

Information Science

Our laboratory focuses our research on developing new methodologies to apply state-of-the-art Information and Communication Technologies to health sciences and clinical use.

Associate Professor

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Interests:

Information and communication technologies for health sciences, Homecare and remote monitoring systems.

1. Assessing and training people with visual inattention

Measuring reaction time (RT) is one of the basic methods to evaluate patients with attentional disorders. We have been developing new RT tasks with visual stimuli for both research work and clinical applications. We have developed novel RT tasks to assess older adults and patients with visual inattention. We clarified that both their sensitivity and specificity to assess inattentive people were more than those by traditional neuropsychological tests (1-5). We also developed RT tasks that could be used for driving assessment of people with brain injury (6, 7).

As tablet computers were getting popular, we developed a new Bluetooth Low Energy device to measure accurate RTs with an iPad. We showed that the device is a simple and practical solution to accurately measure RTs in both laboratory and clinical settings, and it is capable of providing both researchers and health professionals working in clinical settings with new ways of using RT paradigms in their work (8). Furthermore, we have developed serious games for training attentional function of older adults and patients (9, 10). From a preliminary result of using one of the games, termed Whack-A-Mole, it was suggested that attentional function may be maintained by doing the game. We, however, need to collect more data to clarify the result.

2. Assessing clumsiness of children

We had developed a new handwriting assessment system that records the pen's trajectories and pressures during conducting handwriting tasks by using a tablet in 2010. Since then, we have been investigating the usefulness of the system for assessing normal children, healthy adults and clumsy children (11-15). We also developed a new method to analyze the collected data (16).

3. Homecare and remote monitoring system

We have been studying on remote monitoring and e-Health systems since 2002, and had developed WWPM (Wireless Wearable Physiological Monitor) system in 2004. A couple years ago, Apple Inc. had launched a new device, called Apple watch. As WWPM

system consisted of a watch type device, a home station and a central web server, just like Apple watch, iPhone and iCloud respectively, we have developed a WWPM similar system adapted for Apple watch, iPhone and iCloud (17). We showed that the new system worked fine as WWPM system did.

List of Main Publications from 2013.9 to 2018.8

- 1) Ohyanagi T, Kanaya K, Sengoku Y, et al. New reaction time tasks for assessing inattention of people in occupational therapy, Psychonomic Society's 55th Annual Meeting (2014)
- 2) Sengoku Y, Ohyanagi T Development of reaction time tasks for the assessment of attention dysfunction and their usability, 16th International Congress of the World Federation of Occupational Therapists (2014)
- 3) Kanaya K, Ohyanagi T, Yamada K, et al. New methods for assessing inattention when changing the visual situation, 16th International Congress of the World Federation of Occupational Therapists (2014)
- 4) Kanaya K, Yamada K, Ohyanagi T, et al. Preliminary study on a novel method of using reaction time tasks for assessing inattention under an environment of dynamically changing visual stimulus, Sapporo Journal of Health Sciences, 4, 9-16 (2015) (in Japanese)
- 5) Kanaya K, Ohyanagi T, Yamada K, 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)
- 6) Yamada K, Ohyanagi T, Kanaya K, et al. The relationship between a newly developed reaction time task and an on-road driving assessment for people with brain injury, 16th International Congress of the World Federation of Occupational Therapists (2014)
- 7) Yamada K, Ohyanagi T, Kanaya K, et al. A new driving behavior questionnaire for clarifying driving tendency of young and older adults, Sapporo Journal of Health Sciences, 5, 35-44 (2016) (in Japanese)

- 8) Ohyanagi T, Kanaya K, Sengoku Y, et al. Development of a new Bluetooth Low Energy device for measuring accurate reaction time, 45th Annual Meeting of the Society for Computers in Psychology (2015)
- 9) Ohyanagi T, Kanaya K, Sengoku Y, et al. iPad application for assessing and training attention function, 47th Annual Meeting of the Society for Computers in Psychology (2017)
- 10) Ohyanagi T. Development of serious games for training attentional function and their clinical use, 2017 Annual Report of Hayao Nakayama Foundation for Science & Technology and Culture, 40-41 (2018) (in Japanese)
- 11) Ikeda C, Nakajima S, Nakamura Y, Ohyanagi T, et al. A quantitative method for assessing the legibility of Japanese handwritten sentences, 16th International Congress of the World Federation of Occupational Therapists (2014)
- 12) Nakajima S, Ohyanagi T, Nakamura Y, et al. Development characteristics of handwriting performance of normal children and healthy adults, 16th International Congress of the World Federation of Occupational Therapists (2014)
- 13) Nakajima S, Ohyanagi T, Nakamura Y, et al. Developmental characteristic of handwriting performance of normal children and healthy adults, Japanese Journal of Occupational Therapy in Pediatrics, 3(1), 46-52, (2015) (in Japanese)
- 14) Ikeda C, Nakajima S, Ohyanagi T, et al. Characteristic influence of motor function on children's drawing and writing legibility and handwriting motion, Japanese Association of Occupational Therapists, 35(2), 138-148, (2016) (in Japanese)
- 15) Isahaya S, Nakajima S, Ohyanagi T, et al. Effect of pen and pencil size on drawing performance, The Hokkaido Journal of Occupational Therapy, 33(1), 19-25, (2016) (in Japanese)
- 16) Ohyanagi T, Ikeda C, Nakajima S, et al. New evaluation indices to analyze the results of drawing tasks of regular triangles, Sapporo Journal of Health Sciences, 5, 27-34, (2016) (in Japanese)
- 17) Ohyanagi T, Miyazaki M, Goto Y, et al. Wireless Physiological Monitor System adapted for Apple Watch and iOS, eHealth 2016 Annual Conference & Tradeshow (2016)