Image and Multimedia Processing

Image and multimedia technology is expanding to human centric computing. Specific issues and technical problems are diverse. The below are brief description of our current research topics. We operate jointly with Yamasaki, Yamaakita and Matsui laboratories. The entire members of the groups are 12 PhD students; 27 master students, and 12 undergraduate students. Questions are welcome. Send them to aizawa@hal.t.u-tokyo.ac.jp. Our Web page https://www.hal.t.u-tokyo.ac.jp

1. Fundamentals of Recognition and Learning
Deep Learning accurately works for closed dataset containing large number of data per class. However, in reality, unknown classes and new classes with small amount of data frequently appear. We are investigating identification and recognition techniques for such open world situation. We are investigating effective methodology for noisy training data, out-of-distribution detection, positive-unlabeled learning, open-set data learning, uncertainty estimation etc.

2. 360° Image Processing-3D, Movie Map
We are investigating 360° image processing. Specifically, we build “movie map” for walkers to explore in a city. Using 360° street videos, we work on many different research issues such as hyperlaspe 360°video, 360°image object detection, accurate SLAM, intersection detection, RoI detection, real-time route view generation based on user input, building database of automatically segmented video sections etc. We prototyped our first version MovieMap by which we can freely explore in a certain area in a city.

We have been pioneering life logging technology. Starting from generic purpose lifelogging, we now pursue specific purpose lifelogging. We focus on research on capture and analysis of our daily food logs (FoodLog), Using the app we developed, food records we captured exceeds 10 million. We are investigating various processing of FoodLog data, such as personalized food recognition, recipe and food record multimodal analysis, building a new tool for athletes and dietitians, prediction of healthy index, etc.

4. Manga & Comic Computing
Manga, our unique culture, is our research target, which has rarely been discussed in the field of image processing. We have built a world largest scale Manga dataset, and investigate image processing techniques such as retrieval, segmentation, recognition, colorization etc.

5. Design, Font
We investigate image technology for creation, retrieval of designs of fonts, products etc. We built Emotype - a mobile messenger expressing our emotions via different typo-graphics, social font search by multimodal inputs, font search across various languages, font generation using a small number of samples, design of bags etc.

6. Learned Image Compression
We are investigating new image compression techniques using deep learning. Although image compression is a long traditional area of signal processing, a lots of research issues exist. Learned compression makes ultra low rate coding possible.