Car Sense

Post Mortem of the blind spot monitoring and parking-assisting device **Safe Direction™**

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Introduction

Car Sense's Safe Direction is an electronic driving aid system that can be installed on any car regardless of the model. Using Ultrasound sensors this system sends the appropriate signals to the main Arduino for processing and as needed warns the driver of any objects in their blind spot in addition to the sensors on the bumper which help the driver to avoid hitting other cars and objects while parking.

Overall Current State

Safe direction consists of three main subsystems which are: Blind spot assistance, parking assistance and user interface unit. This section will provide an overview of the whole system and cover the design of subsystems' common functionalities.

Current State Overview

Safe direction is a portable system, which can be installed easily by the user on various types of household automobiles. The system assists the driver by monitoring the driver's blind spot and giving a notification when an object is within the driver's blind spot. In addition it gives the driver parking assistance by giving a notification when an object is at close proximity of the vehicle's front or back side.

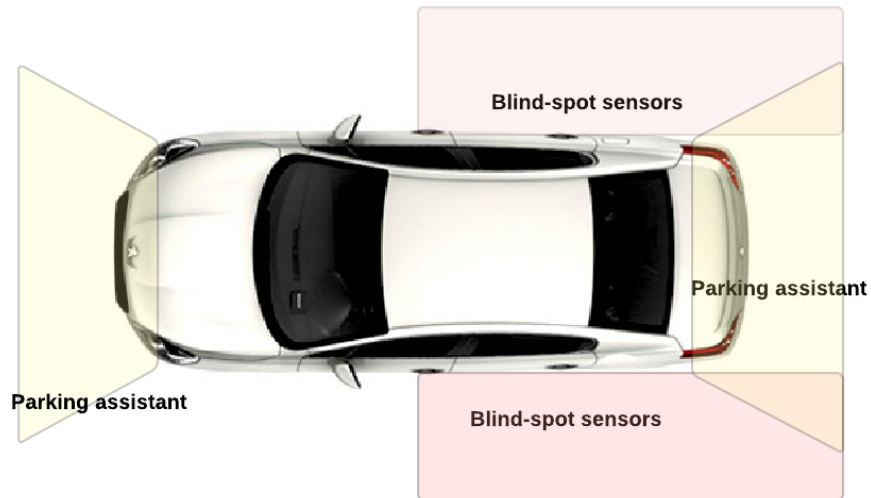The following drawing shows an overview of the system's features:

Figure 1: Overview of the System

The system main components are: 12 ultrasonic sensors, 2 microcontrollers, LED lights and a buzzer. Those components are distributed over the three main subsystems mentioned earlier (i.e. parking assistance, blind spot monitoring and main processing unit). Parking assistance and blind spot monitoring are installed outside the vehicle and consist of: One Arduino Mega Microcontroller, twelve ultrasonic sensors and one RF transmitter. Parking assistance and blind spot monitoring transmit the data collected from the sensors to the main processing unit which is installed inside the car and consists of: one Arduino Uno Microcontroller, one RF receiver, LEDs and buzzers to caution the driver when an object is detected depending on the data it received as shown in the following high level block diagram.
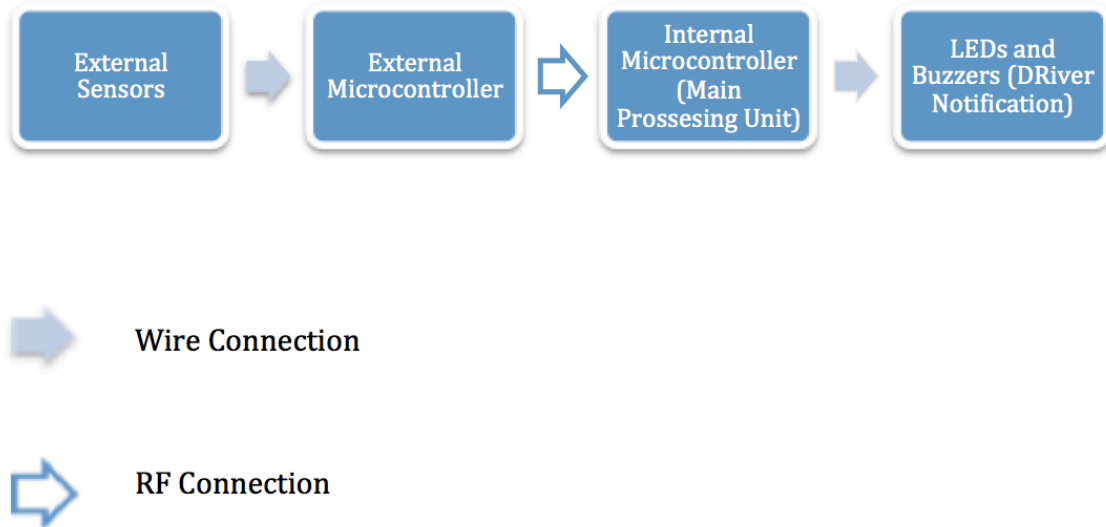
Wire Connection

RF Connection

Figure 2: High Level Block Diagram.

Materials and Overall costs

In addition to the components mentioned in the earlier section, the materials used in the project include 2 PCB boards used for implementation of the circuitry connected to each of the Arduinos, 12 sensors' acleryic casing , 2 Arduino casings and 1 user interface casing.

The projects' overall costs are demonstrated in the following table:

Component	Budget ($)
Arduino Mega board	65
ArduinoUno Board	35
Ultrasonic sensors	50
RF transmitter /Receiver	15
Batteries	20
Battery Holder	5
PCB Boards	15
Power Cord/Car Charger	20
Casings and wiring	200
	TOTAL ($): 425

Table 1: Material Costs Table.

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Schedule

The schedule shown below is the initial proposed schedule for the project:

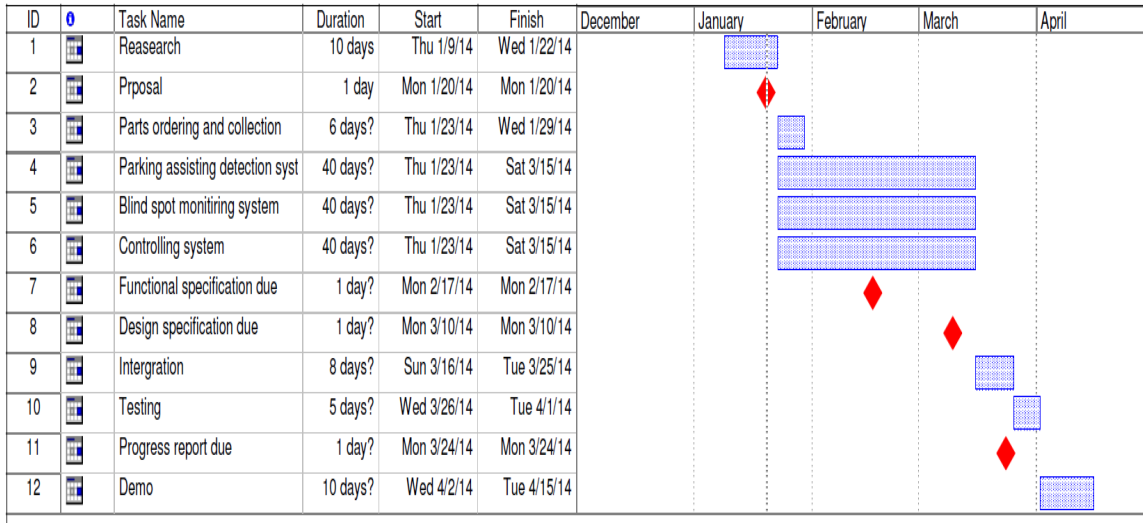| ID	ⓘ	Task Name	Duration	Start	Finish
1		Reasearch	10 days	Thu 1/9/14	Wed 1/22/14
2		Prposal	1 day	Mon 1/20/14	Mon 1/20/14
3		Parts ordering and collection	6 days?	Thu 1/23/14	Wed 1/29/14
4		Parking assisting detection syst	40 days?	Thu 1/23/14	Sat 3/15/14
5		Blind spot monitiring system	40 days?	Thu 1/23/14	Sat 3/15/14
6		Controlling system	40 days?	Thu 1/23/14	Sat 3/15/14
7		Functional specification due	1 day?	Mon 2/17/14	Mon 2/17/14
8		Design specification due	1 day?	Mon 3/10/14	Mon 3/10/14
9		Intergration	8 days?	Sun 3/16/14	Tue 3/25/14
10		Testing	5 days?	Wed 3/26/14	Tue 4/1/14
11		Progress report due	1 day?	Mon 3/24/14	Mon 3/24/14
12		Demo	10 days?	Wed 4/2/14	Tue 4/15/14

Figure 3: Proposed Schedule.

However, the actual schedule of the project had slight differences in which integrating and testing were given more time than the initial proposed time. The actual schedule is as follows:
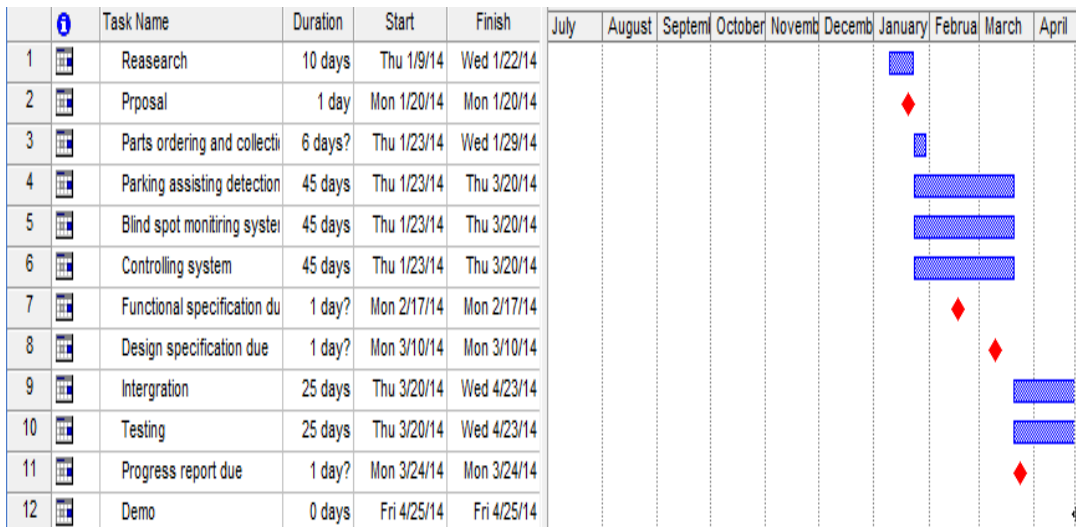
	ⓘ	Task Name	Duration	Start	Finish
1		Reasearch	10 days	Thu 1/9/14	Wed 1/22/14
2		Prposal	1 day	Mon 1/20/14	Mon 1/20/14
3		Parts ordering and collecti	6 days?	Thu 1/23/14	Wed 1/29/14
4		Parking assisting detection	45 days	Thu 1/23/14	Thu 3/20/14
5		Blind spot monitiring syste	45 days	Thu 1/23/14	Thu 3/20/14
6		Controlling system	45 days	Thu 1/23/14	Thu 3/20/14
7		Functional specification du	1 day?	Mon 2/17/14	Mon 2/17/14
8		Design specification due	1 day?	Mon 3/10/14	Mon 3/10/14
9		Intergration	25 days	Thu 3/20/14	Wed 4/23/14
10		Testing	25 days	Thu 3/20/14	Wed 4/23/14
11		Progress report due	1 day?	Mon 3/24/14	Mon 3/24/14
12		Demo	0 days	Fri 4/25/14	Fri 4/25/14

Figure 4: Actual Schedule.

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Challenges and Modifications

We had to main challenges when implementing the project. First, we had a problem making the wireless communication between the external components and the internal user interface unit. The RF transmission appeared to not successfully transmit the data collected by the sensors. After spending a couple of weeks trying to fix the problem, we found the problem to be with all the supply of receivers in the store we purchased ours from. By replacing the receiver with another functional one we were able to achieve the required transmission.

The other challenge was failing to achieve a successful test outdoor while we were able to successfully test the system in the lab. In order to solve the problem, we went through several possible reasons until we ended up determining it to be a fault in the coding for sensing and reading the distances for each sensor. Sensors were reading the distances by sending a pulse and waiting for it to bounce back of the detected object and then calculating the distance form the time spent from sending and receiving of the ultrasound sensor. This caused us a problem in the outdoor as the sensors spent long time when detecting far objects which then caused the whole system to delay and thus not work properly. Fixing this problem was by changing the code so that if the signal take long time to get back then the process of reading is halted and the object is ignored because it is outside our range.

We had a simple modification in our system, which was switched from using two arduino uno boards for the external circuitry to using one mega arduino board. The change enabled us to connect all the twelve sensors to one arduino and give each sensor a separate trigger pin and therefore improving the performance of the system in both accuracy and speed.

Group Dynamics

Our group consists of five engineers majoring in computer and electronics engineering: Angel Tian, Keren Wang, Shaham Shafeie, Aziz Mikwar and Khalid Almoammar. Our entire project was divided into designing, individual part development, system integration and testing. Our Chief of Executive Officer Khalid has been in charge of assignment distribution and calling for regular meetings. Shaham the Chief of finance keeps track of the budget and expenses. Under individual part development, each member adopted part of the project and integrated and tested parts together as a group. The following table demonstrates

the contribution of each member in each task where **XX** indicates primary responsibility while **X** indicates some some responsibility

High Level Task	Angel	Aziz	Keren	Shaham	Khalid
Research	X	X	X	X	X
Financials				XX	
Part ordering	XX	X		XX	X
Sensing system Design and Implementation		XX			XX
Wireless Transmission Design and Implementation		XX	X		XX
User Interface Design and Implementation		XX		X	XX
Software	XX	XX			XX
Casings and Packaging	XX		X	XX	
PCB boards Implementation			XX	XX	
Testing	XX	X	XX	X	X
Documentation	X	X	XX	X	X
Administration task	X	X	X	X	X

Table 2: Work Load Distribution.

Individual Learning

Khalid Almoammar

Taking this course was an incredible experience as it involved a significant amount of technical, personal and emotional challenges. Since this course comes in a time, which I am close to graduation, it made me feel from its first weeks that in this project I shall put all my efforts to make it a good ending for my 4 years in engineering school and that in this project I shall demonstrate my worthy of earning an engineering degree. Therefore, I tried to put all the effort and time I had this semester on achieving what would make me proud and thus trying to contribute to every aspect of this project and handling the major tasks needed to be done. Having this desire in mind while also taking five courses load, put a huge emotional pressure and stress on me which I worked on developing my ability to handle as I believe it is the best preparation for the professional environment as an engineer in the field. In regards to technical challenges, spending days and weeks trying to figure out a problem and going through all the possibilities was a great challenge for the technical knowledge and background I gained during my studies. In order to analyze the problems and their possible solutions, I had to reflect upon several courses I have taken. Moreover, the technical problems that arose through the semester taught me to pay attention to the smallest details and make sure to test every aspect of the system in its exact operational environment as the small details can make a significant impact on the system operation and are more difficult to detect.

Forming a group in the beginning of the semester with three members I had no earlier relationship with and working on our most important course we have as engineering student was also a great social experience. I learned how to be able to identify each individual strengths and build on them. Also, as the CEO of the company and the person who put the group together, I was responsible of assigning the tasks, maintaing good coordination between the group members and trying to anticipate any issue that could cause conflict and resolve it as soon as possible. As a result, I was able to practice leadership and management skills, which are necessarily for future success in my career.

Documentation aspect of the course was as well a great practice of what a career will require, it was the first time I was asked to make the such of functional specifications and design specifications. We tried to make it to the best we could and the feedbacks we got were great and gave us an idea about what we need to improve in order to achieve the level required in industry.

Keren Wang

At the beginning of the semester, I have no team for varies of reasons. After 3 weeks, I join this group. Group members are very friendly to me and thanks for all of them. In the team, my main responsibility is circuitry and testing. In the meantime, I also help other group members to handle something that they need a hand.

Our team meets frequently and discusses a lot during the meeting. Each one state and explain his/her own opinion in the meeting and we find out the best option together. More than that, when we work on the project, our teamwork is perfect. Each of us is willing to help other group member and totally trust each other. So I start with 4 classmates for the project but end with 4 really good friends.

At the beginning, I think our project is not that hard. Just transmit the signal gaining from the sensors to receiver and Arduino will analysis and process signal in order to make LED blink and buzzers sounds. However, when we actually did the project, we met a lot of problems. The biggest one is our RF keep not working for more than 1 month. We tried a lot of way to solve it, like changing the code, changing the way of circuit, changing the version of Arduino, but continue failing. At last, with the LEE'S electronics technician's help, we realized all of our receivers are broken from the beginning. When we approach to complete the project, doing final testing, 3 of LED didn't work. Then we spent 3 hours on that and at last we find out LEDs were burned. So If I meet the problem like this in the future, I will check if all the elements are working and then check other aspects.

From this project, I realize that a successful product needs hundreds of times testing, analysis, and troubleshooting. Overall, I am very happy working with my teammates and I believe we can do the better job if we work together again.

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Shaham Shafiei

I am currently a fourth year systems engineering student at Simon Fraser University. When we first formed the group we had no clue how we were going to be implementing this idea, theoretically and finally making a prototype of it. This seemed like a hard task especially for me since I had no previous co-op or any kind of working experience in the field yet. Once I started working with Khalid, Aziz, Angel and Karen, things started falling into place like a puzzle, piece by piece and we just kind of took it step by step and the team seemed pretty balanced. Aziz and Angel were the software experts; Khalid and I were the hardware and business brains of operation. Slowly things seemed to fall in place and we were following our schedule to the best of our ability until about half way when naturally we started to run into problems and the stress factor also kicked in. But with our great team dynamics we were able to think fast on our feet and solve problems as efficiently as possible and just playing with the cards we were dealt. We had regular meetings and everyone kept each other up to date with their progress and problems. In the case that we ran into problems we would quickly brainstorm as a group and solve the problem or at least come up with possible solutions to try. Even though most of us had heavy course load we managed to keep up the team dynamics during the past few months. During this period I improved on a lot of technical and non-technical skills. I learned more about circuitry; how to neatly make a circuit and test it and also working with PCB boards. I got firsthand experience with Arduino UNO and MEGA. I used Arduino IDE for the first time and learned a lot of useful feature that will also be helpful in the future. I also improved my machine shop skills such as cutting, drilling, grinding, sanding, soldering and etc while making the user interface and the first prototype. I improved my documentation skills such as progress reports and journal. Despite recommendations from previous professors I didn't have experience with journals before but I found it very useful during this project and am going to continue using it. To sum up this course has been the most challenging course I have taken at SFU, as I'm sure most students would too. It has been a ton of work and very time consuming specially considering I was taking 4 courses this semester but I have loved every second and every challenge of it and it has been a great experience to take with me into the future projects and life ahead.

Angel

This project was an amazing experience and journey for me. Although we have just met each other in the beginning of semester, it was like we have been childhood friends forever. Each of us had of strength and weakness. Three of us are Electronics engineering major and one systems engineering and computer engineering major, we have divided our tasks according to what we do best and it worked out perfectly.

There have been a lot of issues and struggles on the technical bits of the project but we have eventually overcome the issues and came up with a solution. All of the members were not afraid to ask for help. During the RF transmission development stage, we have struggle as a team, for almost a month time we weren't unable to find the issue with neither our code nor our circuitry. It was a team effort to figure out the problem. We had sought for help from Ash and Lee's Electronics. Ash offered us connections to RFlink that the company was willing to provide us with parts at no cost. We had numerous meetings with Lee's Electronics trying to fix our issue and they were very willing to help. Every one of us tried to meet with Lee's and figure out all issues.

Not even once that during the project that the team has got into disagreements or fights over any of the problems that we have experience. If we had a problem, the member could call a meeting other than the usual meeting days that we have and we could all sit down and talk about the possibilities and changes that we could do to improve the situation.

With the last two weeks of school in conjunction with finals and 440 project, none of the members got enough sleep or food, but it was a memory of life time and the best partners.

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Aziz Mikwar

From the first day of ENSC440, I was afraid of the course. I didn't know what to expect and whether I am capable of creating a project from scratch. We formed our group, Khalid, Karen , Shaham and Angel. We got along from the first day of brain storming and we felt that we can actually build a decent project. We had many ideas but we chose the blind spot detection system and parking assistance because we noticed the need of such a device by new and young drivers.

The project sounded simple to me. I thought we are going to be able to finish it by the middle of February. But as we proceed deep in the project, more challenges aroused and the project complexity went higher. The main problem that cost us a month and a half was the RF transmission. It seemed impossible to get it working and we even considered making the project with wires. We didn't expect that the problem was a defected chip from the manufacturer. This actually taught me a lesson, never take any new device for granted. The cost of that tip is a month and half and we paid it at the last month when we were rushing to get the system working. The second challenge faced us in the project is delay. Working with 12 sensors and keep them synchronized is harder than I thought. Fixing the delay problem in the lab didn't actually fix the problem when we installed it in the car. I found out that the Echo pin in each sensor must wait for the ultrasonic signal to come back in order to proceed in code. This waiting was causing the system to slow down. To fix the problem I suggested a timeout for the Echo pin, which we did and the system worked perfectly. I learned from the delay problem that I always need to test the system at real conditions and locations. Succession in the lab doesn't grantee succession in the actual world.

I spent a fare amount of time on the project. I worked in all aspects of the project hardware, software and circuitry. I programmed the LCD, 7 segments and the buzzer. I imported as well the code for calculating the ultrasonic distance when several sensors were used simultaneously. In addition, I went back and fourth to Lee's electronics in order to fix the RF transmission problem. Similarly, I pointed out the possible cause of the delay problem, which was true and helped us to finish up the system.

In conclusion, I didn't expect to accomplish the goals of the project at the required time. Challenges were increasing with time and deadlines were coming close. Fortunately, we made it to the end, and our project was working perfectly at the end. I am glad that I've met my team members and worked beside them. They were nice and helpful when I needed them. Finally, finishing ENSC440 was a big challenge

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with all the work and documentation. Now I can rest and feel graduation approaching.

Conclusion

We achieved to produce a fully functional proof of concept of our system. We plan to add an LCD to the user interface, which shows the distance of the objects detected in front or behind the veiechle. Improvements also include working to achieve a safe and secure mounting of the sensors on the car while not affecting the body of the car nor its appearance.

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Meeting Minutes

Agenda

Monday January 13, 2014
11:00-1:00
Burnaby Campus

Purpose of meeting: getting know with each other and discuss the possible topic
Items for Discussion:

1. Group members self-introduction
2. Discuss the topic that we may focus on

Minutes

Monday January 13, 2014
11:00-13:00
On Burnaby Campus

Present: Khalid Almoammar, Shamham Shafiei-Fazel, Aziz Mikwar, Angel Tian

Absent: None

Purpose**:** getting know with each other and discuss the possible topic

Minute:

1. **Getting know with each other**
   Members introduce themselves, including background and area of expertise. Group members also exchange the phone numbers, email address and build a What's app group

2. **Discussing the possible topic**
   Each group Members come up with a topic, including restaurant idea, trendwill idea, electricity control, and blind spot detection.

3. **Next Meeting**
   Next meeting will be on Jan 14th, meeting with Steve and get some suggestion from him

Agenda

Tues January 14, 2014
13:30-15:00
Burnaby Campus

Purpose of meeting: Discuss the possible topics
Items for Discussion:

1. To meet with Steve and get some suggestion from him
2. Discuss the possible topics

Minutes

Tuesday January 14, 2014
13:30-15:00
On Burnaby Campus

Present: Khalid Almoammar, Shamham Shafiei-Fazel, Aziz Mikwar, Angel Tian

Absent: None

Purpose: Discuss the possible topics

Minute:

1. Meet with Steve.
   Steve gives us a lot of suggestion.
2. Steve's suggestion
   --- Restaurant idea has the perfect marketing potential.
   --- Concerns about technical and hardware aspect
   --- Talk to Andrew
3. Making an appointment with Andrew
   Contact with and making an appointment to discuss the possible on Thursday
4. Next Meeting Time
   Next meeting will be on Thursday, Jan 16th , 2014

Agenda

Thursday January 16, 2014

10:30-12:00

Burnaby Campus

Purpose of meeting: Discuss the possible topics

Items for Discussion:

1. Meet with Andrew
2. Discuss the topics

Minutes

Thursday January 16, 2014
10:30-12:00
On Burnaby Campus

Present: Khalid Almoammar, Shamham Shafiei-Fazel, Aziz Mikwar, Angel Tian

Absent: None

Purpose: Discuss the possible topics

Minute:
1. Meet with Andrew.
   Andrew's opinion is a really important part to choose the topic for us
2. Andrew's suggestion
   --- Restaurant idea is not technical and lack of hardware
   --- Blind spot detection is a good idea for project
3. Making decision
   Based on Andrew's opinion, we decide to choose blind spot detection as the project topic.
   More than that, we want to build a parking assistance system as well
4. Assigning task for proposal
   Discuss the proposal and assign the task, making sure each group member distribute equally
5. Next Meeting Time
   Next meeting will be on Monday, Jan 20th, 2014

Agenda

Monday January 20, 2014
10:00-12:00
Burnaby Campus

Purpose of meeting: Buy the parts that our project needs
Items for Discussion:
1. Integrate all the parts of the proposal
2. Research and buy the parts

Minutes

Monday January 20, 2014
10:00-12:00
On Burnaby Campus

Present: Khalid Almoammar, Shamham Shafiei-Fazel, Aziz Mikwar, Angel Tian

Absent: None

Purpose**:** Buy the parts that the project needs

Minute:

1. Integrate all the parts of proposal
   Combine everyone's part together and review and discuss if any part need to be modified
2. Research and buy parts
   Research online and find out what unit we need for the project and buy the main part at LEE's electric. Also order extra sets online with a cheaper price
3. Next Meeting Time
   Next Meeting will be on Thursday, Jan 23rd , 2014

Agenda

Monday January 23, 2014
11:00-13:00
Burnaby Campus

Purpose of meeting: Checked the status of the parts online
Items for Discussion:
1. Check the status online for the parts
2. Research RF, Ultrasound

Minutes

Monday January 23, 2014
11:00-13:00
On Burnaby Campus

Present: Khalid Almoammar, Shamham Shafiei-Fazel, Aziz Mikwar, Angel Tian

Absent: None

Purpose: Checked the status of the parts online

Minutes:

1. Checked the status for the extra sets on line

2. Research RF, Ultrasound
   Research and learn how the RF and Ultrasound works

3. Next Meeting Time
   Next meeting will be on Monday, Jan 27th, 2014

Agenda

Thursday January 27, 2014
11:00-13:00
Burnaby Campus

Purpose of meeting: Test each simple part
Items for Discussion:

1. Unit test component
2. Talk about project to Keren

Minutes

Monday January 27, 2014

11:00-13:00

On Burnaby Campus

Present: Khalid Almoammar, Shamham Shafiei-Fazel, Aziz Mikwar, Angel Tian, Keren Wang

Absent: None

Purpose**:** Test the simple part

Minutes:

1. Keren join in the group
    New group member getting know with each other
2. Test simple part
    Test the ultrasound sensors, LEDs, RF. Designed the circuits and mounting mechanism
3. Next meeting time
    Next meeting will be on Wednesday, Jan 29th, 2014

Agenda

Wednesday January 29, 2014

10:30-13:30

Burnaby Campus

Purpose of meeting: Test code with Arduino

Items for Discussion:

1. Test code for the driver of microcontroller
2. Connect the Arduino with 1 sensor

Minutes

Wednesday January 29, 2014
10:30-13:30
On Burnaby Campus

Present: Khalid Almoammar, Shamham Shafiei-Fazel, Aziz Mikwar, Angel Tian, Keren Wang

Absent: None

Purpose: Test code for Arduino

Minutes:
1. Test code for Arduino
   Download and test the driver code of the arduino. It works fine
2. Test sensor connecting with Arduino
   Connect 1 sensor with Arduino. Sensor can detect obstacle in front of it
3. Next meeting time
   Next meeting will be on Monday, Feb 3rd, 2014

Agenda

Monday Feb 3, 2014
11:30-14:00
Burnaby Campus

Purpose of meeting: Test RF with Arduino
Items for Discussion:

1. Test RF with Arduino

Minutes

Monday Feb 3, 2014
11:30-14:00
On Burnaby Campus

Present: Khalid Almoammar, Shamham Shafiei-Fazel, Aziz Mikwar, Angel Tian, Keren Wang

Absent: None

Purpose**:** Test RF with Arduino

Minutes:

1. Test RF with Arduino
   We try sending binary strings, bits, word, sentence, but receiver could not receive anything we desire.
2. Next meeting time
   Next meeting will be on Wednesday Feb 5th, 2014

Agenda

Wednesday Feb 5, 2014
11:00-14:00
Burnaby Campus

Purpose of meeting: Test RF with Arduino
Items for Discussion:

1. Research more code and connection for RF
2. Test RF again

Minutes

Monday Feb 5, 2014
11:00-14:00
On Burnaby Campus

Present: Khalid Almoammar, Shamham Shafiei-Fazel, Aziz Mikwar, Angel Tian, Keren Wang

Absent: None

Purpose: Test RF with Arduino

Minutes:
1. Trouble shooting
   We then test the transmitter and it work fine. So we realize receiver has something wrong.
2. Research
   Research more code and connection way of the RF
3. Different Frequency
   We try RF with different frequency and still fail
4. Next meeting time
   Next meeting will be on Saturday, Feb 8th, 2014

Agenda

Saturday Feb 8, 2014
13:00-16:00
Burnaby Campus

Purpose of meeting: Test RF with Arduino
Items for Discussion:

1. More trouble shooting and research
2. Working on Func.Spec.

Minutes

Saturday Feb 8, 2014
13:00-16:00
On Burnaby Campus

Present: Khalid Almoammar, Shamham Shafiei-Fazel, Aziz Mikwar, Angel Tian, Keren Wang

Absent: None

Purpose: Test RF with Arduino

Minutes:

1. More Research and Trouble Shooting
   We did more research, trying to find out what is wrong with receiver. Trying a longer distance between RF and Arduino, but still fail

2. Split the Parts of the Func.Spec
   Split the parts of the Func.Spec to each member and make sure each one contribute to it.

3. Next Meeting Time
   Next meeting will be on Wednesday, Feb 12, 2014

Agenda

Wednesday Feb 12, 2014
12:30-15:00
Burnaby Campus

Purpose of meeting: Meet with TA and Ash

Items for Discussion:

1. Meet TA for trouble shooting
2. Meet Ash for alternative solution

Minutes

Wednesday Feb 12, 2014
12:30-15:00
On Burnaby Campus

Present: Khalid Almoammar, Shamham Shafiei-Fazel, Aziz Mikwar, Angel Tian, Keren Wang

Absent: None

Purpose**:** Meet with TA
Minutes:

1. Meet with TA
   Meet with TA for troubleshooting. Unfortunately, TA has no experience with RF. If we use Bluetooth as wireless tool, he will be very helpful.
2. Next Meeting Time
   Next meeting will be on Saturday, Feb 15, 2014

Agenda

Saturday Feb 15, 2014

14:30-16:00

Burnaby Campus

Purpose of meeting: Finishing up Func. Spec

Items for Discussion:

1. Integrate all parts of Func. Spec

Minutes

Saturday Feb 15, 2014
14:30-16:00
On Burnaby Campus

Present: Khalid Almoammar, Shamham Shafiei-Fazel, Aziz Mikwar, Angel Tian, Keren Wang

Absent: None

Purpose: Finishing up Func. Spec

Minutes:
1. Integrate all parts of Func. Spec
   Integrate all parts of Func. Spec and review it together to see if something needs to be modified
2. Next Meeting Time
   Next meeting will be on Thursday, Feb 20, 2014

Agenda

Thursday Feb 20, 2014
10:30-13:00
Burnaby Campus

Purpose of meeting: Research for other wireless option
Items for Discussion:

1. Research for other wireless option

Minutes

Thursday Feb 20, 2014
10:30-13:00
On Burnaby Campus

Present: Khalid Almoammar, Shamham Shafiei-Fazel, Aziz Mikwar, Angel Tian, Keren Wang

Absent: None

Purpose: Research for other wireless option

Minutes:

1. Research for other wireless option
   From the research, we realized that the most practical way to achieve wireless is Bluetooth, except for RF. However, Bluetooth is a way more expansive and power consumption than RF. If we really can not fix RF problem, we have to use Bluetooth

2. Set up the circuit with wire
   Circuit with wire works very well

3. Next Meeting time
   Next meeting will be on Wednesday, Feb 26, 2014

Agenda

Wednesday Feb 26, 2014

13:30-16:00

Burnaby Campus

Purpose of meeting: Testing Multiple Sensors and RF

Items for Discussion:

1. Test multiple sensors with wire
2. Continue work on RF

Minutes

Wednesday Feb 26, 2014
13:30-16:00
On Burnaby Campus

Present: Khalid Almoammar, Shamham Shafiei-Fazel, Aziz Mikwar, Angel Tian, Keren Wang

Absent: None

Purpose: Research for other wireless option

Minutes:

1. Test multiple sensors with wire
   Test multiple sensors with wire for parking assistance. It works fine without any interference.
2. Determine the number of sensors we need
   Basically we are planning use 10 sensors. 6 for blind spot system, 3 on each side, 4 for parking assistance system, 2 in the front, 2on the back of the car.
3. Continue working on RF
   Still not working
4. Next Meeting Time
   Next meeting will be on Wednesday, March 3' 2014

Agenda

Monday March 3, 2014
10:30-13:00
Burnaby Campus

Purpose of meeting: Test RF and Split Design Spec
Items for Discussion:

1. Test RF with old version of Arduino
3. Split Design Spec

Minutes

Monday March 3, 2014
10:30-13:00
Burnaby Campus

Present: Khalid Almoammar, Shamham Shafiei-Fazel, Aziz Mikwar, Angel Tian, Keren Wang

Absent: None

Purpose**:** Test RF and Split Design Spec

Minutes:

1. Test RF
   We ask LEE's Electric people for help and they recommended us using older version of Arduino and apply us the sample code. But it is still not working
2. Split Design Spec
   Split Design Spec to each group member and start working on that
3. Next Meeting Time
   Next Meeting will be on Monday, March 10. 2014

Agenda

Wednesday March 13, 2014
11:30-13:00
Burnaby Campus

Purpose of meeting: Integrate and Editing Design Spec
Items for Discussion:

1. Integrate and Editing Design Spec
2. Set up meeting with LEE's people to troubleshoot with their circuit

Minutes

Wednesday March 13, 2014
11:30-13:00
Burnaby Campus

Present: Khalid Almoammar, Shamham Shafiei-Fazel, Aziz Mikwar, Angel Tian, Keren Wang

Absent: None

Purpose**:** Integrate and Editing Design Spec

Minutes:
1. Integrate and Editing Design Spec
    We use the no penalty late submission this time. That's the reason we haven't submit the Design Spec.
2. Setting a time with Lee's people and troubleshoot on their circuit to see if our RF is broken or not
3. Next Meeting Time
    Next Meeting will be on Monday, March 17, 2014

Agenda

Monday March 17, 2014
10:30-14:00
Burnaby Campus

Purpose of meeting: Test Transmission of 1 sensor
Items for Discussion:

1. Transmission problem solved
2. Test Transmission of 1 sensor

Minutes

Monday March 17, 2014
10:30-15:00
Burnaby Campus

Present: Khalid Almoammar, Shamham Shafiei-Fazel, Aziz Mikwar, Angel Tian, Keren Wang

Absent: None

Purpose: Test Transmitter with sensors

Minutes:

1. With the help of LEE's people, we finally solved the transmission problem.
2. Test RF with 1 sensor.
3. Test RF with multiple sensors
4. Integrate RF transmission into system with all sensors and finally work successfully
5. Next meeting will be on Monday, March 24. 2014

Agenda

Monday March 24, 2014
13:30-16:00
Burnaby Campus

Purpose of meeting: Integrate everything together and adding more features
Items for Discussion:

1. Integrating everything together
2. Considering add more features

Minutes

Monday March 24, 2014
13:30-16:00
Burnaby Campus

Present: Khalid Almoammar, Shamham Shafiei-Fazel, Aziz Mikwar, Angel Tian, Keren Wang

Absent: None

Purpose: Integrate everything together and adding more features

Minutes:

1. Integrating everything together and test it, it works well
2. Considering add turning detection so that once driver turns, the blindspot detection system will be on
3. Split the written progress report
4. Next meeting will be on Monday, March 31st , 2014

Agenda

Monday March 31, 2014
10:30-14:00
Burnaby Campus

Purpose of meeting: Create final test plan and integrating turning detection
Items for Discussion:

1. Write the final test plan together
2. Integrating turning detection

Minutes

Monday March 31, 2014
10:30-14:00
Burnaby Campus

Present: Khalid Almoammar, Shamham Shafiei-Fazel, Aziz Mikwar, Angel Tian, Keren Wang

Absent: None

Purpose: Create final test plan and integrating turning detection

Minutes:

1. Write the final test plan based on the test plan we had before
2. Integrating the turning detection with system we already integrated
3. Test the whole system