

# 2017-227 Full Body Haptic Device - LOJK

Published date: Sept. 6, 2019

## Technology description

### SUMMARY

UCLA researchers in the Department of Mechanical and Aerospace Engineering have developed a full body haptic device that optimizes the location of the four robotic arms and allow the user to feel the force feedback from the interaction with VR objects.

### BACKGROUND

The full body haptic device may have applications in virtual reality gaming, physical rehabilitation and occupational therapy, as well as in sport either as an exercise machine or training via simulation. Many haptic devices have been developed in the past 20 years and most of them are focused on single or dual hands, arms, and legs however very few focused on the entire body. Furthermore the location of the robotic arm / haptic device with respect to the human body is critical in order to provide a full coverage of the range of motion as well as optimized manipulability (a mathematical term in robotics addressing how well a robotic arm is manipulated within its work space).

### INNOVATION

The inventors have developed an optimization approach that optimizes the locations of the four robotic arms serving as haptic devices with respect to the body. It includes a frame including a movable seat along with four robotic arms that interact with the two hands and the two feet of a user sitting on the movable seat. The seat itself is a haptic device that aside from supporting the user weight it may also transmit force feedback to the body core. The force feedback generated by the haptic device may render all the physical attributes of the VR objects including shape/size, compliance/stiffness and surface texture.

## Application area

- Virtual reality gaming
- Physical rehabilitation
- Occupational therapy
- Sports exercise or training simulation

## Advantages

- Optimized locations of four limbs
- Force feedback on the VR objects that users interact

## Institution

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