

Diaper Detection - Android Application: Project Overview

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Motivation

Anyone who has experience raising an infant knows that it is a difficult endeavor...The tech generation is reaching the age of parenthood, and the demand for tech gadgets that make parenting easier are growing. There are now tons of smart baby monitors, some even monitor baby blood oxygen level. However, diapers, the most tedious part of taking care of a baby, have not seen much help from technology.

While there isn't much to be done about the process of a diaper change, headache can be prevented if diaper change is done right after it has been soiled and before the baby starts to feel discomfort. As of now, the only way for a parent to know if their infant's diaper is soiled is to physically check, usually after signaling from the baby. If we are able to know right after the baby urinates, and changes their diaper immediately, we would be able to prevent discomfort to our child and eliminate the possibility of diaper rash, helping to improve the quality of life of babies and their parents in the process.

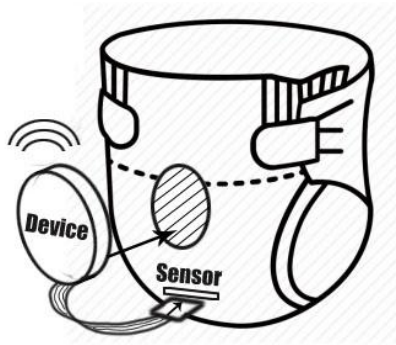
Expected Functionality

- Wet diaper detection
- Alert transmission via WiFi to mobile phone app while at home
- Alert transmission via bluetooth to mobile phone app while mobile
- Audio alert if both wireless fails to transmit to mobile phone app
- Track how long since the diaper has been wet
- Diaper usage quantity projection for the week, month, or year
- Rechargeable battery

Wireless Technologies Used

- 802.11n WiFi
- 802.15 Bluetooth 4.0

Implementation Overview



- We'll make our custom diaper by making a sensor insertion slit near the front-bottom of the diaper, we'll also attach the 'loops' side of velcro to the front of the diaper for device attachment.
- Wetness detection will be done with arduino compatible capacitive moisture sensor.
- Moisture sensor will be attached to a Raspberry Pi Zero W which will poll analog readings from the sensor every 5 seconds.
- Once the Raspberry Pi detects reading over threshold, it will turn on WiFi (WiFi is not constantly on to save battery) and transmit alert to App.
- Raspberry Pi will be powered by a 5000mA battery bank via USB which is rechargeable.
- Raspberry Pi and the battery bank will be enclosed together in a case which has the 'hook' side of velcro on it.
- The moisture sensor will be connected to the unit via ribbon cable.
- The whole device will be made as small and sturdy as possible.
- App will be written with a Raspberry Pi friendly dev kit.

Team Roles

Hardware: Scott

App: Michael

GUI: Mary

Tentative Timeline

Phase I - Sensor test, App dev kit research

Phase II - Raspberry Pi setup, App interface test

Phase III - Early prototype (test), App development (basic features)

Phase IV - Prototype (refinement), GUI development, App development (advanced features)

Phase V - Final prototype (packaging), App testing and polishing, documentation prep

Phase VI - Remaining Fixes/Adjustments