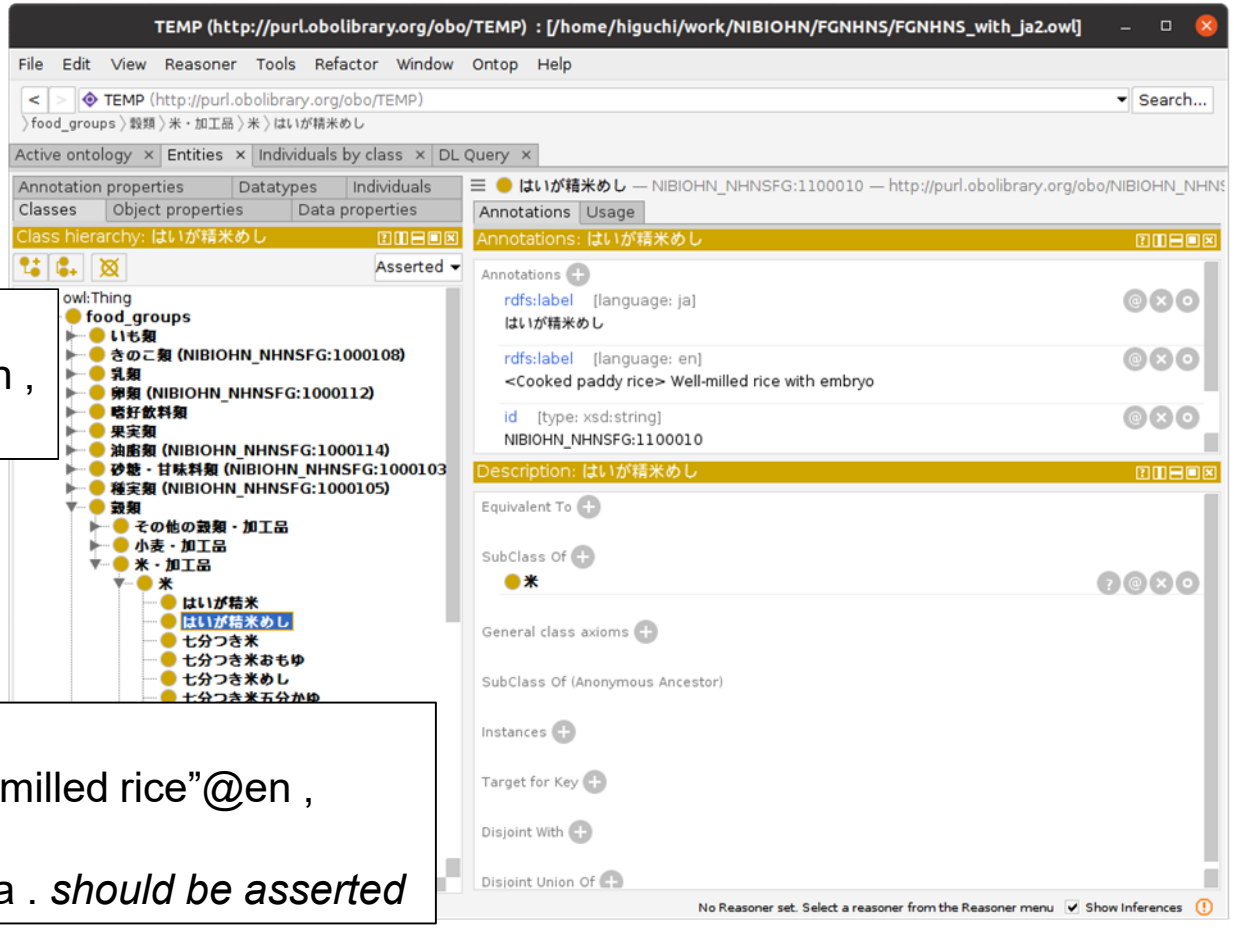
Medium classification

rdfs:label
“Rice and rice products”@en ,
“米・加工品”@ja .

Small classification

rdfs:label
“Rice”@en ,
“米”@ja .

rdfs:label
“<Cooked paddy rice> Well-milled rice”@en ,
“精白米めし”@ja .
fgnhns:synonym “ごはん”@ja . *should be asserted*



Future plan

- Continue improving of FGNHNS ontology
  - OWL description improvement
  - Elimination of term notation fluctuation
  - Treatment of suitable term not in food groups
    - Ask nutritionist for feed back and satisfy their needs.
- Collaborate and Integrate our work with Foodon
  - Enrich the content of Japanese food in Foodon
- Extend the produced ontology by including other Japanese food information

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