MALD - Motor Aided Limb Device

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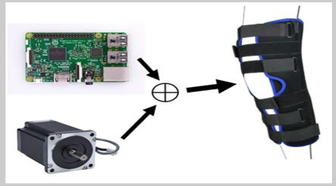
Purpose

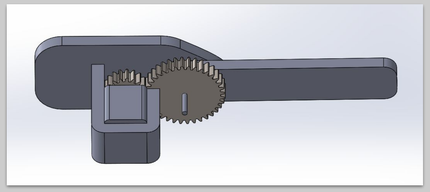
- Design and build a motorized brace that will assist with joint movement.
- This brace will aid in the movement of immobilized limbs which will prevent pressure sores/ulcers from appearing as they develop when the body is bedridden for long periods of time.
- A Raspberry Pi will control the functions of the motor to assist with joint movement.

Progress

- Fall Quarter
  - Completed
    - Conceptual design
    - Hardwired functioning prototype
    - Begin software development
- Winter Quarter
  - Completed
    - Finished gear train
    - Nearly complete device- with regards to hardware
  - In-progress / Planned
    - Software development (Python for RPi and Swift for App connected with Firebase)
    - Testing (Functional and Safety)

Diagrams





Primary technical components: Raspberry Pi, Nema 17 stepper motor, leg brace(left) SolidWorks prototype (right)

Nema 17 Test Bench

Hardware implemented on device (Nema17 motor, custom gear train, Raspberry Pi, LiPo Battery Pack, Thigh and calf brackets

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Materials

- Brace:
  - Soft Brace
  - Securing Mechanism: Velcro
- Electric Stepper Motor - Nema 17 Bipolar 2A
- Microcontroller - Raspberry Pi 3
- Gears - Module 1, 15/60 teeth, 20 degree PA, Spur
- LiPo battery pack
- Driver - DRV8825

References

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