Food IT 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. We collaborate with the Aizawa Lab, and students in our laboratory share space and resources with the Aizawa-Yamasaki Lab.

Multimedia Processing for Recognizing Human Creative Activity and its Results

Recent advances in machine learning have made object recognition much more accurate. Most approaches assume that objects with the same label have common characteristics (for example “apple: red and spherical”). But during cooking, objects change appearance and even physical composition, ending up as an object of another label. We are devising a new approach for computer understanding of object change caused by human creative activity.

Support for Creative Activity at Home: Smart Kitchen and Cooking Navigation System

Cooking is a "creative activity" since it creates new objects from ingredients. Ordinary people tackle a new cuisine just by reading “recipes” (which are a kind of procedural document). Kitchens and their appliances are an active field of IoT, inspiring Smart Kitchen research into “cooking navigation system”, “food storage management”, and “robotic kitchen". Our Smart Kitchen research focuses on "food and action recognition in cooking by video observation" and "spoken dialogue system to recognize the current cooking situation via conversation and to support it by speech".

Recipe Search and Recommendation Based on Procedural Structure Analysis

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.

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