ECE 492 - Computer Engineering Design Project
Smart Bandage

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Overview:

The Smart Bandage is a small, embedded solution for wound monitoring with medically useful sensors and Android and Web applications targeted at Doctors and Nurses.

Temperature, humidity, and surface moisture sensors embedded within the bandage provide data crucial to medical professionals. This data allows Doctors and Nurses to ensure that the wound is in a state conducive to healing, and informs them when the dressing needs changing.

With a Bill of Materials of $25 the bandage could provide significant cost savings over the $1000/day cost of homecare by a nurse.

Motivation:

The motivation for the smart bandage is two-fold:

• Reduce costs of homecare and extended care

• Increase speed of healing for significant wounds

With the aid of the Smart Bandage, medical personnel only have to visit the home when the wound requires attention, instead of every day. Additionally, over changing or under changing the dressing on the wound can lead to infection and slow healing.

The humidity and moisture sensors also help doctors ensure that the wound is neither too dry, nor too wet which could slow or inhibit healing.

Features:

Smart Bandage hardware consists of a Disposable Bandage Module and a Bluetooth Communications Module. The bandage module contains all sensors and is in direct contact with the wound, while the communications module contains the MCU, moisture circuitry, and Bluetooth capabilities.

Temperature data can be used to detect bacterial infections in the wound, while moisture and humidity data ensures that the wound has the correct moisture content to ensure fast healing.
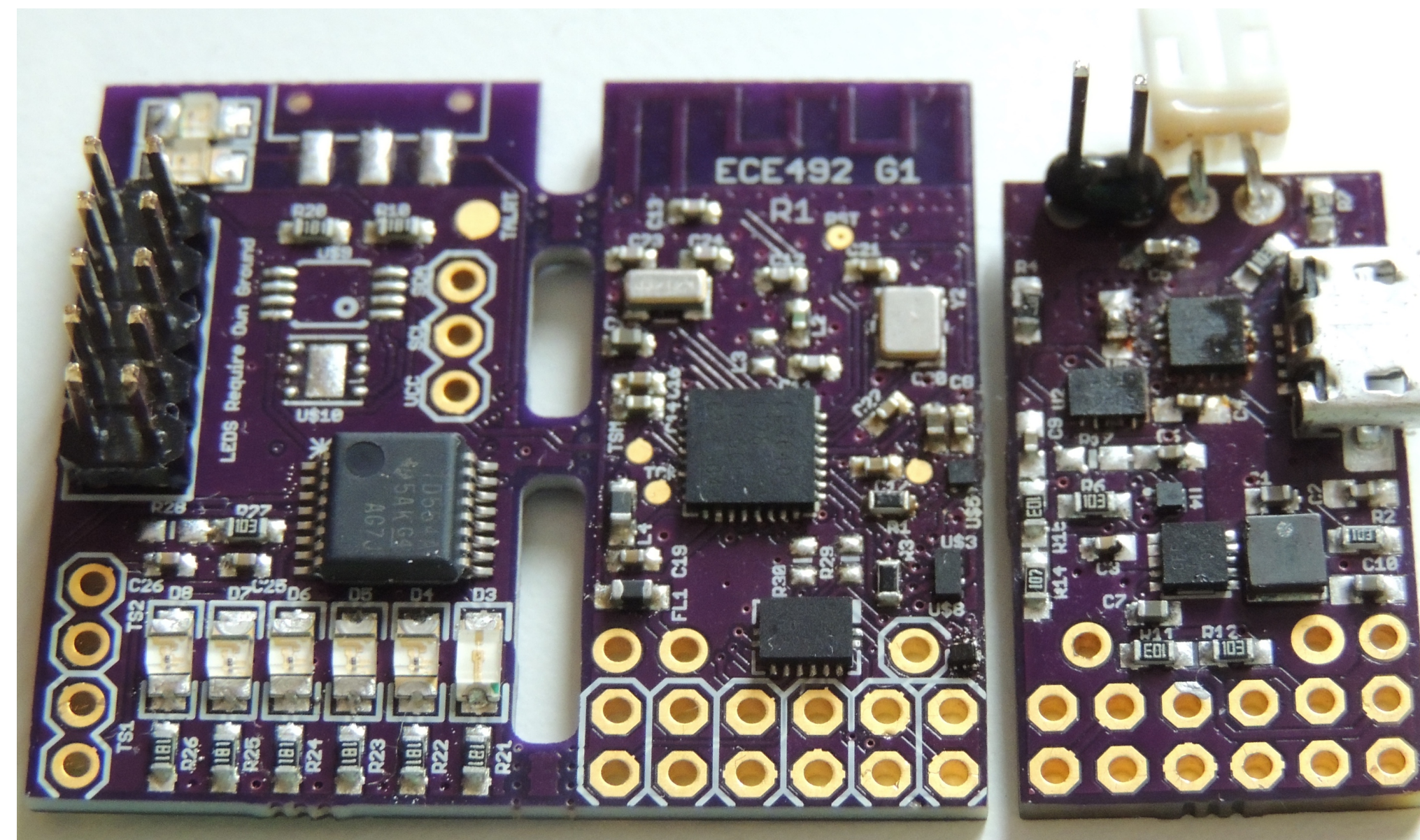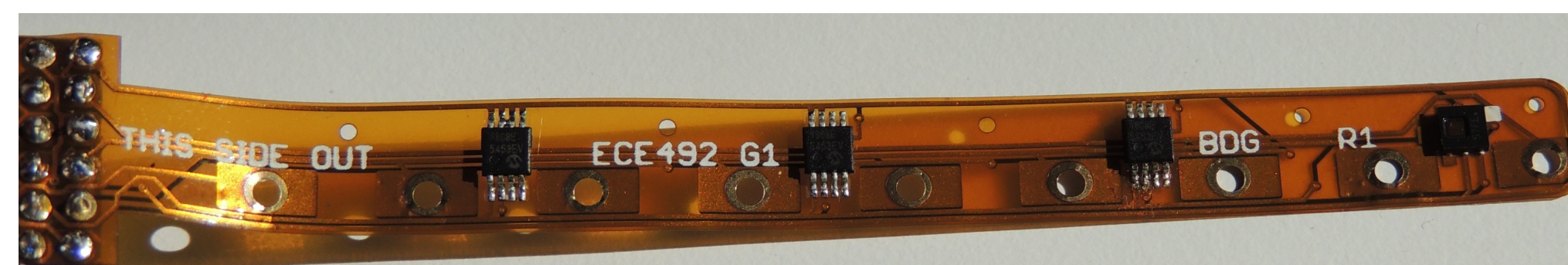

Fig. 1 Bluetooth Communications Module

Fig. 2 Bandage Module

How It Works:

The communication module takes sensor readings from the bandage every 30 seconds, and saves significant ones. Every 1-6 hours the module connects to the Android device and relays the data which is then uploaded to the web application for remote monitoring. The web application is pictured in figure 3.

The web application generates warnings and alerts for Doctors and Nurses for unusual or values or values that could indicate attention is required. Alerts are also generated if data is not received within a particular interval.
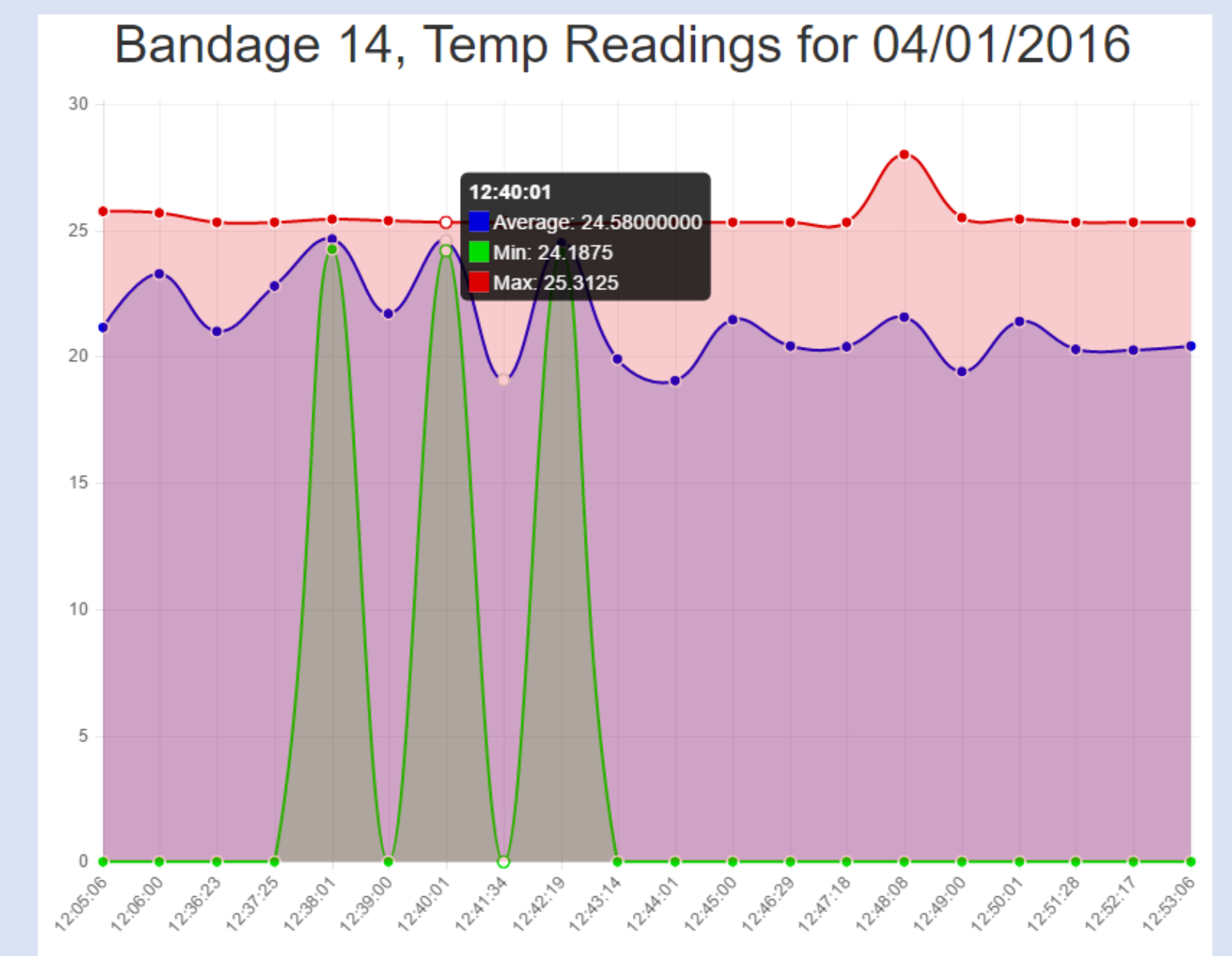

Fig. 3 Data in Web Application

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