

# AHCI: Applications of Human-Computer Interaction

## Editorial

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Okky Dicky Ardiansyah Prima  
Iwate Prefectural University  
Department of Software and Information Science  
152-52 Sugo Takizawa Iwate 020-0693, Japan.  
email: prima@iwate-pu.ac.jp

**Abstract**— Human-Computer Interaction (HCI) was originally a field of study that focused on the design and use of computer technology and the interface between users and computers. Since then, the field has evolved to focus not only on human-computer interaction, but also on methods for using computers to achieve new goals. This special track introduces research cases based on psychological approaches to physical and electronic information sharing tools and tools to enhance self-affirmation. Computer vision-based applications will then be presented, including a simple method for generating 3D ambiguous objects and a tree-structuring method for pruning apple trees. We believe that the proposed tools and their implementation methods can provide hints for research in HCI and contribute to the development of new interfaces.

**Keywords**-Human Computer Interaction; electronic information bulletin board, diary system, ambiguous object, tree pruning.

### I. INTRODUCTION

Human-Computer interaction (HCI) research has traditionally focused on the development of user-friendly software and supporting sensing technologies to enable interactive interaction with computers. However, recent HCI research topics extend beyond computer input and manipulation to methods for interacting with information represented in real and virtual spaces. Future HCI may evolve into Human-Engaged Computing (HEC), which represents a synergistic interaction of advanced human capabilities and advanced technology capabilities.

Many tools have been developed to facilitate communication using HCI techniques. Slack, Line, and Teams are actively used to share information within organizations and groups. These tools provide the ability to share information with people inside and outside the community. In addition, topics can be ranked by importance and time spent on the topic to make it easier to find the shared information.

To achieve maximum interaction between the user and the computer, interface developers and designers often use various psychological theories and approaches. Recent

developments include a number of self-counseling apps, some of which can provide remote counselor assistance and Artificial Intelligence (AI) based mental health checkups. Users can use the apps at any time, allowing them to check their own mental health at ease.

Combining HCI with computer graphics and computer vision can facilitate the design of 3D objects. Various technologies have been developed recently to facilitate 3D mapping. For example, Matterport [1] allows users to generate a 3D model of a building using only a camera and to move virtually within it, while NeRF techniques can generate multi-view videos from multiple photos rapidly [2]. The 3D human pose estimation allows the extraction of the 3D skeleton of a person, captured in a single photo as well [3].

This special track invites researchers working in these areas to present and discuss their research cases that can be applied in real life. Some of the most relevant topics to the goals of this special track are the development of communication tools, interactive user interfaces, object recognition.

The rest of this editorial is organized as follows: the following Section II summarizes the papers accepted for presentation and publication in the special track. Section III concludes and presents future perspectives and challenges for this topic.

### II. SUBMISSIONS

The first paper entitled “Design of Information Sharing media based on observation of reading and writing behavior on message boards within a large organization” by Ogura and Hoshi [4], observes the usage patterns of physical information bulletin boards by users in order to implement an electronic information bulletin board for information sharing in a large organization. From the observation results, the authors found that categorization of post topics and space for replies to those posts are necessary. Furthermore, they found that it is necessary to adaptively visualize information by designing the display time of posts according to the status of replying to posted information and its importance. Four

months of experimental operation of the electronic information bulletin board showed that the number of users increased more than that of the physical bulletin board, and active information posting and replying were also observed. Future plans include further analyzing the results of the experimental operation and adding more user-friendly features to improve the system as an effective information exchange tool.

The next paper entitled "Research on the Improvement in a Feeling of Self-Affirmation Using a Self-Reframing Diary System" by Ogura and Kimura, describes the construction of a self-reframing diary system that can be used to facilitate the counseling technique of reframing to enhance self-affirmation [5]. Experimental results showed that although self-reframing using the diary system was not effective in improving self-affirmation for all participants, subjects who were originally high in self-affirmation could be expected to further improve their self-affirmation through self-reframing.

The third paper, entitled "A Tool for Generating Ambiguous Objects in Two Viewing Directions" by Nakaguchi and Prima, proposes a Three-Dimensional (3D) modeling tool to generate an object that can be perceived differently from two different viewing directions [6]. The tool uses solid models of cylindrical surfaces parallel to each of the viewing directions. These models are intersected at the central axis and rotated according to the viewing direction, using the intersection as the origin. Finally, by transforming each Two-Dimensional (2D) figure drawn by the user in each viewing direction into a cylindrical surface, a 3D ambiguous object can be generated. Their experiments show that ambiguous objects consisting of simple and complex shapes have been successfully generated.

The last paper entitled "Toward an Automated Pruning for Apple Trees Based on Computer Vision Techniques" by Hu and Prima, proposes a simple apple tree recognition method based on computer vision to achieve pruning of apple trees in real environments [7]. The method roughly consists of three steps: segmenting apple trees by semantic segmentation, skeletonizing the apple tree by segmentation image, representing the graph tree by applying breadth-first search. They tested 12 semantic segmentation models for apple tree segmentation, and the Segformer model was found to have the highest accuracy.

### III. CONCLUSION & FUTURE PERSPECTIVES

The special track "AHCI: Applications of Human-Computer Interaction" featured efforts to improve

communication and increase self-affirmation by analyzing the characteristics of behavior patterns. Although the proposed interfaces are not yet completed, these interfaces were found to have certain effects. In the case of information sharing tools, the findings were that it is possible to create better tools by considering the differences between physical and electronic tools. Similarly, in the case of a diary system for logging information, reframing can be expected to enhance self-affirmation. Finally, using computer vision tools to generate 3D ambiguous objects and to structure apple trees, tasks that were previously done manually can be automated by considering geometric elements from images.

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### REFERENCES

- [1] Matterport, <https://matterport.com/> [retrieved at April 1, 2023]
- [2] Instant Neural Graphics Primitives, <https://github.com/NVlabs/instant-ngp> [retrieved at April 1, 2023]
- [3] MediaPipe, <https://google.github.io/mediapipe/> [retrieved at April 1, 2023]
- [4] K. Ogura and R. Hoshi, "Design of Information Sharing media based on observation of reading and writing behavior on message boards within a large organization," The Sixteenth International Conference on Advances in Computer-Human Interactions, ACHI 2023, Venice, Italy, April 24-28, 2023
- [5] K. Ogura and R. Kimura, "Research on the Improvement in a Feeling of Self-Affirmation Using a Self-Reframing Diary System," The Sixteenth International Conference on Advances in Computer-Human Interactions, ACHI 2023, Venice, Italy, April 24-28, 2023.
- [6] K. Nakaguchi, K. Matsuda, and O. D. A. Prima, "A Tool for Generating Ambiguous Objects in Two Viewing Directions," The Sixteenth International Conference on Advances in Computer-Human Interactions, ACHI 2023, Venice, Italy, April 24-28, 2023.
- [7] K. Hu and O. D. A. Prima, "Toward an Automated Pruning for Apple Trees Based on Computer Vision Techniques," The Sixteenth International Conference on Advances in Computer-Human Interactions, ACHI 2023, Venice, Italy, April 24-28, 2023.