PresTrack

PROPOSAL FOR A PLANTAR FOOT PRESSURE ANALYSIS SYSTEM

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REVISION 1.0	

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1. Introduction & Background

PresTrack is a company of five enthusiastic and ambitious engineers who are passionate about delivering reliable and affordable solutions to health problems in the biomedical realm. Our spotlight product for this capstone project is the Plantar Foot Pressure Analysis System. This product is a portable diagnostic system which will aid researchers and doctors to detect plantar fasciitis – a painful foot condition – in its early stages by means of observing foot mechanics. The primary indicator in our system will be foot pressure mapping, and in addition to that, we will present measurements of two angles of the foot during the gait cycle which will provide further insight into proactive diagnosis. With the group's current progress and financial state, we are confident to be able to deliver a product that is cost-effective and functional by April 4th, 2014 for demonstration purposes.

2. Schedule

ENSC 440 – PROJECT TIMELINE

PROJECT PHASE	STARTING	ENDING
ACCELEROMETER AND MUX INTEGRATION	3.3.2014	3.7.2014
CALIBRATION OF DATA	3.11.2014	3.13.2014
DESIGN SPEC	3.3.2014	3.10.2014
CIRCUIT INTEGRATION	3.10.2014	3.14.2014
GUI	3.10.2014	3.14.2014
TEK SCAN RESULTS	3.24.2014	3.25.2014
POWERPOINT FOR THE DEMO	3.24.2014	4.4.2014

PROJECT PHASE	STARTING	ENDING
WRITTEN PROGRESS REPORT	3.20.2014	3.22.2014
POST MORTEM REPORT	3.25.2014	3.28.2014
MAKE ENCLOSURE AND ANKLE WRAP	3.24.2014	3.26.2014
RESEARCH ANKLE DATA VALUES FOR COMPARISON PURPOSES	3.22.2014	3.23.2014
EAGLE – PROTOTYPE LAYOUT	3.24.2014	3.26.2014

Green=Task completed, Yellow=Task in process, Red = Task yet to be started

3. Financial

Having reviewed the cost of the materials purchased for the successful completion of our project, we can conclude that our project is still under budget and we would not require any assistance from the Weighton Fund. We received $500 through ESSS funding as well as an Arduino Uno for our usage. Our estimated budget was $900, hence, we are in good financial standing.

Items	Cost to date
Non-electronic components (Fabric, casing, shoe insert, paint, calibration equipment)	113.7
Electronic components (MCU, MUX, Data logger shield, sensors, battery, gyroscopes, accelerometers, heat shrink, LED)	310.18
Total	423.88

Table 1: Cost Breakdown

4. Progress

The primary objective for our product was to provide a safe, cost-effective, reliable and comfortable device that can be worn by consumers. We have made progress in all these areas by moving towards a product that is now on a soldered on a prototype board, with sensors tested for accuracy and reliability. In addition, much research during design phases was put into user comfort while walking with our device on, and we have chosen materials for our ankle wrap and insole accordingly. The graphical user interface – which will further analyze the data is mainly set-up with final analysis coding remaining.

Planning and Research

We have been progressing in all areas through strategic planning for design and research. Research into project and the future scope of our project led us to change the primary focus from producing high resolution for pressure distribution to measuring parameters which ensure the effective diagnosis of plantar fasciitis at a trade-off for lower resolution.

Design and user experimentation

We have iterated through the design process several times to ensure user safety and comfort. Whenever we were integrating a new part into our system, or deciding best design method, we would do a crude test by getting a user to try the insole within their shoe and then revisit the design if we received feedback on discomfort.

Material Acquisition and testing and fabrication

All of our initial parts for circuitry assembled and tested. Initially, we had a set-back with the multiplexer and data logger, both which were an integral part of our data collection and logging. We managed to exchange these for full refund, and they are now in a working state. Additionally, we have purchased fabric and sewn the ankle wrap which holds our product enclosure together. This will be purchased and fabricated in the coming week.

Documentation

Our group had successfully submitted all required documents up till this point. The final two documents are currently in progress and we have had participation and input from all members during this process.

5. Summary & Conclusion

Our project is in the final stage of development, and about 80 % completed. We are expecting to complete the project by the March 28th 2014 with a spare week to accommodate any set-back as well as to allow the proper presentation of our project for the demo. Our demo date is the 4th of April, which will showcase our efforts over the last four months in designing and developing and presenting the Plantar Foot Pressure Analysis System, which will serve the purpose of characterising various aspect of foot mechanics for research and diagnostic purposes.