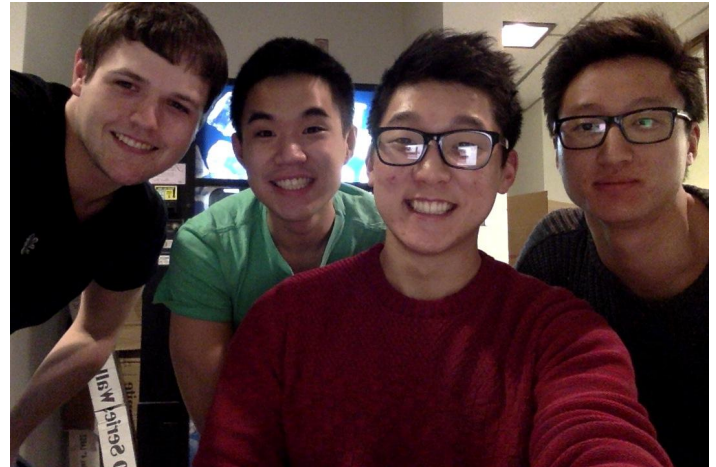

SmartPark

Tests and Validation

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Status Update

- Parts Received: All of them
 - Last updates:
 - Test Car design complete
 - Sensors attached and soldered
 - Arduino receives proximity data
 - Website up
 - Newest updates:
 - LCD display code compiles
 - Further soldering of components (LCD, switches, etc).
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Requirements

- Functional
 - Proximity sensors will trigger changes in display real time as objects become closer
 - When the driver turns on parallel parking assist, the display and speakers will assist him/her in parking.
 - The system will turn off when the car turns off
 - Nonfunctional
 - Provides response to the driver shall be less than one second
 - Sensors shall work independently from each other
 - Failure to receive and transmit message shall result in the system still being functional
 - Whole system shall be portable
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Coverage (Requirements) Testing

Requirement	Test
Proximity sensors trigger changes in display as objects become closer	Black-box - sensors update the LCD in accordance to distance of objects White-box - ensure proper transition of states as distances of objects change
Turning on the parallel parking assist will cause display and sounds to assist the driver	Black-box - ensure that the car is properly parked after following the instructions provided White-box- ensure proper transition of states
System turns off when car turns off	Black-box - ensure that LCD display turns off when car is turned off White-box - system is in the OFF state
System provides responses in less than one second	Performance testing - ensure latency between polling each sensor is low
System components shall work independently from each other	White-box - failure of LCD does not mean failure of sensors - ensure failure of one sensor does not mean failure of all
Network failure still results in functional system	Black-box - ensure other non-broken sensors are functioning properly and non-functioning sensor is indicated on LCD display
Whole system shall be portable	Black-box - make sure average set up time of the system is under 20 minutes

Use Cases

1. Driver attempts to parallel park
 2. Driver attempts to drive in non-parallel park mode
 3. Driver turns off system
 4. Driver turns on system
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Functional (Use Case) Testing

Use Case	Test
Driver attempts to parallel park	Black-box - testing of all the components satisfying their requirements - Check if LCD reads correct values - Check if proximity sensors are working as expected - Check if algorithm is working as expected
Driver attempts to drive in non-parallel park mode	White-box - testing of all components being in IDLE state
Driver turns on system	White-box - ensure all state variables are set properly Black-box - ensure proper start screen is displayed
Driver turns off system	White-box - ensure proper shutdown procedure is handled by program Black-box - ensure display is turned off properly

Custom Tests

- Calibration Test
 - Ensure system is calibrated correctly for various distances at start up
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Looking Ahead

- Goals to accomplish
 - Getting LCD working and functional
 - Complete soldering of whole project
 - Implement the parking assist algorithm
 - Define test performance standards and measurements
 - Update website with tests
 - Concerns
 - Latency of sensors will be too long
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