Post Mortem for the Robison Detector

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Issue Date: December 15, 2014
Revision 1.2

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Glossary

EMV	Emergency vehicle (police car, ambulance, fire truck, etc.)
DSP	Digital Signal Processor, a device that will read and process analogue (real-world) signals
IVI	In-Vehicle Infotainment, an embedded system for cars that provides entertainment
USB	Universal Serial Bus, a standard connection platform for computing devices
OS	Operating System, software that interfaces between hardware and the user for ease of functionality
Tizen	An OS for the IVI system
IDE	Integrated Development Environment, a program that includes a compiler for software developing
SDK	Software Development Kit, software for developing hardware or other devices

1. Introduction

Distracted driving is becoming more of a problem in today's society, especially with the rise in usage of mobile devices. Because of this, many drivers don't focus on the road and are putting themselves and others at risk [1]. For instance when an emergency vehicle has its siren enabled, distracted drivers may not notice and hence will not yield safely for the emergency vehicle. This is where the Robison Detector comes in.

Our device will receive a nearby emergency siren and alert the driver so they can safely yield in time. This will not only give the driver an opportunity to give way, but it will ensure the emergency vehicle driver has a safe path to navigate and improve road safety as a whole. The Robison Detector consists of 3 basic steps in its functionality:

1. Receiving the external sound in real-time
2. Determining if the sound has a siren
3. If Step 2 yielded a valid siren, then alert the driver

The device can eventually be fully integrated within a vehicle so that it operates without any user intervention. This way the driver is alerted of an emergency siren whenever they are driving.

2. Current State of the Project Modules

The Robison Detector has 3 main subsystems which correlate to its 3 basic functionalities.

2.1. Microphone

The microphone's job is to read in the audio from the external environment and send it to the digital signal processing board. It needs to be able to pick up audio from all directions and have a relatively high SNR ratio to maintain a good quality signal.

In the beginning it was decided that the first prototype would have a quality omnidirectional microphone. However during the testing phase the results did not differ much with a higher quality microphone. Hence, we decided to keep using the ear-bud microphone even though it is slightly lower in quality but it is still able to perform adequately. Figure 1 below shows the microphone used for the first prototype:

Figure 1 - Microphone used for the prototype

2.2. Digital Signal Processing (DSP) Board

The DSP board that was eventually decided upon was the eZdspc5535. It has all our required features and comes at a reasonable cost. Figure 2below shows its layout:

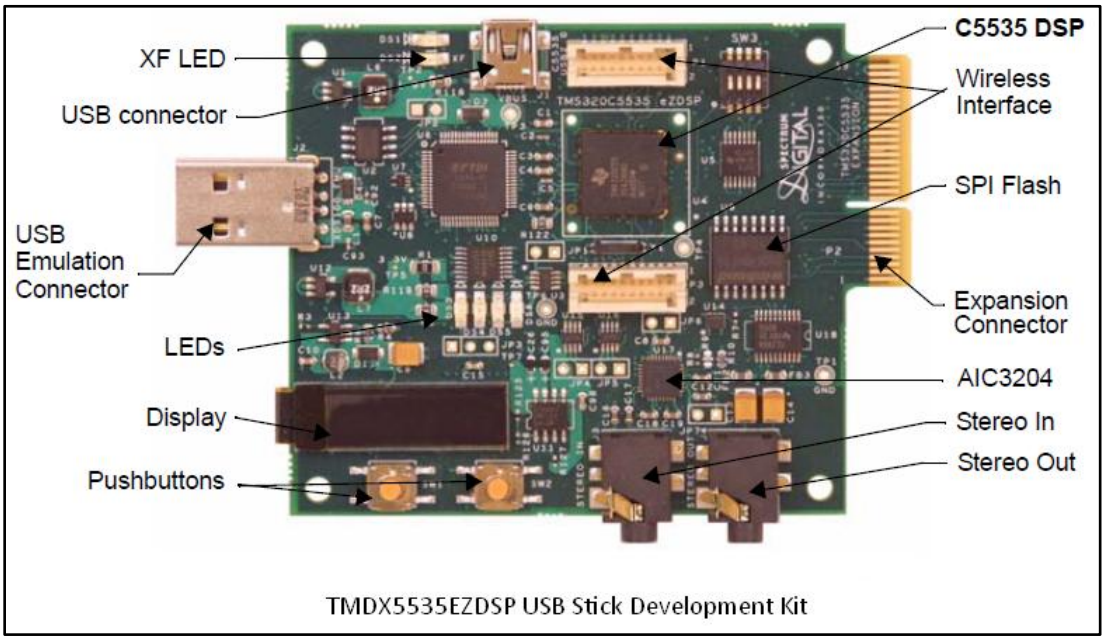

Figure 2 - DSP board used for the first prototype [2]

The board's primary focus is taking the audio signal from the microphone and determining if there is a valid siren present. It does this by first reading in a sample of the siren and storing it into memory. The real-time audio signal is then compared to the sample to check if a siren is present. If it is, then an interrupt is sent out and the alert subsystem carries out its function.

2.3. External Alert

Once a siren has been detected, an alert is sent to the Blackberry Z10 device pictured below:

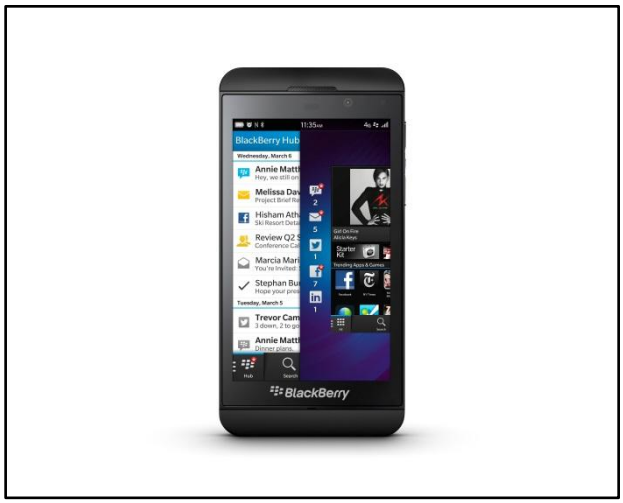

Figure 3 - Target device for the external alert used in the first prototype

Using the app that we developed specifically for the Z10 device, an interrupt is received and an audio notification is sent which asks the driver to yield to the emergency vehicle. Also, if there is a song being played, the volume is lowered during the notification. The DSP board and the Z10 are interfaced with a laptop in the current prototype. However for future models, it is possible that the IVI system can replace the laptop.

3. Materials & Cost

Table 1 below outlines the expected and actual cost of the entire project.

Table 1 - Expected and actual costs of the first prototype

Component	Expected Cost ($)	Actual Cost ($)
MSP430 Launchpad	43	40.36
eZdsp C5535	N/A	122.80
Kit Eval Audio Booster Pack	60	56.34
The BluPack Booster Pack	7	N/A
BT Boosterpack	20	N/A
HC05 Bluetooth Module	10	N/A
Hazardous Light	20	N/A
Manual Push Buttons	5	N/A
LCD displays	50	N/A
Microphone sensor	30	N/A

Car enclosure	100	N/A
Speakers	N/A	100
HDMI Cable	N/A	12.50
Audio Y-cable	N/A	10.00
Shipping costs	150	36.86
Total Costs	**495**	**398.86**

The project came in under budget with respect to its expected cost, as can be seen from Table 1. Some expenses that we expected to occur didn't and some that we didn't expect occurred. The ESSEF has granted us $350 to use for the project, and the rest we have covered from our own pockets. A lot of the boards that we were planning to use but didn't were borrowed from the engineering faculty, this saved us quite a bit of money.

4. Schedule

Figure 4 below shows an overview of the project's timeline.

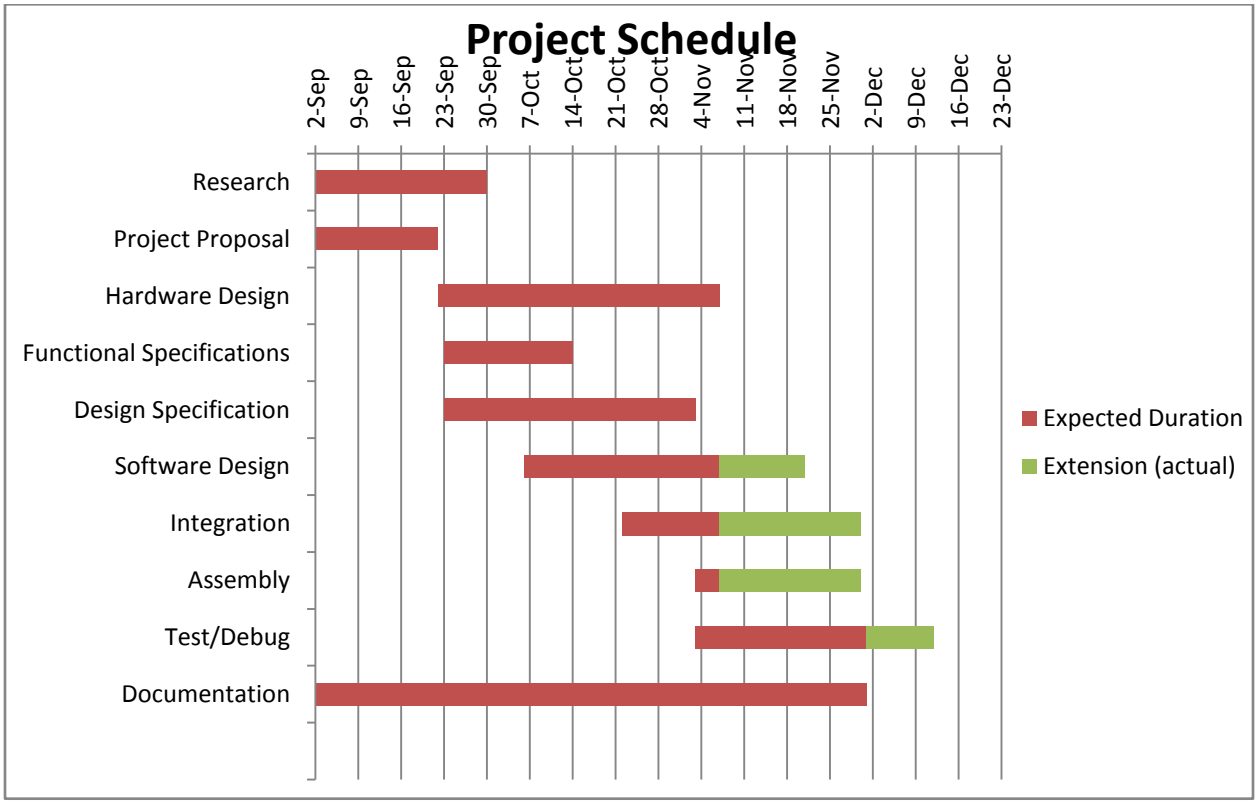

Figure 4 - The original timeline is in red and the extended timeline includes the green bars

As seen from above, the delays occurred in the second half of the semester which is when we switched DSP boards. This set us back on our schedule however we were still able to accomplish our goals. The parts of the schedule before the DSP switch are on time, which was to be expected.

5. Problems & Challenges

There were various technical and logistical challenges that we faced throughout the development of the project. They were resolved by communicating with those that were involved and collectively reaching a solution.

5.1. Siren Detection Algorithm

There are a few algorithms which can be used for siren recognition. The first one detects a siren based on the frequencies and pattern recognition. The second one compares the audio signal to a database of already stored sirens and determines if there is a match. The third one stores a sample and then compares the audio signal to the sample to determine a siren match. Determining the advantages and disadvantages of these algorithms took a lot of time to research and test. However once this was complete, a group decision was made to use the third algorithm since it was not as complicated to code as the others and it performed to our standards.

5.2. DSP Board

Originally it was decided to use the MSP430 DSP board. However, after about 6 weeks of coding it turned out the board did not support the technical customization we needed for our project and so it was abandoned in favour of the eZdspc5535. This set the group back quite a bit in terms of progress since only small amounts of code could be transferred to the new DSP. However with the new board, it supported all our design requirements.

5.3. External Alert

There was much discussion early on in the semester as to what target should be used for the external alert of the Robison Detector. We explored the idea of a Bluetooth enabled device that would wirelessly receive the interrupt from the DSP and send an alert. However, because of library complications and licensing issues this did not end up being feasible. Then we moved forward with the Tizen operating system and implementing it on Pandaboard. This was very challenging because of the lack of documentation and support for the Pandaboard. We eventually did manage to boot Tizen from it, however it was very slow and the music player on it was not customizable enough for our needs. So this option was also abandoned. Eventually we settled on the Blackberry Z10 as the target alerting system and finally this ended up being an achievable system to develop.

5.4. Logistical Issues

Some of our items that we ordered were shipped late to us. In cases like this, the item was bought locally instead, especially if the item was a high priority. With a group of 6 it was also difficult to find time slots where everybody was free to meet or work. At times it was simply easier to hold smaller meetings with only 2 or 3 people and then hold large meetings with everyone once every 2 weeks. This way the meetings are more productive and everyone is eventually caught up with what is being done.

6. Group Dynamics

At Vantek building the Robison Detector has been a difficult yet rewarding process over the last few months. Everyone's workload was distributed based on their strengths and what task became a priority at the time. So for example when a document was due, everyone contributed to finish it. There were some differences of opinion throughout the project, which is to be expected with a group of 6. However they were resolved by discussing possible solutions and reaching a decision as a group. The workload of the Robison Detector fell under the following 5 categories:

1. Hardware – Interfacing the hardware units of the detector.
2. Software – Coding and debugging systems.
3. Documentation – Compiling the reports.
4. Logistics – Ordering of parts and organizing meetings.
5. Research – Acquiring the needed background information.

Everyone in the group contributed to all of the above parts at least in some capacity. Because of varying skillsets, some members focused more on certain parts than others.

Weekly group meetings were held to update other members on the project's progress and any others issues that may have taken place. Outside of the meetings, some of the members worked together a lot and some preferred to work individually. Everyone had different styles when working but there were also days when the entire group would work together.

7. Reflections & Workload Distribution

7.1. Shayan

Working at Vantek with the other members has been a true pleasure. I've been able to implement an idea from scratch to an actual working device. I have improved my technical and my managerial skills and have learned how to lead a team of 6 members with diverse qualities. There have been some challenging moments throughout the semester but they were overcome with collaboration with other members and a lot of patience.

One of the first ideas was to use a Bluetooth enabled dashboard to receive the interrupt from the DSP and send an alert to the driver. I learned a lot about Bluetooth protocols and developed my researching skills using resources such as the internet and the opinions of industry professionals. Eventually I became familiar with many different kinds of Bluetooth enabled devices and how they could interact with our detector. Unfortunately because of technical complications the Bluetooth idea was abandoned, but I still retained the relevant information.

I was involved with the configuring of the Pandaboard subsystem and through this I learned various things about Linux operating systems, kernel handling, and boot partitions. Before I was unfamiliar with how they functioned, but now I have a better understanding of how they work and interact with one another. It was very challenging getting the Pandaboard to boot into the Tizen OS. There were a lot of testing and workarounds that took place to achieve this, especially because of the Pandaboard's lack of documentation. Because of this and the Pandaboard being a discontinued model, this subsystem was replaced with the Blackberry Z10 alert.

From the beginning I've always had a keen interest in this project. I fully believe it is a unique device that serves a valuable social service by improving road safety. I am confident that it can be taken to the market with the right business strategy. Throughout the semester I have had many discussions with industry, patent agents and business professionals who have provided me with valuable insight with respect to the Robison Detector's future. I have learned about business strategies and how to formally communicate with professionals. Their feedback has given me confidence in the Robison Detector and ideas of entrepreneurship for future projects. My time in APEGBC AGM conferences has also enhanced my knowledge in this field throughout practicing multiple business strategies learned from the conference.

Along with the technical and professional experience, I improved my interpersonal skills. I had to organize meetings, assign tasks, and make sure internal deadlines were met by everyone. This improved my management abilities greatly as I oversaw the entire project and kept things moving in the right direction. Also, I handled a lot of the logistical issues that came up such as the procuring of items and organizing business meetings. This helped improve my time management skills. I would often have to juggle meetings with errands and make sure the project is on schedule. Sometimes this would create a packed schedule for me and I wouldn't get much leisure time, however this only encouraged me to be more efficient with any spare time that I did have.

I was partially responsible for the budget of the project and this made me aware of all the expenditures the group is undertaking. I had to log all the payments and make sure we did not overspend. Luckily we are well within budget without sacrificing the prototype's features.

7.2. Kartick

As my summer semester was ending I heard about the opportunity to join the Vantek team in developing a siren detector. Its background in digital audio intrigued me because of my interest in musical programming and audio filters. The project had a good social benefit and the solution seemed achievable during a 4 month course.

My primary focus for the project was managing the documentation and helping out with the hardware programming. Since I had to delegate tasks for the documents and make sure internal deadlines were met I learned how to manage members within our group. This was important because with proper guidance, work is completed in an efficient manner and there is a sense of direction for the project. I also learned to manage my time accordingly because some weeks I had to juggle other course assignments, mid-terms, and ENSC 440 deadlines which became quite hectic. So, making the most out of the time I had became very important. Also a lot of research had to be completed for this project and this is one part where everybody contributed. The use of special resources such as online documents and industry professionals proved to be valuable, especially when an outsider's opinion was needed.

The Tizen emulator was going to be our initial target for the external interrupt. Setting this up required the installation of Linux, the configuration of the Tizen IDE, and the integration of the virtual machine. I had problems doing this at first, but with the help of my peers and some online tutorials I got it to work. It's unfortunate that we had to abandon this subsystem, however now I know how to perform these tasks and I am familiar with the Linux operating system.

In addition to the testing that was done using a simulated siren from speakers, real-world testing also took place with an ambulance. With the help of Rob Howland from BC Ambulance Services, we had the opportunity to do some real-world testing. I took an early version of the prototype and we tested it in a real environment, which included many uncontrollable variables such as rain, engine noise, and additional highway traffic. It was nice to follow through on a project that was initially just an idea but eventually became a real working device. To our delight, the test was successful.

Throughout the semester I also had to work on a testing video and create complicated graphs. For this I had to learn to how to use software such as Adobe Photoshop and Premiere which could accomplish what I wanted to do. Through online tutorials and testing I quickly learned how to use the programs and became comfortable with them.

7.3. Gurinder

Over the course of the semester I have learned many aspects of group and technical work. Although I didn't expect to at the beginning of the semester, I ended up taking a leadership role within the group and assigned tasks to members. This happened towards the end of the semester when many of our deadlines and demo were due.

I had experience with coding in C from my prior co-op and from numerous school assignments. This proved to be very useful for this project since the DSP board was programmed using C code. I not only used my current set of skills but I gained new ones by using the DSP's APIs and understanding how exactly certain aspects of the DSP board are programmed. This was challenging because even though all the code was in C, it was written in a way that interfaced with the DSP and there was a lot of it. However with some research I was able to overcome any problems I faced and my group members were also helpful.

Another part of the project that I learned about was the audio signal processing. There were several algorithms which could accomplish our task of siren recognition. A few of them required some advanced techniques such as frequency recognition or FFT which I was not too familiar with. Learning about these methods from literature and with the aid of research I was able to code some of these algorithms. This required my knowledge of C and helped further my abilities in debugging. Also, some of these algorithms were first programmed in MATLAB and then ported to C code. Through this I learned how to use MATLAB and some of its advanced audio capabilities. Because of this, converting an algorithm from one computer language to another is an additional skill I picked up.

Because we had a few subsystems in our project, specifically the DSP and the Blackberry app I had to learn how to integrate them using various protocols. This required a lot of testing and patience on my part. At times there didn't seem to be enough documentation available that would help us. However eventually with the help of other members and some persistence the integration process was successfully completed. Hence I was able learn how to develop apps using the Blackberry SDK and installing it on the Blackberry Z10 device. Again this required my knowledge of C code and debugging.

In addition to the technical skills I developed during the semester I learned many interpersonal skills including leadership and management. Towards the end of the project I became an additional leader of the group. I learned how to organize group meetings and assign specific tasks to my members. If there is not a leader taking charge, especially in a large group like ours, then everybody works individually and there is no communication between everyone. With proper leadership there is a definitive direction to the group and tasks get completed on time. All of these interpersonal skills I have gained by working on the Robison Detector will prove to be invaluable for me in the future.

7.4. Shane

It is my pleasure to join Vantek along with the other talented and dedicated members.I have been anticipating this project since the summer when the idea was first introduced to me. The CEO Shayan is the core of this team and his leadership keeps this project moving forward. All tasks were divided evenly amongst the members according to their strengths. Also it is grateful how much effort all the group members contributed to this project, we really took it seriously as a full time position and we are confident we can take this product to the market. There were

many challenges along the way. We have made five major changes on our initial design including changing components which set back the team significantly. Despite this theVantek team survived and the prototype is complete.

There are many things I learned not only from this project but also from other team members. First of all from a technical perspective, I have learned about a new operating system Tizen. I understood the workflow of software development and writing our own app from scratch. Although we decided to use BlackBerry instead of Tizen, the experience with Tizen IDE was a good one and it will help my future career. Tizen is a Linux based OS, so I familiarized myself with Linux even more. This was an operating system that I had not even used before. In addition, I have gained the knowledge of the DSP board from other group members.

In addition to the above technical experience that I gained, I also learned how to work in a large group and improved my interpersonal skills. Collaborating with my team members was a common occurrence and I worked individually also. When working with others I learned to consider other ideas even if they weren't mine and contribute my thoughts to a collective discussion. Often I would work in tandem with another member to write documents and this improved my communication skills. We would have to split up our work and communicate on issues that would affect both of us. Since we did a lot of researching and learning on our own, I used all the resources available to us from industry professionals to SFU professors.

Over the course of the project I learned the importance of time management. Since all the members were taking several courses at the same time with theCapstone project, time is one of our constraints. We have created a Facebook page and Google Drive for team members to communicate with each other easily and share the progress in certain parts of the project.

7.5. Raj

Throughout the semester I have learned a lot working on the Robison Detector. I have been looking forward to this course since July, 2014 when the group was initially being formed and ideas were being discussed. Overall the course has been demanding, but I have gained valuable experience and am proud of the group's achievements.

I have learned how to work independently, especially when the other members were busy and I had my own personal deadlines to meet. I quickly found out that I had to organize my time efficiently and plan out my days in advance. This was especially important because I had a busy semester with 3 other high workload courses. By working individually, I learned that I could accomplish a lot since there weren't others to distract me and I could work at my own pace. It was also nice to work with a group since they could help me when I got stuck on a problem or needed to brainstorm ideas. But it was important to stay focused in a group because it was easy for people to get distracted and then their work was affected.

This was the course I've taken that made me write so much formal documentation. It made me an excellent formatter using Microsoft Word and it even taught me a few new tricks. I also

understood the importance of written documents since they became the basis for all group decisions and they were used as references throughout the semester.

During the course of the project I also refined my researching skills. I used all the resources available to me including the library, the internet, and any professionals working in the industry. My discussions with working professionals gave me insight into their problems with respect to our product and how the Robison Detector can be helpful to their work.

From the technical aspect of the project I learned how to install and run different operating systems including Tizen and Linux. First I had to learn how to dual-boot an Intel machine with both Linux and Windows since I would need both environments, depending on the kind of work I would be doing. In the Linux setup I learned how to simulate the Tizen operating system using an emulator and how to alter the code of its media player to change some functions. The biggest challenge here was getting started since there was little documentation and the online forums did not completely explain some of the errors I was encountering. But with some time and trying different things, I was eventually able simulate Tizen. Eventually Tizen had to be ported to a hardware device which in our case was the Pandaboard. Along with some other members I learned how to create a self-booting Tizen hardware device. Unfortunately this subsystem was scrapped for the Blackberry subsystem, however I gained the experience of loading an operating system onto a dedicated hardware device.

7.6. Siavash

I first heard about the Robison Detector in July and it immediately peeked my interest. The problem is a common one for many drivers and our device provides an appropriate solution. Over the course of the semester I have learned a lot not only from the technical side of the project, but from working with the other members in the group. We faced many challenges, in particular on the technical side of things where a few of our early candidates for the external alert were abandoned for the Blackberry Z10.

For our project it made sense to use a DSP board for receiving the audio signal and determining if it is actually a siren. This involved researching different kinds of algorithms and seeing which one would work for our scenario. During my research in this field I learned different audio filters and algorithms related to signal matching. I had not explored any of these topics before and so seeing them initially took some time to interpret and understand. Once an algorithm was chosen, we began development on the DSP board. This involved hours and hours of coding and testing. The DSP hardware is a low-level device and requires C code which is not intuitive to read. In addition, understanding the libraries took time and required a lot of patience going through the code.

One of the early subsystems that we decided to use was the Tizen OS with the Pandaboard. I had to use my research skills in programming the board since there wasn't much documentation available. There were some online tutorials that helped, however the errors that we encountered took a lot of time to debug. A lot of testing took place to accomplish this. I was not familiar with the Tizen OS before any of this and so by the end of the semester I

understood the operating system and how to make it boot from a Pandaboard.

Our final subsystem of the Blackberry Z10 included interrupt handling with its USB peripheral. The USB standard is a complicated one that has a lot of documentation and sophisticated protocols. Because of this, understanding all about the USB interrupt was very challenging at first however with the help of some example code we were able to successfully implement this crucial feature into our system. The interrupt handling on the Blackberry side of the device had to be done by using a laptop in between the DSP and the Z10. This also included making a Blackberry app that would handle the interrupt from the DSP. Through all of this I expanded my coding and debugging skills while learning new Linux-based operating systems like Tizen.

Along with the technical skills I developed during this project, I had a chance to enhance some of my interpersonal skills, in particular peer-programming. Most of my work was with Gurinder and we spent a lot of our time developing the hardware. I learned how to share my code with my peers and be open to criticism, especially when I may have thought I was right but maybe I was not. Peer-programming allowed us to share the workload and it helped with debugging since the other person would look at the code with a new set of eyes, so to speak. This way, bugs are more likely to be noticed. This was an enjoyable experience because I worked well with Gurinder and we would often catch each other's mistakes while coding. It was also nice because ideas could be bounced off one another and different opinions allowed for a better solution in the end.

7.7. Workload Distribution

Table 2 below shows the workload distribution amongst the group.

Table 2- Workload distribution for the first prototype

High-Level Task	Kartick	Shane	Shayan	Raj	Gurinder	Siavash
High Level Design	x		x	x	x	x
Hardware Programming					xx	
Alert Subsystem	x		x	xx		xx
Integration					x	xx
Debugging & Testing	x	x		x	xx	x
Research	x	xx	x	x	x	x
Marketing		xx	x			
Administrative Tasks			xx			
Budgeting			xx			
Documentation	xx	x		x		

8. Conclusion

The Robison Detector project gave many challenges for our Vantek team. But our drive to succeed and deliver a working prototype was enough to make this project a success. By the demo date, we will have a working device that delivers on almost all the features we anticipated to have. In addition we were under budget and for the most part on schedule with all our internal deadlines and due dates for deliverables. Our group worked hard together and overcame a lot to succeed.

The future looks to be bright for the Robison Detector. There are already documents underway for patenting the product and discussions have been held with business professionals on its marketibility. Future prototypes of the device will include new features such as stand-alone integration within a vehicle, faster detection, and possibly the ability to determine how far the emergency vehicle is with respect to the car at the moment of detection. More testing and procurement of other materials will have to take place in order for this to happen and Shayan, Vantek's CEO, is prepared to do what is necessary to push the product to market.

9. References

[1] W. Vermaak. (2014, May 5). *Safe Driving when Hearing the Emergency Siren.*[Online]. Available: https://www.arrivealive.co.za/Safe-Driving-when-Hearing-the-Emergency-Siren Date accessed: August 22, 2014.

[2] Texas Instruments. (2014). *C5535 eZdsp USB Development Kit.* [Online]. Available: http://www.ti.com/tool/tmdx5535ezdsp#Technical%20Documents/. Date accessed: October 30, 2014.

10. Appendix

10.1. Meeting Agenda and Minutes

Vantek
AGENDA
September 5, 2014
4:30-5:30
Lab 4

Purpose of Meeting: First official team meeting with all members

Items for Discussion:

- Assign team roles
- Clarify the project for everyone
- Discuss possible solutions
- Update everyone on the research being done

Vantek
MINUTES
September 5, 2014
4:30-5:30
Lab 4

Present: Shayan, Siavash, Shane, Kartick, Gurinder, and Raj

Absent: None

Purpose of Meeting: First official meeting with all members

Minutes:

A. Assign team roles

- CEO – Shayan
- COO – Siavash
- CFO – Raj
- CTO – Gurinder
- CMO – Shane
- CIO - Kartick

B. Clarify the project for everyone

Done. Everyone now has a clear idea of the project entails.

C. Discuss the possible solutions

Discussion: At first, software solutions will be looked at to familiarize ourselves with the algorithms involved. Then, candidate hardware will be researched to decide which one will be best suited for the project. Right now the biggest challenge is getting the hardware to properly receive and detect an EMV siren.

Action: Continue the research and decide on hardware within the month.

D. Next Meeting Date

The next meeting will beSeptember 12, 2014in Lab4.

E. Other Business
None.

Meeting was ended at 5:30.

Vantek
AGENDA
September 12, 2014
4:30-5:00
Lab 4

Purpose of Meeting: Update everyone on their own work

Items for Discussion:

- Make sure everyone knows what they're doing
- Check status on proposal write-ups
- Play around with the new C5000 board

Vantek
MINUTES
September 12, 2014
4:30-5:00
Lab 4

Present: Shayan, Siavash, Shane, Kartick

Absent: Gurinder and Raj

Purpose of Meeting: Update everyone on their own work

Minutes:

A. Make sure everyone knows what they're doing

Some of Siavash's and Gurinder's responsibilities have been re-allocated to Raj, Shane and Kartick

B. Check status on proposal write-ups

Most have started their work on the proposal and beginning to upload it to Google Docs

C. Play around with the new C5000 board

All present members got to see the board and its specifications.

D. Next Meeting Date

The next meeting will beSeptember 19, 2014in Lab4.

Meeting was ended at 5:00.

Vantek
AGENDA
September 19, 2014
4:30-5:30
Lab 4

Purpose of Meeting: Weekly meeting

Items for Discussion:

- Proposal Status
- ESSEF Funding
- MSP430 UART
- Discuss new algorithm
- Shayan's meeting with BC firefighting director

Vantek
MINUTES
September 19, 2014
4:30-5:30
Lab 4

Present: Shayan, Siavash, Shane, Kartick, Gurinder, and Raj

Absent: None

Purpose of Meeting: Weekly meeting

Minutes:

A. Proposal Status

The proposal is mostly complete. There's a few remaining sections that need to be integrated. Also, a few figures and table need to be captions and it needs to be double-checked for spelling/grammar. Otherwise, it is well on track for completion before the deadline.

B. ESSEF Funding

The application for the ESSEF funding is almost complete. It needs to be reviewed before submission.

C. MSP430 UART

The part was discussed and the launcher for the C5000 was also brought in.

D. Discuss new algorithm

The new algorithm seems to be working well in MATLAB. This will likely be the one that we will go with as it seems to work the best. Now the challenge will be to transfer the code to C/C++.

E. Shayan's meeting with BC firefighting director

The director offered to view our project and give his opinion. He could be very helpful to us, and Shayan was asked to explore that option further if possible.

Meeting was ended at 5:30.

AGENDA

September 26, 2014
3:30-4:00
K9500

Purpose of Meeting: Weekly meeting

Items for Discussion:

- Algorithm & Wiki article for the hardware
- Hardware compatibility
- Bluetooth research
- Next deliverable

Vantek
MINUTES

September 26, 2014
3:30-4:00
K9500

Present: Shayan, Siavash, Shane, Kartick, Gurinder, and Raj

Absent: None

Purpose of Meeting: Weekly meeting

Minutes:

A. Algorithm & Wiki article for the hardware

The algorithm is finalized. Siavash has posted a wiki article on some of the crucial hardware that is required; it will serve as one of the core components of the device.

B. Hardware compatibility

So far through research all the parts that have been ordered should be compatible with one another. However only through actual testing will this be known for sure.

C. Bluetooth research

Raj and Shane have begun research on Bluetooth devices that can be integrated with the sire detector. So essentially the alert can be given to a Bluetooth earpiece.Getting close to choosing hardware that will work for us.

D. Next deliverable

The Function Specification documentation will again be split into parts and assigned to members to work on, just like the Proposal document. This should be done within the next few days so that everyone known what they have to work on.

Meeting was ended at 4:00.

Vantek
AGENDA
October 10, 2014
4:00-4:30
BCIT

Purpose of Meeting: Everyone give an update on their work. Get everyone on the same page

Items for Discussion:

- Update on the MCU+DSP programming
- Status on Function Specification document
- Research topics for Bluetooth

Vantek
MINUTES
October 10, 2014
4:00-4:30
BCIT

Present: Shayan, Siavash, Shane, Kartick, Gurinder, and Raj

Absent: None

Purpose of Meeting: Weekly meeting

Minutes:

A. Update on the MCU+DSP programming

We're still having some trouble configuring the pins on the boosterpack board. But we found some documentation that might be helpful for this. Now we're probably going to try the energy algorithm first to make sure things are working before anything else.

B. Status on Function Specification document

Most people have started working on their parts and the Google Doc was created for preliminary integration.

C. Research topics for Bluetooth

Raj and Shane are close to deciding on the right Bluetooth part. Once this is done, hopefully soon, it will be ordered.

Also, research needs to be done on the topic of multiple Bluetooth devices connected to a car's system and how this configuration will affect the Robison Detector's alert, if at all.

Meeting was ended at 3:20.

Vantek
AGENDA
October 10, 2014
4:00-4:30
BCIT

Purpose of Meeting: Weekly meeting

Items for Discussion:

- Everyone's opinions and ideas on "Speeddating"
- Document status
- Programming status
- New advisor

Vantek
MINUTES
October 10, 2014
4:00-4:30
BCIT

Present: Shayan, Siavash, Shane, Kartick, Gurinder, and Raj

Absent: None

Purpose of Meeting: Weekly meeting

Minutes:

A. Everyone's opinions and ideas on "Speeddating"

Everyone was impressed by the all the machines that were available at BCIT, in particular the 3D printer. Shayan spoke to the designer Brian Keane and got his feedback on the project. He really like it and recommended that we keep the idea to ourselves to prevent anyone else from building the same project. Also, if any of the machines are needed, Andrew can be contacted.

B. Document status

The document is about half complete. The extension may have to be used because a lot of work still remains. This will be decided on the day the document is due, October 14.

C. Programming status

The programming is going well, however there are some issues that still need to be sorted out. Configuring the pins and using some commands (e.g. printf) are not working. This needs to be resolved soon.

D. New Advisor

Shayan spoke to Craig Scratchley, one of the SUF professors, and he will be our official advisor for the project. He has experience with microcontrollers and integrating systems into vehicles. He has recommended researching Tizen OS combining this with the siren detector.

Meeting was ended at 4:30.

Vantek
AGENDA
October 16, 2014
12:00-12:30
K9500

Purpose of Meeting: Functional Specification meeting

Items for Discussion:

- Update on Functional Specification

Vantek
MINUTES
October 16, 2014
12:00-12:30
K9500

Present: Shayan, Siavash, Shane, Kartick, Gurinder, and Raj

Absent: None

Purpose of Meeting: Functional Specification meeting

Minutes:

A. Update on Functional Specification

The extension has been used for the document. Everyone's part is almost complete. Integration has begun and everything should be complete by the new deadline. A few parts have been re-assigned and everybody knows what they must complete.

Meeting was ended at 12:30.

Vantek
AGENDA
October 24, 2014
2:30-3:15
Lab4

Purpose of Meeting: Weekly meeting

Items for Discussion:

- Update on Design Specification
- New DSP board

Vantek
MINUTES
October 24, 2014
2:30-3:15
Lab4

Present: Shayan, Siavash, Shane, Kartick, Gurinder, and Raj

Absent: None

Purpose of Meeting: Weekly Meeting

Minutes:

A. Update on Design Specification

Everyone's part has been assigned and some of the early work has begun. Make sure everyone knows that we don't have an extension this time.

B. New DSP board

It was clarified to everyone that a new DSP board was ordered because the old one had coding limitations. Because of this, we are set back a few weeks. However it should quicker to program this board because of the experience with the old one.

Meeting was ended at 3:15.

Vantek

AGENDA

October 30, 2014

2:30-3:10

CSIL

Purpose of Meeting: Weekly meeting

Items for Discussion:

- Update on Design Specification
- New DSP board
- IVI update
- Demo date

Vantek
MINUTES
October 30, 2014
2:30-3:10
CSIL

Present: Shayan, Siavash, Shane, Kartick, Gurinder, and Raj

Absent: None

Purpose of Meeting: Weekly Meeting

Minutes:

A. Update on Design Specification

The document is coming along nicely and is on track for completion. However a lot of the work still remains and because of its length, extensive proof-reading is required by all team members.

B. New DSP board

The new DSP board has arrived and its APIs were shown to everyone. Programming will have to start as soon as possible to make up for any lost time.

C. IVI update

The operating system and Tizen SDK has been setup on one of the machines and testing of the alert code can now begin. This includes lowering of the car stereo's volume.

D. Demo date

Possible dates for the demo have to be picked. Everyone has decided to go with a later date so that it falls after everyone's final exams.

Meeting was ended at 3:10.

Vantek
AGENDA
November 6, 2014
2:30-3:00
Lab4

Purpose of Meeting: Presentation Preparation

Items for Discussion:

- Assign parts for presentation
- Confirm Demo dates

Vantek
MINUTES
November 6, 2014
2:30-3:00
Lab4

Present: Shayan, Siavash, Shane, Kartick, Gurinder, and Raj

Absent:

Purpose of Meeting: Presentation Preparation

Minutes:

A. Assign parts for presentation

Everyone is assigned parts to speak about for the presentation. For specifics, they can go to the Facebook group page. Each person should speak for 80-100 seconds.

B. Confirm Demo dates

Make sure everyone is okay with any day from December 13-19 for the demo. They are.

Meeting was ended at 3:00.

Vantek
AGENDA
November 14, 2014
2:30-3:00
Lab4

Purpose of Meeting: Weekly Meeting

Items for Discussion:

- IVI system update
- DSP update
- Demo date confirmation

Vantek
MINUTES
November 14, 2014
2:30-3:00
Lab4

Present: Shayan, Siavash, Shane, Kartick, Gurinder, and Raj

Absent: None

Purpose of Meeting: Weekly Meeting

Minutes:

A. IVI System Update

Kartick has synched up with Raj and the emulator system needing for Tizen testing. This includes installing the IDE and testing the Tizen Media Player's functionality.

B. DSP Update

The core functionality of the siren detection now works. What's left is some optimization that can always been done after integration. The DSP now compares the real-time audio with different siren samples to check for a match.

C. Demo Date Confirmation

The demo date has been confirmed for Tuesday, December 16.

Meeting was ended at 3:00.

Vantek
AGENDA
November 21, 2014
2:30-3:00
CSIL

Purpose of Meeting: Weekly Meeting

Items for Discussion:

- IVI system update
- Patent status

Vantek
MINUTES
November 21, 2014
2:30-3:00
CSIL

Present: Shayan, Siavash, Shane, Kartick, Gurinder, and Raj

Absent: None

Purpose of Meeting: Weekly Meeting

Minutes:

A. IVI System Update

Shane, Raj, Kartick and Gurinder all have working Tizen setups on their laptops. However the function for lowering the volume still needs to confirmed and the code needs to be read to fully understand how the IVI system's media player works.

B. Patent Status

Shayan is in the process of patenting the Robison Detector. Initial documents have been collected and need to be filled out.

Meeting was ended at 3:00.

Vantek
AGENDA
November 30, 2014
12:00-12:45
Skype

Purpose of Meeting: Status Meeting

Items for Discussion:

- Kartick's Update
- Siavash's Update
- Shane's Update
- Raj's Update
- Shayan's Update
- Gurinder's Update

Vantek
MINUTES
November 30, 2014
12:00-12:45
Skype

Present: Shayan, Siavash, Shane, Kartick, Gurinder, and Raj

Absent: None

Purpose of Meeting: Status Meeting

Minutes:

A. Kartick's Update

Research is ongoing for the USB interrupt that will connect the Pandaboard or emulator to the DSP. Some promising code and examples have been found which need to be further analyzed.

B. Siavash's Update

Few of the bugs for the DSP siren detection have been fixed and need to be confirmed. The work with the DSP is basically done. Now Siavash can co-ordinate with Kartick on the interrupt code.

C. Shane's Update

Found additional documentation on the interrupt. Shane's role is with the Pandaboard team and assisting them with getting Tizen OS booting on the Pandaboard.

D. Raj's Update

Still trying to load Tizen OS on the Pandaboard.Having issues with the boot sector and the different configurations on the Pandaboard. A final decision will have to be made within the next few days whether to continue with the Pandaboard or focus on the emulator.

E. Shayan's Update

Assisting with Raj on the Tizen OS and continuing work with patent documents. Need to co-ordinate with Kartick on some additional documentation.

F. Gurinder's Update

Will now be helping Shayan, Raj, and Shane with loading Tizen on the Pandaboard and making a final decision whether to continue with the Pandaboard or not.

Meeting was ended at 12:45.