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ACHI 2021, The 14th International Conference on Advances in Computer-Human Interactions

HCIP: Human Computer Interaction in Practice

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Research Interests

- Human Computer Interaction
- Behavior Analysis
- Eye Tracking
- Virtual Reality
- 3D Spherical Display

HCIP Special Track :: Summary

HCI (Human-Computer Interaction) technology is designed to respond to various human movement patterns and to enable humans to work at their most efficient. Three-Dimensional (3D) analysis of human behavior in HCI not only allows us to see the characteristics of each behavior from various angles, but also to display the patterns in a virtual environment, which can be used for appropriate behavior support systems. In this special track, three practical studies in human-computer interaction were introduced, including an assessment of drug picking activity using RGB-D camera, the development of a Virtual Reality (VR) simulator for speed sprayers, and a flexible 3D pointing device with haptic feedback. These studies involved the development of systems with multiple sensors and discussed the measurement data obtained from the systems.

HCIP Special Track :: Topics of Interests

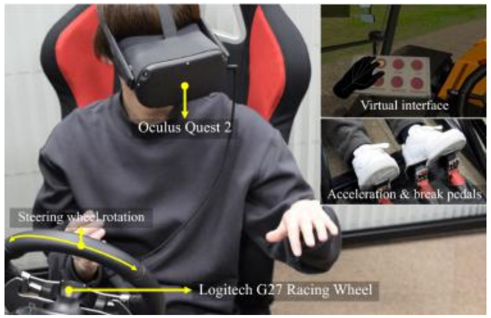
- Body motion analysis
- Behavior analysis
- Interactive human computer interaction
- Tactile sensors and application
- 3D VR simulation
- Special applications (healthcare, assistive-robotics, special interfaces, etc.)

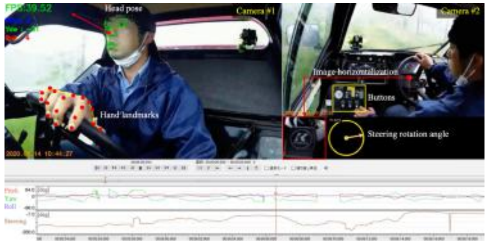
Summary of Contributions 1/3

Title Toward the Development of a VR Simulator for Speed Sprayers

Authors Yu Tanaka, Oky Dicky Ardiansyah Prima, Kanayo Ogura, Koichi Matsuda, and Shoichi Yuki

- This paper proposed a speed spray simulator that allows users to experience driving and operating a car in a virtual environment. Data from the operators driving the actual speed sprayer was also collected so that the same behavioral data could be reproduced in the virtual environment.
- The simulator enables us to collect a time series of information on the driver's head pose, hand gestures, and gas pedal and brake controls measured by the simulator, and to visualize the characteristics of the driver's behavior during driving.

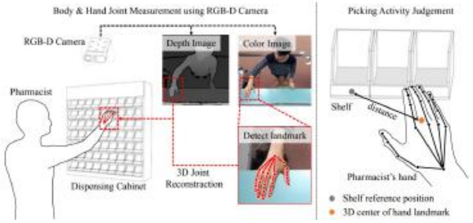

Oculus Quest 2
Virtual interface
Acceleration & break pedals
Steering wheel rotation
Logitech G27 Racing Wheel

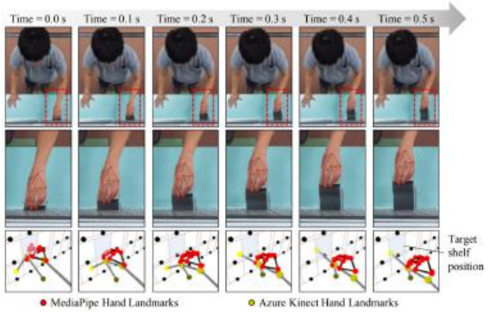

Head pose
Camera #1
Camera #2
Hand landmarks
Image horizontalization
Buttons
Steering rotation angle

Summary of Contributions 2/3

Title	Assessment of Drug Picking Activity using RGB-D Camera
Authors	Yuta Ono and Oky Dicky Ardiansyah Prima

- This paper proposed a framework to determine the medication picking behavior using Azure Kinect.
- Compared to the barcode medication management and the automated dispensing system, the proposed framework is easy to use and does not require capital investment or high cost to install LEDs or AR markers on the dispensing shelf. Experimental results show that the proposed framework can accurately determine the picking process by hand tracking.


Body & Hand Joint Measurement using RGB-D Camera
RGB-D Camera
Depth Image
Color Image
Pharmacist
Detect landmark
Dispensing Cabinet
3D Joint Reconstraction
Picking Activity Judgement
Shelf
distance
Pharmacist's hand
● Shelf reference position
● 3D center of hand landmark

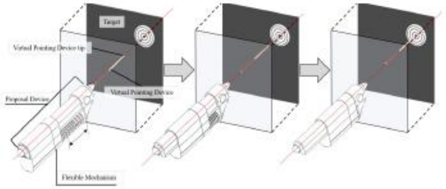

Time = 0.0 s
Time = 0.1 s
Time = 0.2 s
Time = 0.3 s
Time = 0.4 s
Time = 0.5 s
Target shelf position
● MediaPipe Hand Landmarks
● Azure Kinect Hand Landmarks

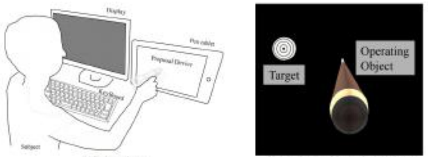
Summary of Contributions 3/3

Title Development of a Flexible 3D Pointing Device with Haptic Feedback

Authors Koma Yoshikawa, Yuta Ono, and Oky Dicky Ardiansyah Prima

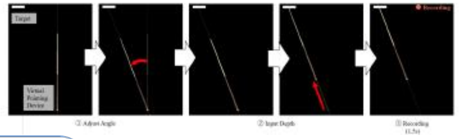
- This paper proposed and evaluated a stylus-type 3D pointing device with a flexible mechanism and vibration actuators for intuitive input.
- The experiments showed that haptics had a significant effect on 3D pointing, enabling more accurate input manipulation. However, the flexible mechanism did not have a significant effect on adjusting the input to match the depth.


Target
Virtual Pointing Device tip
Proposal Device
Virtual Pointing Device
Flexible Mechanism


Display
Pen tablet
Proposal Device
Keyboard
Subject
Target
Operating Object

(a) Equipment layout (b) A visual target and the virtual pointing device

Figure 4. Environmental experiment for this study.


Target
Virtual Pointing Device
Recording
① Adjust Angle
② Input Depth
③ Recording (1.5s)

Conclusion & Future Perspective

- The special track, "HCIP: Human Computer Interaction in Practice," provided a forum to discuss research themes related to human-computer interaction to enable humans to work most efficiently with various movement patterns, as well as issues and solutions related to each theme.
- At the upcoming HCIP, we are looking for case studies using motion capture and will discuss a wide range of topics related to the analysis and application of human behavior using digital humans.