Talking Walker

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Rachel O'Connell, Jared Ness, Alpha Liu, Billy Zuleger

Problem Statement:

Older adults that require the use of a walker for day to day motility can cause serious harm to themselves by forgetting to use their walker. The goal of this project is to design a walker that can notify the user when the user begins to walk away without it. In addition, the walker should provide useful feedback about the walker usage such as time, total steps taken and cadence. The technology would ideally be transferable to use with a walker.

Client Requirements:

- Walker must have a sensor that notifies the user when they walk away without it
- Walker needs to be able to measure time used, steps taken, and cadence
- Data from the walker must be transferable to care provider

Design Restraints:

1. **Physical and Operational Requirements**
    a. *Performance requirements:* The walker should be able to support user weight and should not inhibit normal mobility.
    b. *Safety:* The alarm on the walker should not startle the user causing unsafe behavior.
    c. *Accuracy and Reliability:* The walker should notify the user when they are approximately one foot away from the walker. Step count, cadence and time of use data should be accurate within 5% of the total steps taken and the total time used.
    d. *Life in Service:* The device should last for lifetime of the patient with appropriate power supply.
    e. *Shelf life:* Shelf life is not an applicable restraint for the device.
    f. *Operating Environment:* The device will be used in a clinical study by a clinical research assistant. The device should be able to function in the home as well as outside.
    g. *Ergonomics:* The device should be comfortable for the user and not inhibit their normal. The device should be easy to read for low vision users, should have no small buttons, and should be easy to use for users with limited technological knowledge.
    h. *Weight:* The device weight should not add more than 2 lbs to the functional walker weight.
    i. *Materials:* The walker should be made out of standard materials such as aluminum, that can incorporate the appropriate electronic equipment.
    j. *Aesthetics, Appearance, and Finish:* The user sensor should be small and attachable to clothing or wrist. The incorporated electronics should be neatly packaged.

2. **Product Characteristics**
    a. *Quantity:* The client requires one working prototype to be tested by human subjects.

b. *Target Product Cost:* $20-500, could be increased with client approval

3. Miscellaneous

a. *Standards and Specifications:* The device should hold patient weight and be user friendly.
b. *Customer:* The device will be tested on human subjects
c. *Patient concerns:* The device should be user friendly for those with audio, visual, and precise movement impairments. The alarm should not cause additional agitation or unhealthy patient behavior.
d. *Competition:* There are no walkers that are able to sense when the user walks away or that are able to quantify usage.