H.I.C.S. – Hand input control system

Subject: CPVR
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The goal of this thesis was to find a way to capture the movement of one hand in a way that the handling of the mouse and keyboard is still possible. A practical realization of the concept together with a small software based demonstration revealed its functionality and potential. Latency and performance are both on a high level, however the shape and complexity of the glove would need further refinement.

Why

Oculus Rift promises a new era of vision, but the leap from screen to head-mounted display brings along some critical interaction problems. Keyboard and mouse, both unquestioned over the last decades, will be difficult to use in Virtual Reality. This is due to the fact that a user has to see these devices in order to use them properly, which would in most cases lead to a less realistic environment. The goal of H.I.C.S is to find a solution to capture the movement of one hand and search for a way to control the computer with less use of keyboard and mouse.

How

In an earlier project the best method to capture a movement of one joint has been searched and the needed skills for this thesis gathered. In iterative steps the model of the glove has been shaped on the computer, printed in 3D, tested and corrected. The electronics from the earlier project have been simplified and extended. While the movement of arm and hand are captured with three MPU9150 (9-DOF Inertial measurement unit), the bending of fingers are transferred over strings to a sensor system which relies on a light bridge component and which was specially developed for this thesis. All that information is collected on an Arduino Mega 2560 and send to the computer over serial communication. There the H.I.C.S. – Control center is responsible to filter and calibrate this data. In a last step the simplified state of the hand (which joint is bend by how much) is provided with nearly no delay for any other application over inter process communication.

Concept with future

What makes this concept special is that it can be extended with force feedback without much modification. The desire to touch what we are already able to see in 3d thanks to head-mounted displays is just the logical next step. Kickstarter projects like Control VR, Perception Neuron or Dexmo seem to underline that hand input control systems will come.
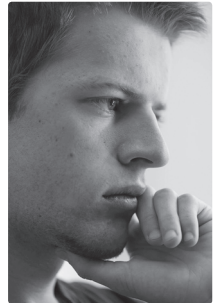
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H.I.C.S. Model

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