EECE 461 Design and BOQ

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I. Final requirements

Our project is to improve the traditional electric wheelchair. During discussions, our improvements varied from detecting heart attacks during use to measuring the amount of power consumed by the battery. After a long list of desired features, we were able to cut down our list features into three fundamentals (musts)

1. Ability to detect obstacles and stopping wheelchair before any accident
2. Modulate its speed on inclinations and slopes and adjusting it (have a minimum speed when going up and a maximum speed when going down)
3. Detect gaps and holes that might be fatal to the user

We decided to classify some features as wants rather than musts due to the time constriction on our project.

1. Determining the power consumption of the motor

II. Hardware Design

If we were to implement only the fundamental features, the Arduino would be connected to three inputs and one output.

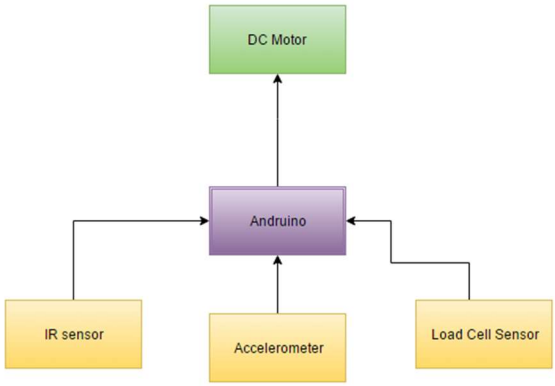

Figure 1 Schematic of hardware connections

The input to the Arduino are the infrared sensor (IR sensor), accelerometer, and the load cell sensor.

The infrared sensor would detect gaps, holes, and as well as obstacles on the track. The accelerometer would detect the slope of the incline and the wheelchair acceleration. Finally, the load cell would detect the user on the chair. According to these three inputs, Arduino would adjust the voltage delivered to the DC motor of electric chair.

III. Software Design

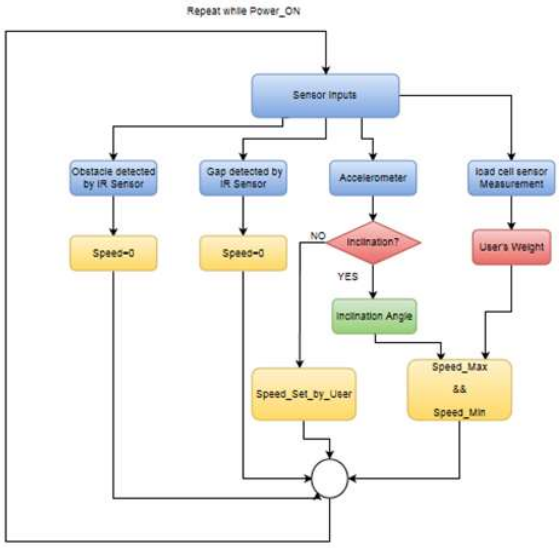

Figure 2 Software Design Schematic

IV. Bill of Quantities

Required Parts	Usage	Quantity	Cost ($)	Total
412 ARDUINO SENSOR ACCELEROMETER	Determine the inclination angle and the acceleration of the wheelchair	1	4.32	4.32
14 SENSOR LOAD CELL 40KG	Determine the weight of the person	1	8.25	8.25
412 CH INFRARED OBSTACLE	Detect obstacles and gaps	2	8.72	17.44
DC Motor	Move the Wheelchair	1	15	15
Arduino	Motor Controller	1	15.12	15.12
				60.13

V. References

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[3] Micro-Epsilon, "Sensors for displacement, distance and position," Micro-Epsilon, [Online]. Available: http://www.micro-epsilon.com/displacement-position-sensors/index.html. [Accessed 1 April 2016].

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