# HCI: A Gaming Console for the Blind

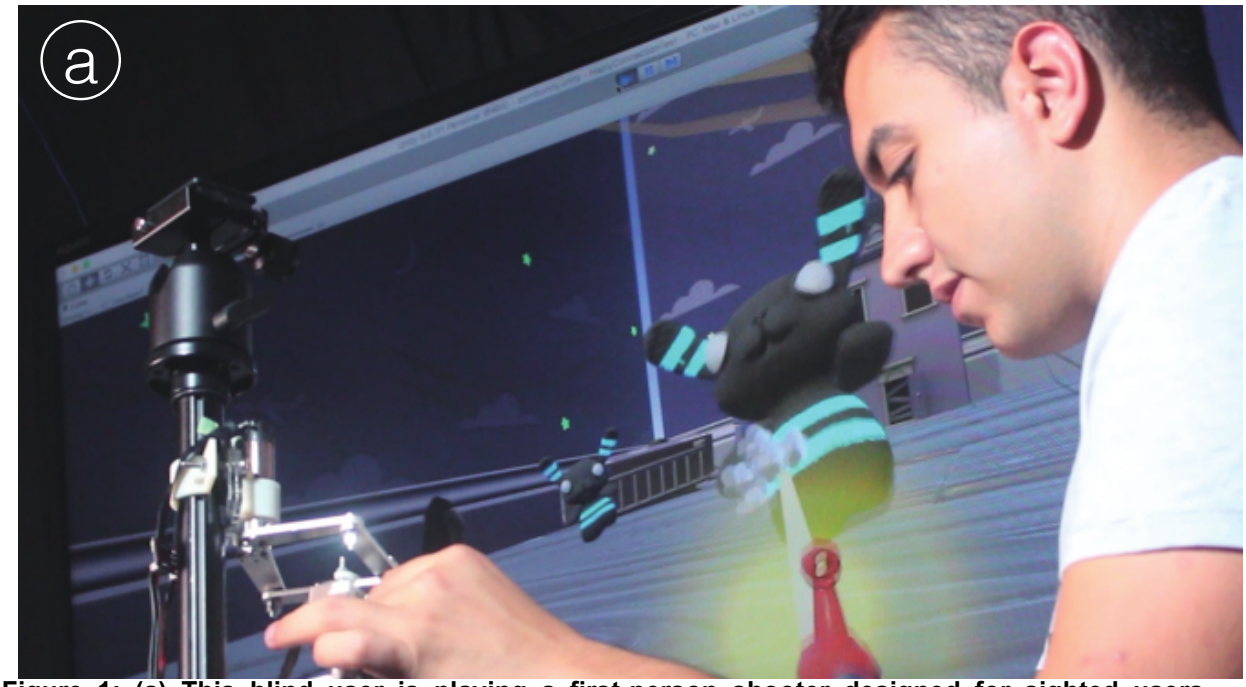


**Figure 1: (a) This blind user is playing a first-person shooter designed for sighted users. (b) The DualPanto bimanual force feedback device enables this. Its *me* handle allows users to move their avatar around the virtual space. Force feedback prevents users from crossing virtual walls. The *it* handle moves by itself. It allows users to feel where the current opponent is located and what direction it faces. Users aim using the haptic knob on the *me* handle; a foot pedal fires the gun.**

As part of this project, the team you will create (1) a mobile version of the shown haptic device hardware and most of all (2) a software framework, API, and IDE around it.

The device enables blind users to interact with spatial virtual environments that contain objects moving in real-time, as is the case in sports or shooter games. Users interact with DualPanto by operating its *me handle* with one hand and by holding on to its *it handle* with the other hand. Each handle is connected to a pantograph haptic input/output device. The key feature is that the two handles are *spatially registered* with respect to each other. When guiding their avatar through a virtual world using the *me* handle, spatial registration enables users to track moving objects by having the device guide the output hand. This allows blind players of a shooter game to aim at an opponent or dodge the opponent's shots; it allows blind players of a 1-on-1 soccer game to race for the ball or evade an opponent. In our user study, blind participants reported very high enjoyment when using the device to play (6.5/7).

## Software you will write & required skills

One team member will probably specialize on working on the hardware, while the others will focus on creating a software system around it.

Ideally, you have **experience in 3D computer graphics, and in the design and implementation of software system.** If you had **taken HCI2** and enjoyed it, that would be nice, but is not mission critical.

## Questions

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