BME 484 Biomedical Engineering Capstone Design

Project Proposal

Project Title: Wearable Pressure Measurement Insole for Use with EMG Measurements

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Abstract: The project will expand the offerings for additional supporting data for EMG-centric sensors. Specifically the insole will offer insight into uninhibited movable studies of gait movement. Current solutions are cumbersome, stationary, or fragile. In order to obtain a full spectrum of data, the insole will pair with the Trigno EMG System to offer real-time, robust, and accurate foot pressure data. The key attributes of the sensing insole will be an array of pressure sensing cells and a encapsulation strategy for the array to afford compliance and durability.

Innovation: This project will be the first of its kind to encapsulate an array of pressure sensors into a durable and flexible membrane

Materials:
-*Force Sensing Resistors*
  -*Some options:*
  TE
  Interlink
  Parralax
  Honeywell
  Sensitronics
  Sensor Porduct Inc
  Tekscan
-*Gel Encapulation*
-*Flexible Circuitry*
-*Trigno System*

Subtasks:
-Primer
-Design
-Protyping
-Testing and Improvement
-Delsys Progress Report
-Revised Prototype with Packaging
-Final Report

Timeline:

9/18	Proposal
9/25	Primer
10/2	Mechanical and Electrical Sketch
10/2	Prelimary FSR Evaluation

10/23	Rough Prototype (no primary packaging)
10/30	Testing/Assessment of Rough Prototype
11/6	Revised Prototype (with primary packing)
11/13	Prototype Testing
Next Semester	Encapsulation Methods
	Hydrogel Assessment
	Mechanical Design
	Encapsulation Prototype
	Testing/Assessment of Encapsulation Prototype
	Pressure Map

References:

[1]"In-Shoe Plantar Pressure Measurement and Analysis System Based on Fabric Pressure Sensing Array - IEEE Journals & Magazine", Ieeexplore.ieee.org, 2017. [Online]. Available: http://ieeexplore.ieee.org/abstract/document/5378500/?reload=true. [Accessed: 18- Sep- 2017].
[2]M. Orlin and T. McPoil, "Plantar Pressure Assessment", OUP Academic, 2017. [Online]. Available: https://academic.oup.com/ptj/article/80/4/399/2842449/Plantar-Pressure-Assessment. [Accessed: 18- Sep- 2017].
[3]"Gait Analysis Using a Shoe-Integrated Wireless Sensor System - IEEE Journals & Magazine", Ieeexplore.ieee.org, 2017. [Online]. Available: http://ieeexplore.ieee.org/abstract/document/4358886/. [Accessed: 18- Sep- 2017].
[4]"Force Sensitive Insole", Tekscan, 2017. [Online]. Available: https://www.tekscan.com/applications/force-sensitive-insole. [Accessed: 18- Sep- 2017].