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 Yamazaki, Yanakata and Matsui laboratories. The entire members of the groups are 14 PhD students; 29 master students, and 13 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. The topics are methodology for noisy training data, out-of-distribution detection, positive-unlabeled learning, open-set data learning, new category discovery, 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 hyperlapse 360video, 360image object detection, accurate vSLAM, intersection detection, depth from 360 image, RoI detection, route view generation, building database of automatically segmented video sections etc. We prototyped and update our MovieMap by which we can freely explore in a certain area in a city.

We have been pioneering life logging technology. To 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. We have built a world largest scale Manga dataset, and investigate fundamentals of image processing techniques such as retrieval, segmentation, recognition, colorization, creator style transfer, etc. We are also investigating persons’ reading behaviors.

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 typography, 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 investigate 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.