Department of Mechanical Engineering
2.75 Fall 2015 –Design of Medical Devices

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QuantaFit: A Novel Device for the Assessment of Frailty

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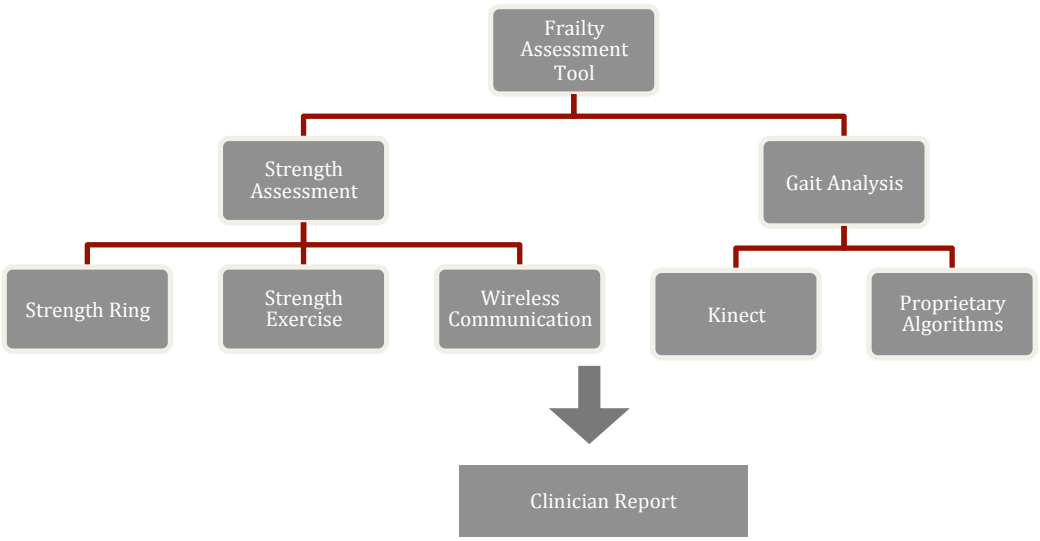
Clinical Challenge

Frailty is a condition that affects 15.3% of adults over the age of 65 and results in a 2.3x increased chance of experiencing morbidity and mortality. Frail individuals are often also potential candidates for invasive procedures, but their physical capability of handling such procedures is often unclear. A better method of quantifying and identifying frailty needs to be developed.

System Architecture

We have developed a novel system consisting of two main parts: a strength assessment tool and a gait analysis tool. Both parts generate data that is collected and printed in the clinician report. Shown in the diagram below is a picture of our finished device, as well as a tree diagram of the system architecture:



Measurements

Gait Analysis

- Gait Speed
- Stride Length
- Stride Duration
- Cadence
- Slouch Angle

Strength Assessment

- Chest
- Bicep
- Shoulder
- Quadricep

Functional Requirements

- Non-invasively assess one or more factors associated with frailty
- Be intuitive for use in a clinical setting
- Provide a quantitatively assessment of frailty

Significance

Our device is intended for use as a research tool that will allow clinicians to collect patient data and analyze the significance of our measurements. Ultimately, we hope that the availability of this data will encourage physicians to use our system and improve the predictability of frailty diagnoses.