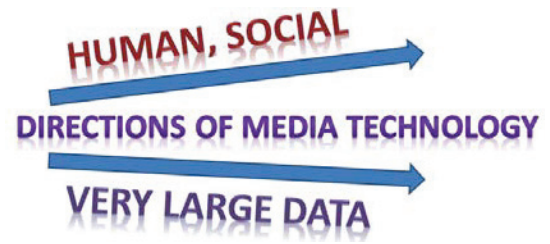


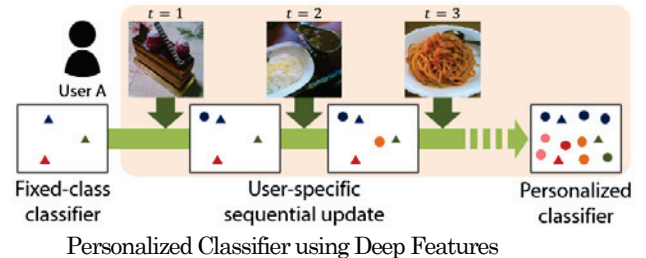
Image and Multimedia Processing

Image and multimedia technology is expanding into two directions: one is big data processing and the other is human centric computing. Specific issues and technical problems are diverse. The below are brief description of our current research issues. We often form joint projects with other groups in the University or groups in industries. The members of our laboratory are two Research Associates; 8 PhD students; 18 masters, and 8 undergraduate students. Questions are welcome. Send them to aizawa@hal.t.u-tokyo.ac.jp. Our Web page is located at <http://www.hal.t.u-tokyo.ac.jp>



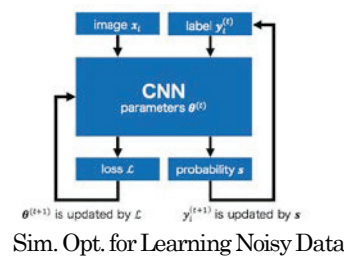
1. Fundamentals: Recognition, Optimization

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 feature representation, sequential learning framework, detection of unknowns. We are investigating learning methodology for noisy data and propose simultaneous optimization of network parameters and label assignment. We also developed very efficient method for non-convex least square optimization.



2. Multimedia Life Log Technology: FoodLog

We have been pioneering life logging technology. Processing of enormous amount of data, aggregation and association of complex lifelog data, intuitive data visualization etc. are technical problems. Starting from generic purpose lifelogging, we pursue specific purpose lifelogging. We focus on research on capture and analysis of our daily food logs (FoodLog). Using the smartphone app we developed, food records exceeded 5 million. Analysis of various aspect of FoodLog data, such as automatic image recognition, personal tendency analysis etc. Diverse applications such as precision medicine and athlete application etc.



Omni Directional Video



Food Detection and Recognition

3. 3D, Omnidirectional Video Processing for Street Videos

We have been investigating technology to capture real world. Real world capture can be a data source for VR. We are working on three dimensional reconstruction (SLAM) from street videos - estimation of the absolute coordinates of the camera's position and orientation and reconstruction of the three-dimension only from video and sparse geotags. We also investigating hyper-lapse video generation of 360 degree omni-directional video of street. We target at structuring vast amount of street videos.



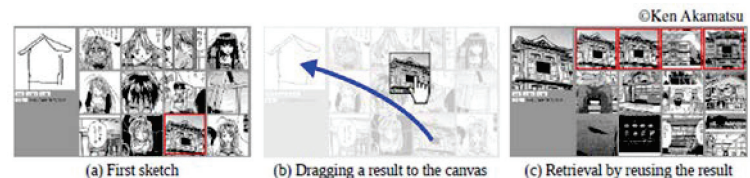
Hyperlapse Video



Accurate SLAM

4. Manga & Comic Processing

Manga, our unique culture, is our research target, which has rarely been discussed in the field of image processing. They are binary monochrome images, and image processing methods developed for natural images do not work well for them. We are investigating image processing techniques such as retrieval, retargeting, segmentation, recognition, colorization etc. We have built the largest dataset of Manga available for academic use.



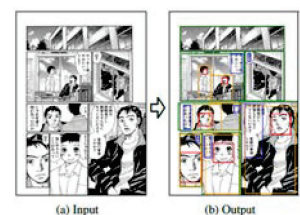
Sketch based Retrieval of Manga

5. Applied Perception

We are investigating image representation, design, aesthetics, analysis of human gaze etc. which benefit functions of human interface. For example, we are building a mobile messenger in which we can express our emotions via different typo-graphics. We investigate human visual attention and differences among different age groups ranging from infants to adults.



Manga109 Dataset



Manga Object Detection