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Food Computing with Multi-Media Processing

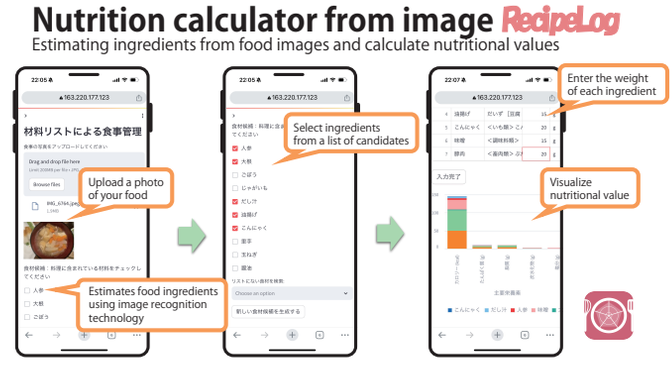
Food is life. Everyone has to eat. Indeed, if you live to be 80, you will have consumed food more than 87,000 times. Our laboratory is tackling a variety of food related issues through image and video processing, natural language processing, spoken dialogue and chat communication systems, information retrieval, and machine learning. Students in our laboratory share space and resources with the Yamasaki and Matsui Lab.

Food Recording App: FoodLog Athl

To understand the nutrients we consume, the first step is to record what we eat. However, keeping track of every meal and snack should be challenging. We are developing a food logging app based on deep image recognition technology called **FoodLog Athl**. When you upload an image of your meal, the app detects the area of each food and recognizes the dish name, allowing it to estimate the nutritional value of that meal. The users who have access to a dietitian's support can share their food records with the dietitians and communicate via chat.

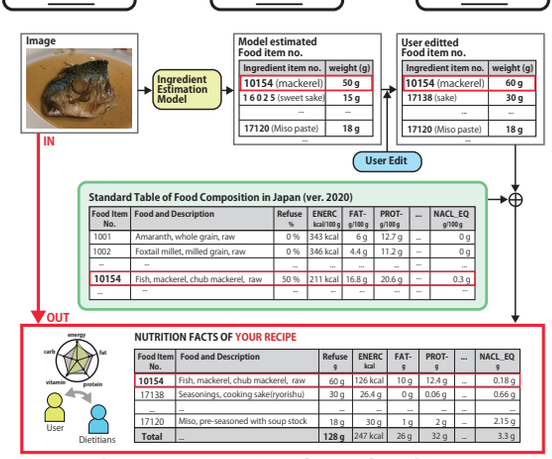
Nutrition calculator from image: RecipeLog

For example, even the same dish, "nikujaga," can have significantly different nutritional values depending on the recipe. We are developing a meal nutrition calculation app, **RecipeLog**, that estimates the types and quantities of ingredients from meal images, allowing for detailed nutritional calculations. The app features functionalities enabling users to assess their meals by visualizing how the nutritional values calculated from their created ingredient list fulfill their daily recommended intake.



Ingredient estimation from food image

Ingredients like salt, oil, and sugar, despite being visually indistinct, greatly impact nutritional values. However, human dietitians can estimate the ingredients and their quantities of a dish just by its type and appearance and make nutritional calculations accordingly. We are developing a technology that accurately estimates even visually indistinct ingredients by adopting a multi-task classification model that simultaneously identifies the type of dish and its ingredient list, following the methods used by dietitians.



Procedural Structure Analysis on Recipe

The Web contains countless recipes, but more is not always better. Searching "spaghetti carbonara" gives several thousand recipes, but choosing the best requires deep understanding of language. A recipe is a text representation of a procedural workflow, and we can analyse its characteristic semantic structure using natural language processing. We have implemented a system for translating recipe text into a flowgraph (Fig. 1) and finding differences between two recipes by node-to-node mapping (Fig. 2). Our system can process both Japanese and English recipes.

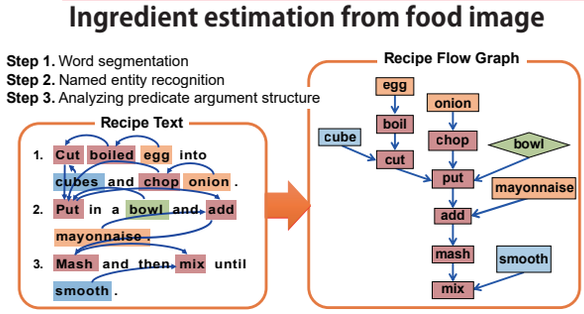


Fig. 1) Recipe structure analysis (English recipe is also available!)

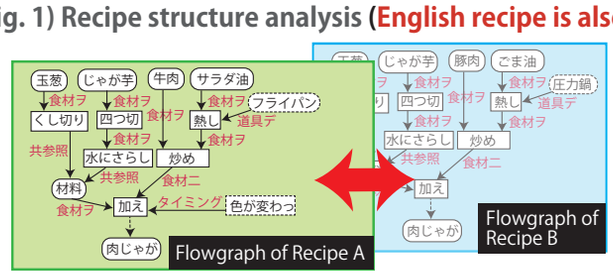


Fig. 2) Find differences between two recipes by node-to-node mapping

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