Car Sense

Test Plan of the blind spot monitoring and parking-assisting device **Safe Direction™**

Project Team:

> Aziz Mikwar
> Angel Tian
> Shaham Shafiei
> Karen Wang
> Khalid Almoammar

Contact Person: Khalid Almoammar
                   kalmoamm@sfu.ca

Submitted to: Dr. Andrew Rawicz – ENSC 340
                 Dr. Steve Whitmore – ENSC 305
                 School of Engineering Science
                 Simon Fraser University

Date: March 31st , 2014

_____

Test Plan

1 Individual Testing

1.1 Ultrasonic sensor

The ultrasonic sensor will be tested on the given specifications for the accuracy in sensing range and width with respect to object size and distance based on the calculated values **[R52_II] [R53_II]**. Testing on the ultrasonic sensor will include but not limited to:

I.   Accuracy of the sensing range and width
II.   Interference between sensors
III.   Signal delay for multiple sensors
IV.   Testing sensors for false detection
V.   Measuring the maximum accurate sensing distance on different obstacle size

1.2 Battery

After combine all the individual modules together, the system will be tested on the power consumption while using battery as the supply. Testing on the power consumption will include but not limited to:

I.   The maximum continuous operation time duration
II.   The best trade between duration and battery size
III.   The consumption level while in sleep mode

1.3 Wireless module - Transmitter and receiver:

The wireless modules will be tested under the given specification and the accuracy and limitation of the signal distance, interference level, and accuracy of transmitted signal. Testing on the wireless module will include but not limited to:

_____   1

_____

I.   Accuracy of the signal transferred
II.   Interference with other products near by
III. The accuracy of the signal transfer under different weather conditions

1.4 Buzzer

The buzzer evaluation will be based on the strength of the notification and adjusting it to the most comfortable level for the user **[R68_III]**. Testing on the buzzer will include but not limited to:
I.   Frequency of the buzzer sound
II.   Accuracy of the buzzer

1.5 LEDs

The LED lights will be tested on the functionality and the warning notifications provided **[R66_II] [R67_III]**.

2 Arduino UNO+ Transmitter and receiver

The Arduino board and transmitter/ receiver will be used to test the wireless communication for the system. Considering the RF transmitter and receiver is the cheapest wireless communication method out there, the liability of the product needs to be extensively tested in the following areas:

I.   Accuracy of the signal transferred
II.   The signal transferred interval
III. The delay between signals send

3 Arduino UNO+ Buzzer

The Arduino and buzzer will test with variations of buzzer response time wirelessly and the level of notification that it provides.

_____

_____

4 Arduino UNO+ Ultrasound sensor

The Arduino board and ultrasonic sensor tests the programmable limitation of the sensor and code. It will be tested under conditions to ensure that the microcontroller will be able to handle multiple sensor data and analysis it in a timely manner. The testing will include:

    I.   Ensure all data transferred for multiple sensors are accurate
   II.   Test the interference between multiple sensor and microcontroller

5 Power consumption testing

Test and evaluate the power consumption of the system, evaluating the battery power usage and the accuracy of the signal under different power levels left in the battery. The test will include:
    I.   Buzzer noise level in lower battery condition
   II.   Single transfer accuracy in lower battery condition
  III.   Warning system for low battery

6 User interface Testing

    I.   Recognizable warning system
   II.   Comfortable level of notification

7 Unit Testing

Combining all individual parts and testing on real environments:
      I.   Ease of installation
    II.   Accuracy of the sensor
   III.   The possible interference
   IV.   Wireless delay between microcontrollers
    V.   Waterproof level

_____