# **Information Science**

Our laboratory focuses its research on developing new methodologies to apply state-of-the-art information and communication technologies to health sciences, educational psychology, and clinical use.

Associate Professor **Toshio Ohyanagi**, Dr. Eng. Interests: Information and communication technologies for health sciences, educational psychology, web-based data collection systems

# 1. Assessing and training people with visual inattention

Measuring reaction time (RT) is one of the basic methods for evaluating patients with attentional disorders. We developed new RT tasks with visual stimuli for both research work and clinical applications.

In addition, we developed novel RT tasks to assess older adults and patients with visual inattention (1-3). To enable the subjects to conduct these assessment tasks in a more life-like setting, we employed mixed reality technology (See Figure).



### 2. Assessing the clumsiness of children

We developed a new handwriting assessment system that records the pen's trajectories and pressures while conducting handwriting tasks by using a tablet in 2010. Since then, we have been investigating the usefulness of the system for assessing typically developing children, healthy adults, and clumsy children (4).

#### 3. New applications for the educational psychology field

We have developed a new online handwriting and spelling assessment system that enables automatic correct/incorrect marking of kanji character tests for students in elementary school by utilizing the CNN machine learning model (5). We have also been developing a digital version of Crack the Code, termed CTC App, which is a problem-solving and planning task originally developed by JP Das. We added the functionality of providing feedback while conducting the CTC App to assess the creativity of children with developmental disorders (6).

## 4. Surgical quality and assessment

We are investigating the effectiveness of surgical methods in several areas (7). We have also shown that providing effective postoperative rehabilitation benefits physical and psychological improvement (8).

# 5. Improving quality of life (QOL) in all cancer patients

We have been developing a web-based system to collect QOL and medical data of cancer patients to identify their QOL, develop a

prognostic model, and assess their mental stability. We have also conducted various studies on the reality of QOL and strategies to improve it (9 - 12).

## List of Main Publications (September 2018– to August 2023)

- Kanaya K., Ohyanagi T., et al.: Development of a method that uses reaction time to evaluate attention deficit associated with challenges in dynamic visual stimuli, Asian J. Occupational Therapy, 14, 1, 53-60 (2018).
- Ohyanagi T., Kanaya K., Sengoku Y., et al.: New application for assessment and training of people with attention disorder: Present and the next steps, 49th Annual Meeting of the Society for Computers in Psychology (2019).
- Ohyanagi T, Kanaya K, Sengoku Y, Rios A, Cruz A, Esmail S, Liu L, Miyazaki M: A novel mixed reality application for assessment and training of attention function, 51st Annual Meeting of the Society for Computation in Psychology (2022).
- Ikeda C., Nakajima S., Ohyanagi T., et al.: The influence of physical function on drawing performance and drawing motion in clumsy children. Asian J. of Occupational Therapy, 15, 1 37-44 (2019).
- Inoue T, Ohyanagi T: Assessing handwriting skills in a web browser: Development and validation of an automated online test, 51st Annual Meeting of the Society for Computation in Psychology (2022).
- Okazaki S, Beppu S, Okuhata S, Inoue T, Ohyanagi T: Preliminary study of assessment of the creativity during problem-solving by children with developmental disorders and their coaches. The Third International Conference of Psychology (ICP2020+) (2021).

