

3D VISUALIZATION ENGINE FOR A WEARABLE SOCK SYSTEM FOR THE PREVENTION OF FOOT ULCERS

Foot ulcers are one of the most important complications for diabetic patients. When talking about quality of life of the patients, the risk of diabetic foot-ulcers could be decreased, by an early indication of the risk, and the development of a customized orthopaedic shoes to minimize pressure on the foot. Foot ulcers are a huge problem for the healthcare system, healthcare-costs and mainly for the quality of people suffering such complications.

However, these shoes are developed based on expertise of the therapist and the traditional sole-pressure mapping systems. But one of the main problems is that foot ulcers do not only originate at the bottom of the foot, but also on the sides and top part of the foot. Currently there is no such system available for podiatrist that could measure and record the pressure on multiple points around the foot while walking using a conventional shoe.

The ExPressure project aims to develop such a state-of-the-art monitoring system, covering many research aspects such as wearable sensing technologies, 3D foot modelling to asses important areas for ulcer formation, embedded wearable sensor systems, wireless data transmission, data storage and visualization, among others. The project consortium is formed by universities, specialist and podiatrist and industrial partners in the area of Twente. The Ambient Intelligence research group is researching on state-of-the-art data infrastructure platforms: data storage, analysis and visualization, with a focus on user interface/experience design that could ease and help the podiatrist to assess the foot ulcer formation.

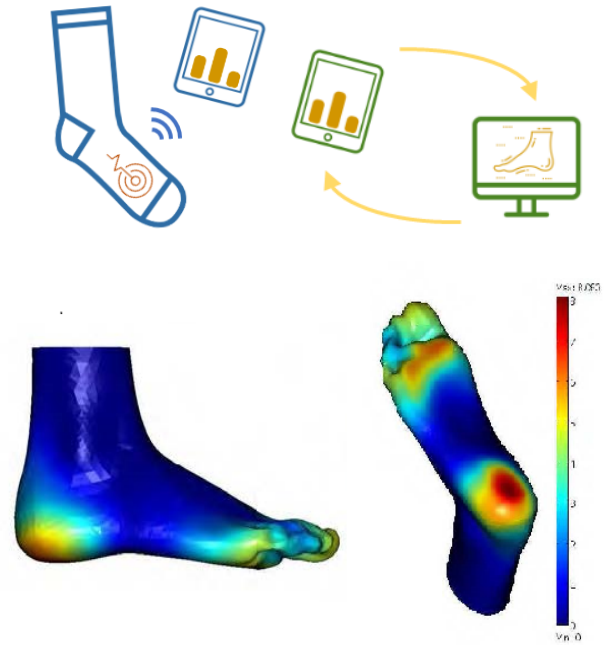


Image Source: P. Franciosa, et al. 2010

PROJECT DESCRIPTION

Within the ExPressure project, different system versions are being developed, following an incremental and iterative design approach. The aim of this project assignment is to research different visualization technologies and developed a 3D visualization engine that could be incorporated into a mobile or hybrid application for the visualization of the different pressure point on the foot. An important aspect is that the 3D visualization engine should be able to replay the measurement session on real time and display the different pressure points on a 3D foot model, as well as its gradients.

PRACTICAL INFORMATION

- **Student profile:** HBO-CMGT, HBO-ICT with passion for 3D rendering and data visualization
- **Duration:** 6 months (2 education terms)
- **Compensation:** 230 €/month (before taxes) when carrying out this assignment at Ambient Intelligence
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