Complementary skills for a great cause

CONNECT meets Domenico Vicinanza from GÉANT and Anglia Ruskin University and Genevieve Williams from the University of Exeter to learn about their project created to support the work of Red Cross International and Handicap International presented at THE Port Humanitarian Hackathon in October last year: the development of an affordable smart wobble-board for lower limb amputees.

Domenico, a physicist and sensor specialist, and Genevieve, a biomechanical and human movement scientist, combined their complementary skills and expertise when they started developing the concept for a technological physiotherapy solution for lower limb amputees. In order to support an inordinate number of lower limb amputees, which was an important step forward and a very useful initiative, but it required the presence of an English-speaking health professional during the rehabilitation process and constant expert supervision.

After the 60-hour Hackathon a multidisciplinary team of experts from around the world, lead by Domenico and Genevieve, developed a working prototype of a special, smart wobble-board that basically brought the Red Cross booklet to life. The board is modular, flat-packable, network-enabled and shippable. The device has a memory card to store data, and expert professionals can access the measurements at anytime from anywhere, track progress and compare performances.

THE PORT Hackathon – Supporting Humanitarian Innovation

A simple, but effective device

The Red Cross had issued a detailed booklet in English language with gait retraining exercises for lower limb amputees, which was an important step forward and a very useful initiative, but it required the presence of an English-speaking health professional during the rehabilitation process and constant expert supervision.

After the 60-hour Hackathon a multidisciplinary team of experts from around the world, lead by Domenico and Genevieve, developed a working prototype of a special, smart wobble-board that basically brought the Red Cross booklet to life. The board is modular, flat-packable, network-enabled and shippable. The device uses real-time data collection, a process where sound is created from variations of melody patterns; real time sonification and identify issues generated according to an algorithm designed for the patients’ specific needs enabling them to follow specific physiotherapy exercises. In addition, the device has a memory card to store data and measurements related to the re-training exercises and is Bluetooth and Wi-Fi enabled, making it possible for physicians and therapists located anywhere in the world to access the data, monitor the progress of the patient, provide feedback in real time and adjust the therapy. Thanks to network connectivity, the therapist can listen to the real-time conversation and identify issues based on variations of melody patterns; while thanks to the local storage of data, expert professionals can access the measurements at anytime from anywhere, track progress and compare performances.

The future

Combining research and education networking - for example connecting the wobble-board to a hospital or a research centre using eduroam - with expertise and remote support, would turn the smart wobble board into a powerful rehabilitation tool for isolated communities or in war stricken zones. It could also work as a prototype for an entire new way of approaching physical therapy. In fact the smart wobble board developed by Genevieve and Domenico’s team is at the crossroad of sciences, technology and arts/ humanities. With the use of smart sensors and networking it can enable remote support and can connect to similar devices in the same region. This revolutionary device can contribute to bringing the focus back to the patient, placing him or her at the very heart of the therapy and to making the rehabilitation process more engaging and effective for patients and practitioners.

Pictures
Left: Final wobble board presentation. Top right: Wobble board in action. Bottom right: Domenico Vicinanza

About THE Port

THE Port is an independent Swiss non-profit association ruled by its members and based on volunteer working. It is supported via in-kind donations from CERN and the Globe of Science and Innovation for holding the Humanitarian Hackathon.

THE Port Humanitarian Hackathon

THE Port Humanitarian Hackathon, organised by THE Port Association, hosted by Idealliance, CERN, with partners from non-governmental organisations, is a 60 hour brainstorming workshop devoted to humanitarian, social and public interest topics. Interdisciplinary teams of selected participants work together in the fields of communication, transport, health, science, learning, culture and data.

This unique event aims to demonstrate how fundamental science can benefit to society through the creation of tangible and cost-efficient technological solutions to humanitarian issues. Challenges tackled within the hackathon's result in the creation of working prototypes which are then promoted to be implemented in the field. This year the Hackathon took place on 6 to 8 October at CERN: 60 participants from around the globe, 12 mentors and field workers and 10 coaches from THE Port worked on 5 humanitarian challenges. Final presentations were delivered to an audience of 350 guests from NGOs, private sector, social entrepreneurs, academia and the media. The following organisations collaborated to make it happen: Terre des Hommes, Global Humanitarian Lab, Hôpitaux Universitaires de Genève, Changemakers Lab, MIT D-Lab, Impact Hub Geneva, Global Shapers Community.

For further information on THE Port Humanitarian Hackathon 2017 visit: http://theport.ch/home/the-port-2017/

For the Hackathon video visit: https://vimeo.com/239013780/6ed08aba8b6