We conduct research activities spanning from machine learning to human-computer interaction with computer vision as the core, from research on image recognition methods to system design and user evaluations for application systems. Machine learning technology has developed rapidly in recent years and attracted a great deal of attention from various fields. However, it is usually not sufficient to improve algorithms alone. It is essential to design and evaluate intelligent systems that adaptively incorporate the demands of target users. We are engaged in research on intelligent systems from a holistic perspective that includes algorithms and user interaction. We welcome students with curiosity to broaden their knowledge and interests in various research fields and who can enjoy tackling new research challenges.

Human-in-the-loop Computer Vision and Machine Learning

When using image recognition and machine learning-based systems in everyday life, pre-trained models alone are often insufficient to meet user requirements. Therefore, it is crucial to design the interaction between the user and the machine learning model, such as a mechanism to naturally acquire training data to adapt to the environment and people, an interaction method to compensate for inaccurate recognition results, and an interface for novice users to train their recognition model. We challenge this issue by developing various human-in-the-loop techniques, including adaptive machine learning algorithms and interface design for interactive machine learning environments.

Vision-based User Understanding and Gaze Estimation

Technologies for measuring and understanding humans have been one of the most important application fields of computer vision. We are researching human/user understanding using computer vision and machine learning methods. For example, the human gaze can be an essential cue for various application scenarios, including context-aware computing and attentive user interfaces. We have been developing a machine learning-based gaze estimation method using large-scale training datasets of face images. Unlike conventional methods that require dedicated hardware, it allows us to use ordinary cameras as gaze estimation devices. We are also working on various computer vision-related tasks to provide the technical basis for the camera- and media-based human-machine interaction.

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