Eurocom Education Program User Profiles

The Story of UBC's Dirk Haupt - VR Healer – The Next Generation of Medicine?

Meet Dirk Haupt

Research: Virtual Reality – A Rehabilitation Aid for Spinal Trauma Patients
Eurocom Laptop: Sky X4

"presenting the prototype at the conference and VR developer meetup did stir considerable interest"

UBC

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The Profile:

Name: Dirk Haupt
School: University of British Columbia
Department: Psychiatry
Research: VR applications to Biomedical Engineering, Neuroscience, and Data-Mining.
Education: Computational Intelligence and Design, Computer Science and Psychology
Laptop: EUROCOM Sky X4:
http://www.eurocom.com/ec/configure(2,331,0)ec
Dirk Haupt LinkedIn profile page:
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The Story:

It started as a final project for his Biomedical Engineering class, Dirk is creating a virtual environment to investigate how people with spinal cord injuries (SCI)s perceive and use their hands in virtual reality. The idea is to harness the growing tidal wave of incoming virtual reality (VR) technology and create a new form of SCI therapy. Dirk's project has the potential of bringing a new form of therapy into the world, and it's being created on a single laptop, a Eurocom Sky X4.

"I chose the Sky X4 because it's fully upgradable, Linux-compatible, and designed for a long lifespan. I spent a month researching competitors, and Eurocom simply offered the very best value for what I needed. My Sky X4 has been my treasure" – Dirk Haupt.

His work involves constant commuting between UBC, hospitals, labs, and other institutions, so powerful mobile computing is a must. Even though this undertaking is being completed by dirk on his laptop, he is not alone, and is working under the supervision of ICORD investigators Dr. Jaimie Borisoff and Dr. John Kramer.

This VR rehabilitation program uses the Oculus Rift, a Virtual Reality (VR) head-mounted display that lets the user see and interact within a virtual environment. Also integral to the project is the Leap Motion (LM) controller - a small peripheral that uses 2 infrared cameras to track a user's hand movements at high enough resolutions to discern individual finger gestures. Dirk's goal is to build a VR environment use the environment to examine body representation and sensorimotor function for people who suffer from SCIs. Dirk and the supervising professors are interested in learning how people with SCIs can assume ownership over VR arms and legs, and how characteristics of injury associated with perception and movement affect immersion in VR.

The project is demonstrating a high potential to implement VR as a new form of SCI rehabilitation aid. Dirk is very confident about the project's completion, and "presenting the prototype at the conference and VR developer meetup did stir considerable interest" – Dirk Haupt.

Despite the potential ramifications of this ambitious project, its competition is estimated to occur in mid-to-late 2017. As a side-project, Dirk is conducting a pilot study where he is designing a virtual reality (VR) environment using the Leap Motion and the Oculus Rift that clinical researchers can use to study the effectiveness of VR for treating/researching quadriplegia and the resultant neuropathic pain that is often linked with it.

It is clear that Mr. Haupt has a lot on the go, and he is definitely one of UBC's master students to watch. "I managed to finish the first milestone in my VR project with the most exciting prospect being a VR start-up company asking to hire me next year after I gave a presentation of my work thus far in front of Virtual Hand - one of the foremost meetup groups for VR professionals in Vancouver and San Francisco. Whether I end up taking it or not, if I get a job in VR, I owe it to Eurocom. I really am at the absolute edge" – Dirk Haupt.

Here's a video of Dirk showing his Eurocom a little love as he demonstrates some a VR environment to a friend at UBC: www.youtube.com/watch?v=32_mJ7NSCr0

Dirk's History:

A man of many talents, Dirk's studies have taken him to a convergence between the evolving fields of neuroscience, virtual reality, data mining, and biomedical engineering. Dirk began his path by studying computer science and psychology at the University of British Columbia. Named on the Dean's Honour List two years in a row, Dirk quickly honed his talents and passions for technology and the human brain.

Despite Dirk's association and interest in modern information & VR technologies, his research is grounded in UBC's Department of Psychiatry. This is because Dirk has built strong connections between software applications and psychiatry/neuroscience. Specifically, as part of his Master's thesis, Dirk is developing a Graphic-User Interface (GUI) application for non-programming savvy neuroscience researchers.

In his words, the end-game of this application is to serve as "a standalone industry-grade cross-platform pyqt4/pyqtgraph application for automating the analysis pipeline required to accurately infer regional brain connectivity changes from wide-field brain images." – Dirk Haupt.

In other words, this application will perform a series of analyses needed for neurosurgeons to meaningfully use the information neuroscience researchers have gathered, significantly improving the efficiency of the research process.

Of particular influence to Dirk's work are UBC Professor Tim Murphy and Dr. John Steeves, professor at ICORD (International Collaboration On Repair Discoveries), an interdisciplinary research centre focused on SCIs.

"Professor Murphy helped me overcome the technical challenges of understanding neurophotonic methods. It was in his lab where I really started to mature as an industry-grade software engineer, and that would not have been possible if he did not gave me the space I needed to properly design the application from scratch. Dr. Steeves helped me think practically, applying my ideas to specific clinical applications. Further, his networking put me in touch with prominent spinal cord injury researchers around the world to the point that my data mining application sees use in Balgrist, a hospital in Switzerland" – Dirk Haupt.

This data-mining application is still being maintained today, which Dirk wrote using R Shiny and Hothorn's seminal Unbiased Recursive Partitioning algorithm. This application continues to be used by the Vancouver General Hospital's spinal cord clinic to assess a spinal-cord-injury patient's eligibility for various clinical trial research settings.

Dirk at the Praxis Conference in April, 2016