Hand Tracking using RGB-D data

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Main Objectives

The main objective was to *create a scene within a virtual reality* in which the user can interact with a coffe machine using his or her own hand gestures.

We used:

1. a Microsoft Kinect v2 with a infrared depth sensor, a RGB sensor and 3D motion tracking
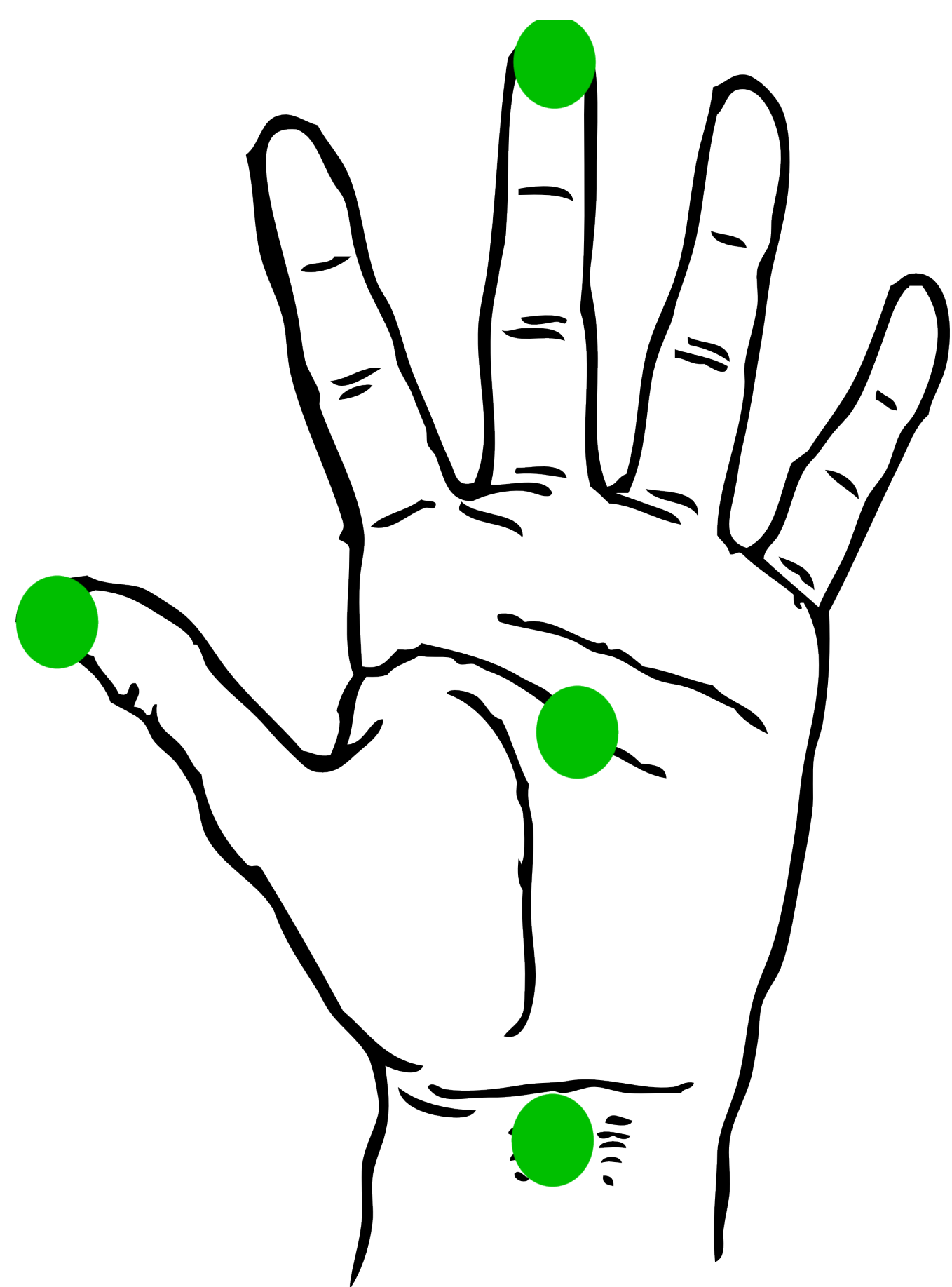
2. A Leap Motion sensor

Figure 1: The 4 different positions we can extract from the sensors.

Methods

We are able to extract the positions of the *Wrist*, the *Palm*, *Finger Tip* and the *Thumb Tip*.

[1] and [2] show a valid approach to estimate the gesture of the hand.

Encountered Problems

In practice, [1] proved to be unliable in bad lighting. Furthermore we experienced *unstable hand orientation* which solved by computing means of positions from several frames.

Unfortunately, there was not enough time to fully deploy solutions such as [2] or to fully deploy a working mesh of the two different coordinate systems provided by the Kinect and the Leap Motion Sensor.

Results

In the end we were still able to provide a virtual reality in which the user can interact with a coffee machine. The user's hands are tracked and the movement is mapped into the virtual reality. Once a hand comes close to the coffee machine, the buttons will chance their color and indicate the pressing of such.
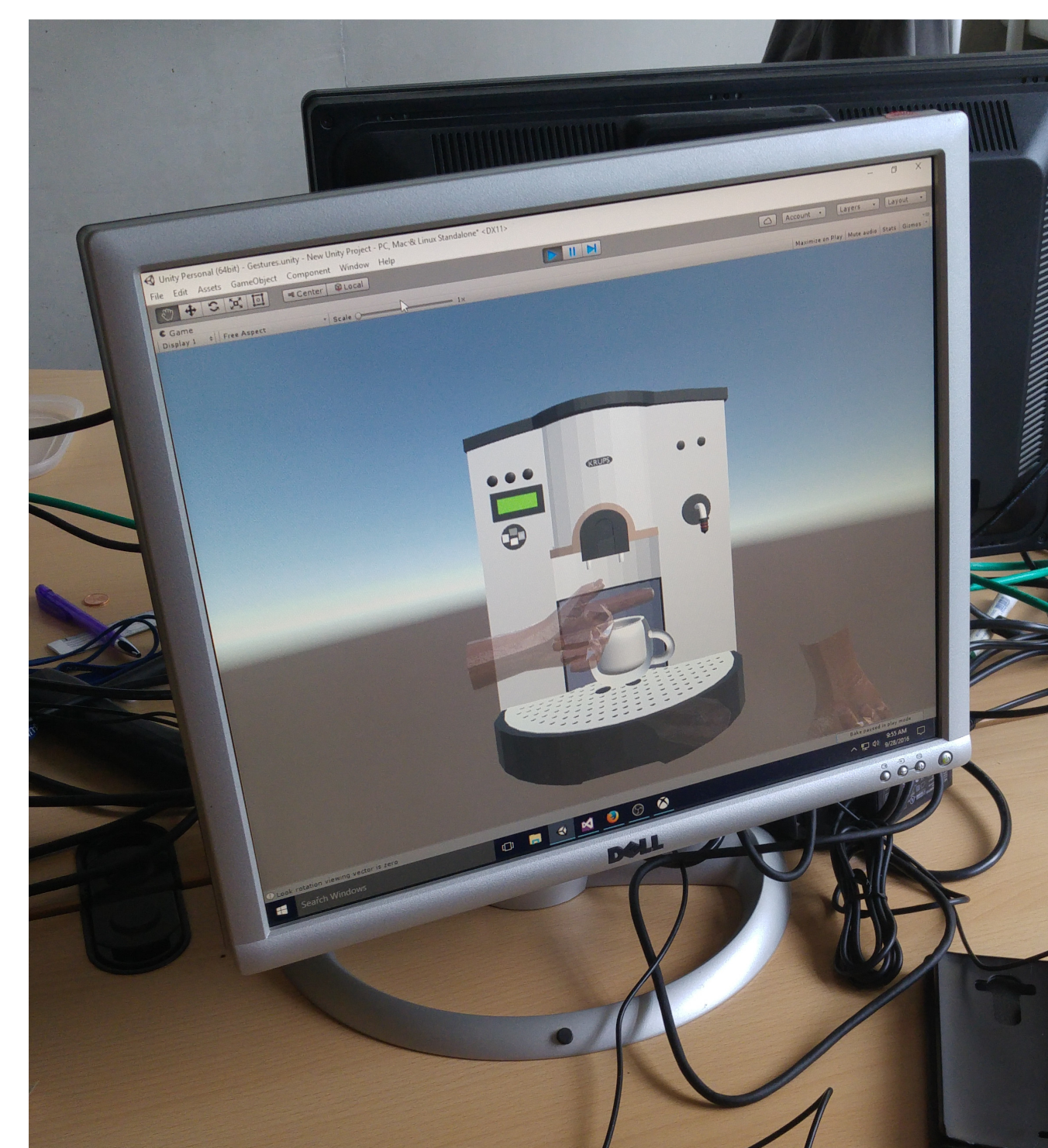

Figure 2: In the virtual reality scene, the user can interact with a coffee machine using his/her own hands.

References

[1] Borbarad. Kinect is awesome.

[2] Joseph Tan. Fits like a glove: Rapid and reliable hand shape personalization. 2016.