

Data and documentation for James Martin Coates PhD Thesis: Podiatric skin health sensing in the diabetic foot

Experimental data storage

All experimental data have been stored in anonymised open format (*.xlsx) spreadsheet format in the folder entitled “Data”. The data for each volunteer is stored in a unique file giving their unique 3 digit identifier followed by the data set number and their racial group.

Chinese volunteers utilised flexible printed circuits mounted in the shoes which were found to be unreliable in practice. Caucasian volunteers used wired sensors taped to the soles of the feet.

Each data file consists of 16 sheets (tabs).

- Tab - Volunteer data - presents all necessary volunteer specific data.
- Tab - Sensor analysis - presents a representation of where sensor failures occurred.
- Tab - Stab - is a repository for the sensor stabilisation data.
- Tabs - Stand1 to Sit2 present the data for all walking, sitting and standing tests.
- Tabs - Left and Right PORH - present the bioimpedance data for short term circulation occlusion tests.
- Tabs LB and RB - present the data for no load, sitting and standing tests for Bioimpedance.

Each experimental data sheet identifies the original *.csv data file name, data and time the data was taken and initial test cell condition (temperature and humidity) at the start of the test in cells A1 - E3. The fourth row indicates the column number for easy reference when using python scripts in the analysis. Row five provides the sensor name, where “T” = temperature, “F” = force, anatomical positions are “calc” = calcaneous, met = metatarsal head, “GT” = great toe. Row 6 declares the unit type and row 7 the site measured “Lab” = laboratory, “L” = left foot, “R” = right foot.

Sensor design

All sensor designs are stored in the “Sensor designs” folder and are presented in *.DWG format. Most 2D CAD systems are capable of reading this format. DraftsightTM from Dassault systems was used to generate these layouts. Flexible breakout circuits are provided to access the hardware with wired sensor arrays are provided.

Software

All software used for data gathering and the final python analysis code is presented in the Software library. Software is stored in application specific folders for easy access.

Circuit design

The final design of the embedded control circuit is presented in the folder “Circuit design - Eagle CAD”. As suggested by the title the free software package Eagle CAD was used to design this circuit.