

Periodic measurement of nighttime weight change while asleep

Week: October 27 – November 2

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Problem Statement

We would like to be able to measure this weight change accurately on people who are in hospital beds, and be able to view and record the weight changes over various intervals through the night (such as weighing a person who agrees to lay in bed all night at intervals of every 10-15 minutes). This is important from a research perspective on numerous potential variables that may affect this weight change, such as medications as well as sleep stage changes. We would also use this to potentially track and eventually predict those at higher risk of developing obesity, correlate with body fat measurements, activity, and assess for metabolic changes when we do things to improve/correct sleep problems. There is popular concern in the most recent sleep literature about various sleep stages, insomnia, and their impact on obesity. This scale would likely have to support a hospital bed, which sits on 4 legs, and read at an accuracy ideally around 0.02- 0.05 lbs (many scales on the market record to such accuracy, the more accurate the better). I'm not sure how the zeroed weight of the bed would affect this. Ideally it would be a device we could move to a different bed without too much difficulty (such as in 1-2 hours time), without too complex recalibration.

Last Week's Goals

- Begin to build prototype
- Divide up future work
- Pick up design notebooks
- Begin research into building test stand

Accomplishments

- We met on Wednesday night to begin hooking up our load cell and ADC. We ran into a problem when the serial port on my laptop was not compatible with the serial cable for the load cell. This should not be a problem though, as Eric brought the cable home and found that it is compatible with his computer, so it is most likely just a problem with my computer.
- We emailed the BME secretary to find out how we can gain access to the electronics lab in the basement of ECB.
- We are going to divide up the work so that people are not all working on repetitive things. Someone will begin building a test stand, someone will begin working with the computers, and someone will begin figuring out the interface between the ADC and the load cell.
- We will also have to build a test stand to test the load cell. We will begin doing that next week hopefully. We will make it out of wood for our preliminary tests, but future stands should be made of a more sturdy material.

This Week's Goals

- Hook up load cell to ADC and see if we can get a reading on the computer
- Continue construction of prototype
- Have papers signed to gain access to electronics lab
- Begin construction of test stand

Difficulties

- The price of a precise enough load cell continues to be a problem
- The circuitry may be very intricate and require help from someone who is knowledgeable with circuits.
- A prototype may have to be built that does not have the accuracy desired by Dr. Juergens
- The test stand may require some complex construction
- The serial cable of the ADC is not compatible with all computers

Mid-semester Report														
Mid-semester Presentation														
Final Report														
Final Presentation														
Weekly Reports														
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MEETINGS														
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Expenses to Date: \$79

- DATAQ computer software: \$25
- Aerocon 44 lbf load cell: \$25
- Digital Scale: \$25
- 9-V Battery: \$4