Fall 2019

CS6501: Topics in Human-Computer Interaction

http://seongkookheo.com/cs6501_fall2019

Haptics

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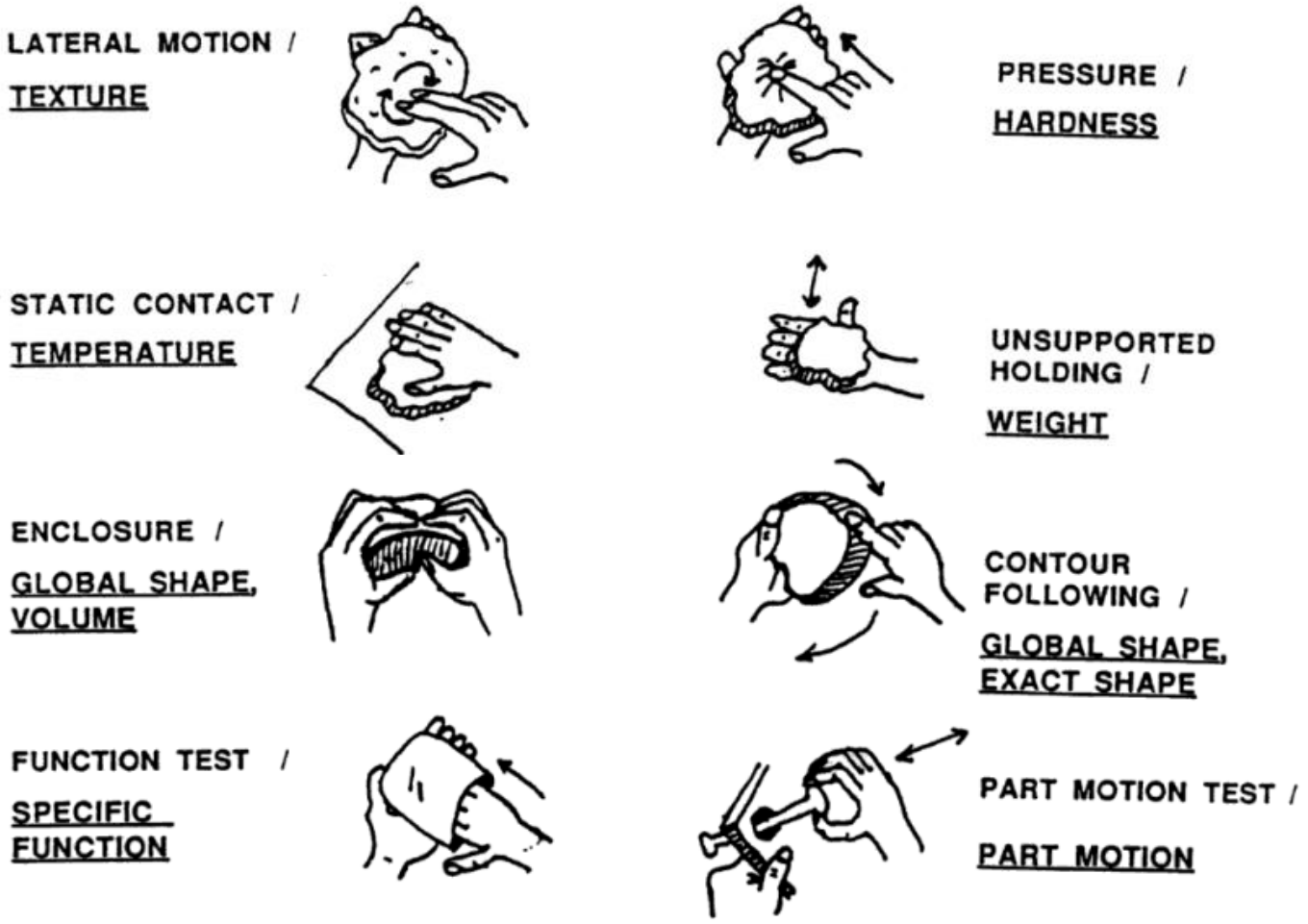
UNIVERSITY of VIRGINIA | SCHOOL of ENGINEERING & APPLIED SCIENCE

Haptic Interaction

https://www.maxpixel.net/Girls-Happiness-Fun-Cute-Children-Happy-Hugging-1869

Haptic Exploratory Procedure



Klatzky, R. L., Lederman, S. J., Pellegrino, J., Doherty, S., McClosky, B., & Goodale, M. A. (1990). Procedures for haptic object exploration vs. manipulation. *Vision and action: The control of grasping*, 110-127.

Haptics

- Haptic: adj. relating to or based on the sense of touch
  - from the Greek *haptesthai* (to grasp, touch)

Cutaneous

Texture
Temperature
Slip
Vibration

Kinesthetic

Location
Motion
Force

The effects of anesthesia on motor skills
https://www.youtube.com/watch?v=0LfJ3M3Kn80

BBC Documentary, The Man Who Lost His Body
https://www.youtube.com/watch?v=FKxyJfE831Q

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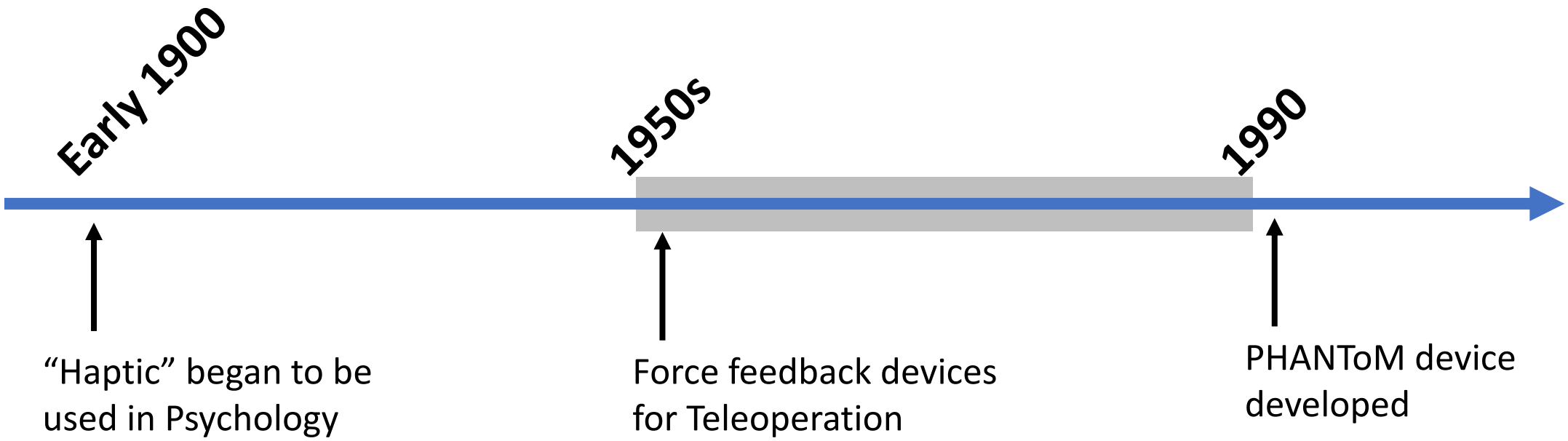
Brief History of Haptics Research



PHANToM Haptic Interface

6-DOF Force feedback

Accurate force up to 3.3N

Now Geomagic Touch


digital
design studio
THE GLASGOW
SCHOOL of ART

Applications

Simple notification / Feedback

Education and Training

Teleoperation

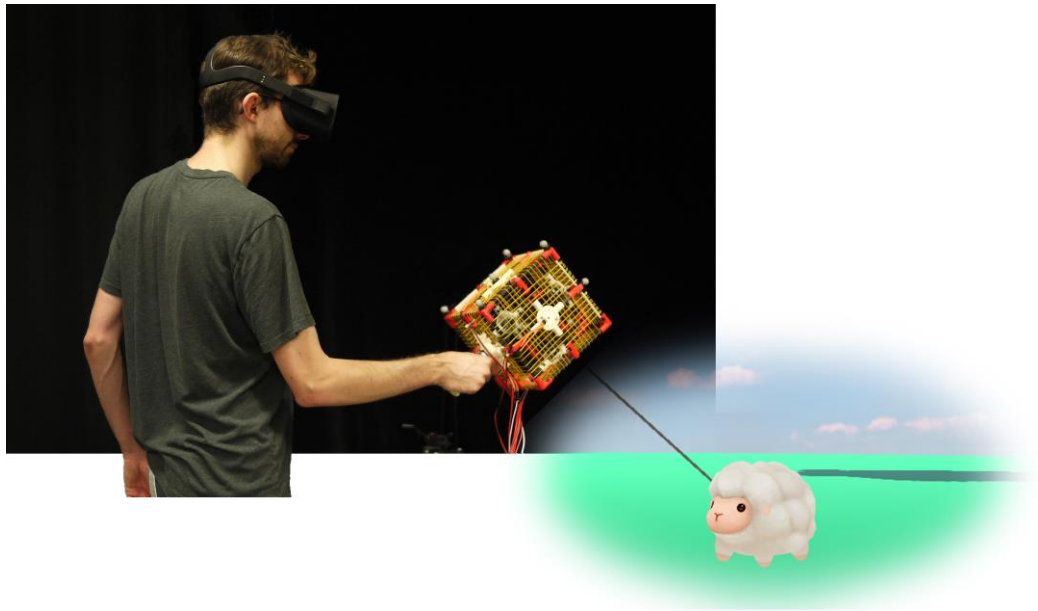
U.S. Air Force photo by Airman 1st Class Bailee A. Darbasie

Applications

Professional design and engineering

From 3D Systems Touch
https://www.3dsystems.com/haptics-devices/touch

Entertainment



Thor's Hammer: An Ungrounded Force Feedback Device Utilizing Propeller-Induced Propulsive Force

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[2] University of Toronto, Toronto, Ontario, Canada, chr.chung@mail.utoronto.ca
[3] HCI Lab, KAIST, Daejeon, Republic of Korea, geehyuk@gmail.com

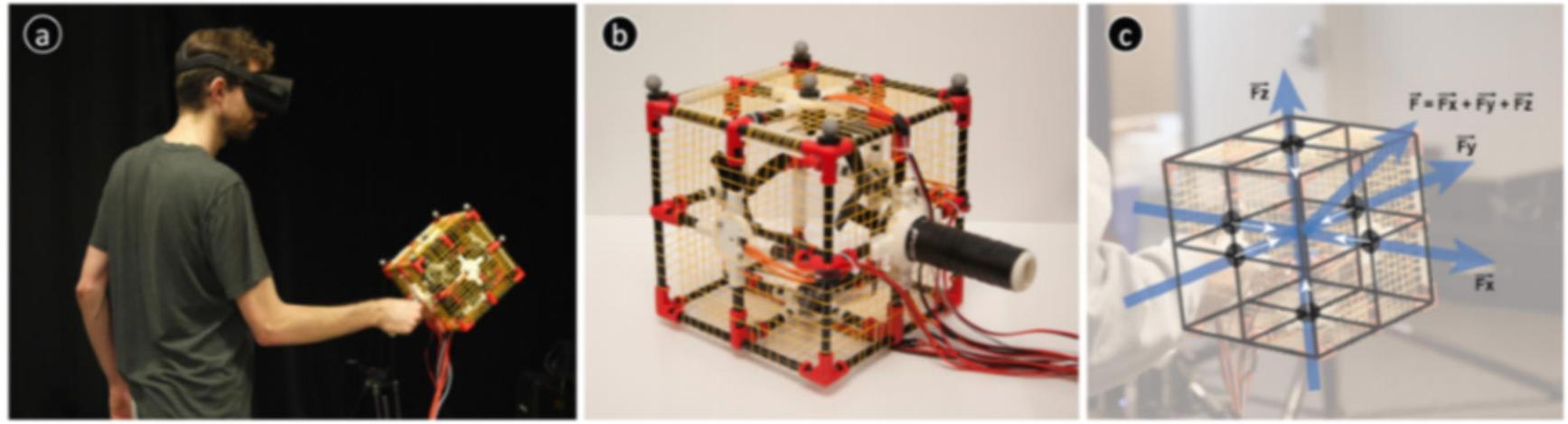

Figure 1. (a) Thor's Hammer held in a user's hand and (b) a close-up of the hammer. (c) The design of Thor's Hammer enables six motors and propellers to create 3-DOF force feedback of up to 4 N without grounding.

ABSTRACT

We present a new handheld haptic device, Thor's Hammer, which uses propeller propulsion to generate ungrounded, 3-DOF force feedback. Thor's Hammer has six motors and

INTRODUCTION

Virtual reality (VR) allows users to engage with compelling experiences in ways that are otherwise not possible. Advances in graphical processing, displays, IMU

Thank you!