



Role: DSP (Digital Signal Processing) Intern

Department: Engineering

Contact: Nabil Uddin, Chief of Staff (nabil.uddin@helpwear.ca)

Background

HelpWear is striving to achieve better at-home healthcare by developing affordable and accessible products for patients all around the world. HelpWear is currently developing HeartWatch, a continuous wearable heart monitoring system with an embedded emergency contact system for further prevention and better treatment of heart-related illness. Since our founding in the summer of 2015 in Ryerson University's Basecamp program, HelpWear has grown to operate in Ryerson University's Zone network, the University of British Columbia through CDL West, the Y-Combinator Accelerator program, and the Waterloo region.

Key Roles

- Working in a team to improve existing in-house algorithms and develop new electrocardiography (ECG) processing algorithms for denoising, feature extraction, and event detection
- Benchmarking and validating ECG processing algorithms using in-house and public databases
- Complete research objectives in timely manner and write summary reports

Required Experience

- Development of scientific or numerical computing software
- Digital signal (or image) processing using Matlab or Python
- Experience training and evaluating performance of supervised Machine Learning algorithms will be an asset, but not essential

Job Description

A viable candidate will contribute to comparison testing existing solutions, innovating ways to improve current Digital Signal Processing techniques. The individual will be working closely with the engineering team in the form of algorithm development, implementation and using Machine Learning to support further analysis.

Things that you will need to know, but not a prerequisite

- Signals Processing in Matlab or Python



- Algorithm implementation, development, and testing
- Software version control
- Creation of supervised and unsupervised Machine Learning models

Things you must learn

- Physiological principles underlying the ECG signal
- Operations of a Capacitive ECG electrode
- HelpWear documentation structure

Product Description

The Heartwatch is a continuous non-invasive ECG monitor that is worn on a patient's bicep. The device leverages novel dry sensor technology to detect anything from a minor heart occurrence like atrial fibrillation, or heart palpitations, to a more severe event.

Unlike other products that record signals intermittently, the HeartWatch collects these signals continuously without any need for the wearer to signal the device that a problem exists. The HeartWatch utilizes four dry sensors to collect the differential ECG signal at the patient's bicep. Collected ECG data is sent via Bluetooth wireless transmission to the patient's smartphone, linked to a cloud-based ECG repository via a wireless internet connection, where advanced analytics are performed, permitting the immediate detection of abnormal heart rhythms and if necessary, prompt intervention, enhancing the well-being and safety of HeartWatch users. The companion software app of the HeartWatch is made for Android OS.