Tricycle for the Visually Impaired

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Introduction

Problem: Children with visual impairments have their ability to exercise independently limited.

Solution: A combination of electrical and mechanical systems allows visually impaired children to ride a tricycle safely and independently, without the need for a support person.

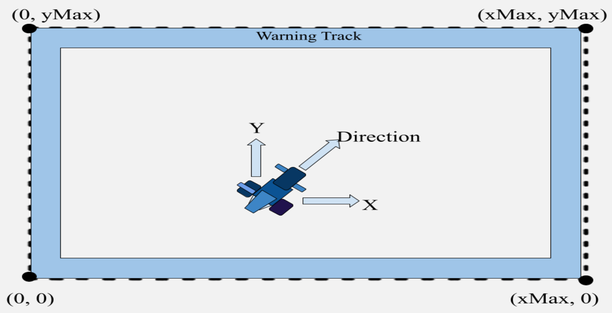
Goal: Safety and user independence.

Safety

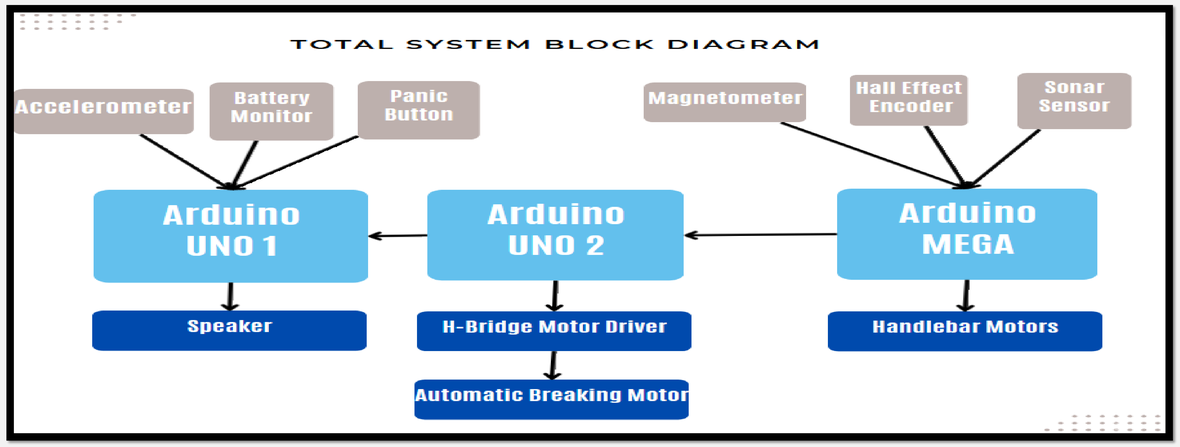
- ❑ Fall Detection and Alarm
- ❑ Vibrating Handlebars
- ❑ Obstacle and Perimeter Detection
- ❑ Automatic Braking
- ❑ Visibility

Perimeter Detection

- ❑ Hall Effect Encoder and Magnetometer
- ❑ Parent/Guardian of User Constructs Customizable Perimeter

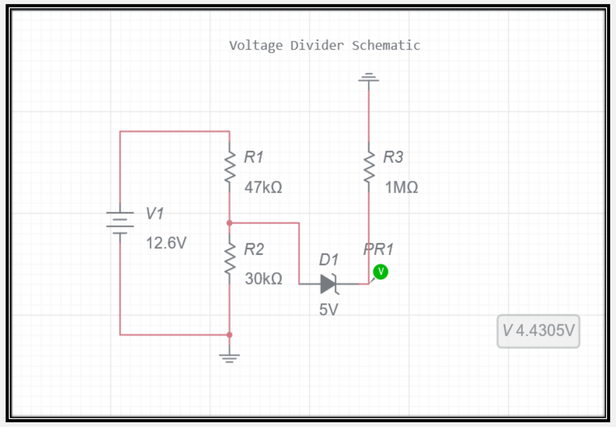


Total System Block Diagram



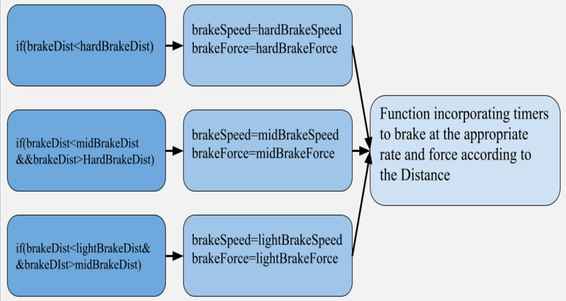
Battery Monitor

Battery Monitor Test Data		
Input Voltage (V)	Digital Voltage (Read by Arduino)	Voltage After Analog Conversion (V)
12.6	912	4.45
12.2	880	4.3
12	864	4.22
11.7	841	4.11
11.4	817	3.99
11	784	3.83
10.7	761	3.72
10.5	746	3.65

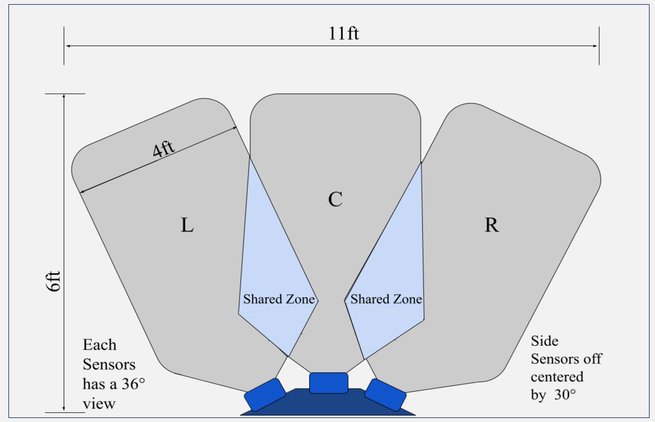


Automatic Braking

- ❑ Three-Stage Braking
- ❑ Proportional to Speed and Distance from Object



Obstacle Detection



Future Work

- ❑ PID Controlled Automatic Braking System
- ❑ Automatic Reverse Pedaling
- ❑ Completely Customizable Perimeter
- ❑ SMS Alerts and Tracking via App
- ❑ Maximum Speed Control

References

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