SUN SMART School of Engineering Science, Burnaby, BC, V5A 1S6

January 14, 2009
Dr. Patrick Leung
School of Engineering Science
Simon Fraser University
Burnaby, British Columbia
V5A 1S6

Re: ENSC 440 Project Proposal for a Portable UVB Monitoring System

Dear Dr. Leung:

The attached document, ***Proposal for a Portable UVB Monitoring System***, defines our project for ENSC-440. Our final goal is to design and implement a portable device that measures the UBV of the environment and gives user warnings about applying a sunscreen when necessary.

This proposal will focus on the purpose and usability of our product as well as outlining the key elements of the design of our product. It will also provide scheduling and budgeting estimates for our project.

Sun Smart consists of three capable, hard-working and dedicated fourth and fifth-year engineering students: Nima Edelkhani, Kimia Nassehi and Darioush Sahebjavaher. If you have any questions or concerns about our proposal, please feel free to contact me by phone at (604) 992-1364 or by e-mail at nedelkha@sfu.ca.

Sincerely,

Nima Edelkhani

Nima Edelkhani
Sun Smart Inc.

Enclosure: ***Proposal for a Portable UVB Monitoring System***

SUN SMART

Proposal for a

Portable UVB Monitoring Device

Project Team: Nima Edelkhani
Kimia Nassehi
Daryoush Sahebjavaher

Contact Person: Nima Edelkhani
nedelkha@sfu.ca

Submitted to: Dr. Patrick Leung – ENSC440
Steve Whitmore – ENSC305
School of Engineering Science
Simon Fraser University

Issued Date: Jan 19th 2009

Version: 1.1

EXECUTIVE SUMMARY

Sara was going to work and she had to visit one of BC Hydro's power plants on that day. The weather was cloudy as usual and she thought she didn't need any sunscreen. When Sara got back home after 8 hours of work she figured she had been sun burnt and had pretty bad skin irritation on shoulders and face. It took her skin a long time to heal and later when she visited her dermatologist, she told her that UVB rays can damage our skin even when the we least expect it.

We have all experienced the problem of being sun burnt because we either thought we didn't need sunscreen due to cloudy weather, we used the wrong level of SPF or we forgot to re apply our sun screen.

We should start paying attention to harmful effects of UVB rays. The exposure to these rays is not preventable but the harmful effects can be prevented by applying sunscreen or seeking shade. New studies show how important it is for us to take care of our skin and exposure to UVB as Sonia Lamont from BC Cancer Agency Prevention Programs says: *"Even a few severe sunburns increase your chances of getting skin cancer [1]."* Overexposure to the sun's harmful UV rays causes skin damage that can lead to skin cancer, including melanoma which is the most dangerous kind of skin cancer and may be terminal. We should be very cautious since new research findings have revealed many cases of serious skin cancer begin with childhood sunburns. Skin cancer is the most common form of cancer in North America and more than one million skin cancers are diagnosed each year. BCC and SCC are the two major forms of non-melanoma skin cancer which are non-fatal but may cause disfiguration, discoloration and more skin problems. Between 40 and 50 percent of Americans who live to age 65 will have either of the above mentioned skin cancers at least once [2].

The purpose of this proposal is to introduce a portable UVB monitoring system which is small enough to be installed on a wrist watch, on a cell phone, in a car or many other places. The device will tell you the amount of UVB index at location, tell you which SPF level to apply and will even remind you to re-apply your sun screen. Although we can read the UVB index on weather channel this device is useful when we don't have access to TV like when we are camping or hiking or when we want to know level of UVB in exact location.

Sun Smart consists of three 4^{th} and 5^{th} year students which specialize in different areas including microelectronics, analog and digital design in addition to software development and testing. This project includes research, design, construction and testing. The prototype and PCB design will take 14 weeks starting from January 5^{th} to April 15^{th} of 2009 to be completed and functional. The calculated budget for this project is predicted to be $485 which will be provided by Sun Smart group members.

TABLE OF CONTENT

1. INTRODUCTION

In the current century many individuals are concerned about their health and do everything they can in order to stay healthy. This involves being more active, eating healthy, quitting smoking and avoiding UV exposure. As cancer society researches show, being aware of different causes of cancer helps us prevent 50% of all types of cancers [3].

The most common form of cancer is skin cancer, which is an abnormal growth of skin cells that usually occurs on skin exposed to UVB rays of sun. Annual rate of all forms of skin cancer are increasing every year and over one million cases of skin cancer is reported annually; therefore, skin cancer has become a public concern [4].

We can try to prevent skin cancer to some extent by paying attention to protecting our skin from extreme exposure to sun. As Aristotle says: “All human actions have one or more of these seven causes: chance, nature, compulsion, habit, reason, passion, and desire [5]” We are going to take an action on improving public health. Our passion is to improve human health and decrease government expenses in treating different forms of skin cancer which in turn leaves more budget for research and study of different health issues.

As part of the solution to improving general public health, Sun Smart is developing a portable UVB monitoring system that shows the level of UVB at any time in that specific location plus the required level of SPF that needs to be used. It also reminds the user to reapply their sun screen. This device is very efficient for people who work outdoors, go camping or hiking, go to the beach and etc. due to the small size, this device can be implemented on cell phones, cars, a wrist watch and many other devices.

At Sun Smart we believe this product is a revolutionary device in market since it is small in size, it’s portable and inexpensive. This device is usable for any group age since its user friendly and simple to understand. Anyone who can use a watch is able to use this device. Later in production a text-to-speech feature can be added in order to make it usable for the blind.

We are hoping this device helps public improve their skin health by alarming them of possible danger of UVB rays and making them more alert in regards to sun exposure. Users can then decide to seek shade or apply sun screen with proper SPF degree. We have to take skin cancer seriously since we cannot prevent UV exposure but we can try to be more aware and do all we can to minimize skin cancer cases.

This proposal gives the reader more information about technical aspects of this project and also provides more detailed analysis of the design, budget and schedule.

2. SYSTEM OVERVIEW

As shown on figure 2.1, the portable system senses the amount of UVB radiation and informs the user about the danger level. The portable system, which could be implemented on popular devices such as a watch or a cell phone, recommends an appropriate sunscreen SPF and warns the user if UVB levels are dangerously high.

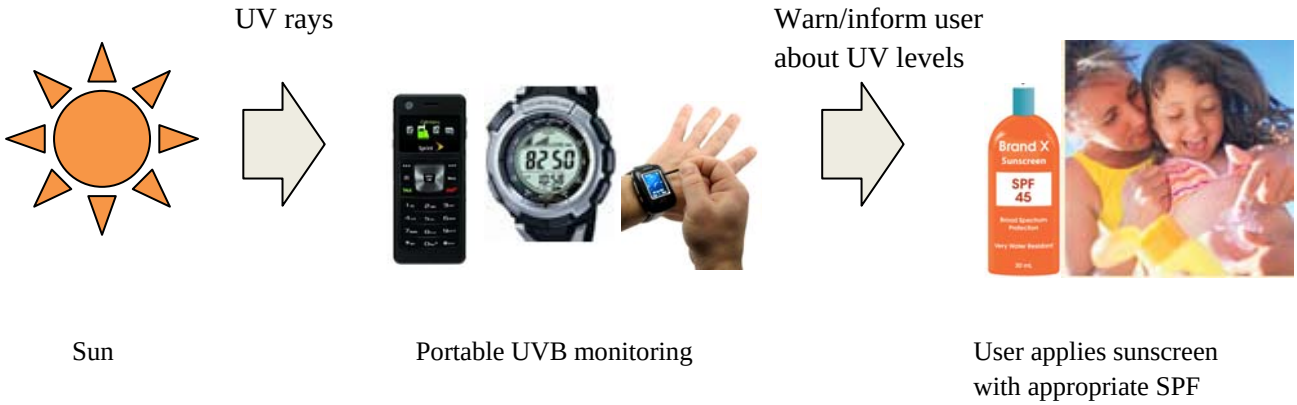


Figure 2.1: System Overview [6, 7, 8, 9, 10]

Figure 2.2 shows a simplified operating algorithm of the device.

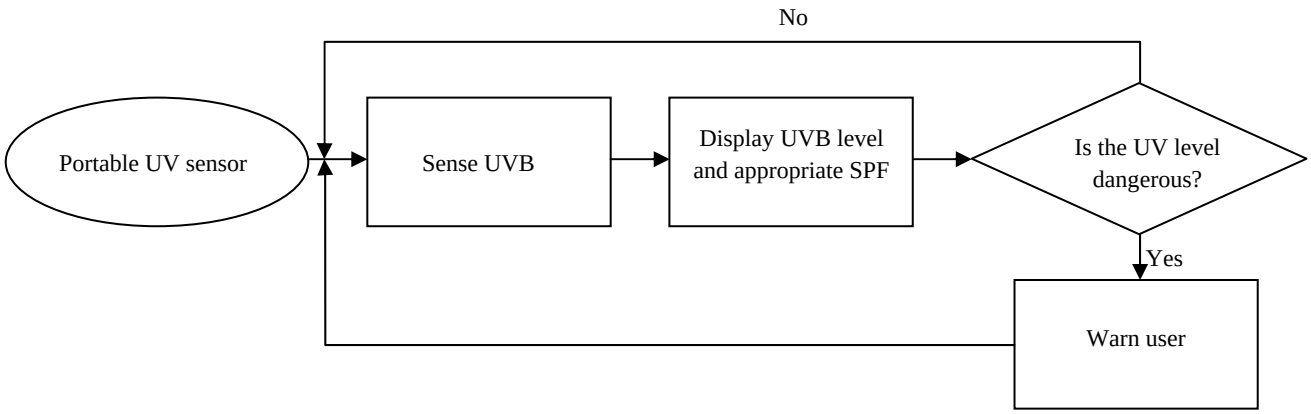


Figure 2.2: Simplified System Operating Algorithm

3. POSSIBLE DESIGN SOLUTIONS

There are currently many approaches people can take to protect themselves against harmful UVB radiation. Having a portable UVB monitoring device is very convenient and allows users to get fast, accurate and reliable UVB information at their exact geographical location. In other words, the user is informed about the SPF requirements at the convenience of looking at their watch or cell phone. Existing solutions on the other hand, are less effective, less comfortable and more time consuming.

Wearing sunscreen is inconvenient and people tend to avoid them as much as possible, specially the ones with higher SPF. People tend not to apply sunscreen because there is no device to warn them against the threat they are in. If the user is utilizing a portable UVB monitoring device, they will recognize the danger and are likely to apply sunscreen despite its inconvenience. Underestimating the UVB levels and applying the sunscreen with the wrong SPF is also a common mistake which can be avoided by using the suggested system. The portable device also serves to remind the user to reapply sunscreen once the effect is fading. Below we have described a couple of existing solutions on how you can currently be informed about the UVB index.

3.1 WEATHER FORECAST

One could check the UV report on the weather forecast available through the media. Obtaining this information is time consuming and inconvenient since one needs access to a radio, TV or the internet and has to patiently browse for the information they are looking for. On the other hand, Sun Smart's portable UVB solution quickly informs users about the UVB index and required SPF. Moreover, the media UV reports are meant for a large geographical area while Sun Smart's solution is based on the user's location satisfying individual needs.

3.2 EXSISTING UVB DETECTION DEVICES

The existing UVB device is large and inconvenient to carry around all the time. Furthermore, it requires the user to carry an extra peace of equipment. Sun Smart's portable UVB solution is much smaller and thereby more portable. Since the system will be integrated on other common devices such as cell phones and watches it does not require the user to carry an extra device.

4. PROPOSED SOLUTION

Sun Smart intends to develop a Portable UVB Monitoring System that provides easy and accurate information about UVB radiation levels. The system also recommends an appropriate SPF level and warns users in case of dangerously high UVB. This device allows users to apply sunscreen more efficiently and more effectively as UVB and SPF levels are accessed effortlessly. This contributes to the society by decreasing the number of sunburns, improving general skin health of the public, and most importantly reducing the chances of skin cancer. This device will also increase public awareness towards harmful effects of UVB rays.

Due to the project's strict time and budget limitations, the team has divided the project into two parts. The first month will be allocated to the design, assembly and testing of a prototype system to serve as a proof of concept. The remaining two and a half months will be dedicated to reducing the overall size of the system to fit inside a wrist watch. With further time and money, many features can be added to the system. For example, it could record a log of a period of UV and temperature readings, it could show the time of dusk and dawn, use a graphical display or have a smarter sunscreen reminder for tanning purposes. In the future, the system could also be integrated into a cell phone and combined with GPS applications to perform geographical UVB statistics across the globe.

Existing UV detection solutions are not designed for ease in transportability and require the user to carry an extra device. While Sun Smart's solution is more portable, it will also be more cost effective when produced in mass production. Merging Sun Smart's portable UVB solution with a watch or cell phone will raise the cost of these devices by a trivial amount since the microprocessor, display, PCB and most of the other electronics components are included on these devices anyway. Nowadays, all products are so similar in quality that manufacturers are forced to look for extra features to add to their products in order to make them more attractive to customers. As UVB monitoring on a cell phone or watch is a distinguishable feature, it is straightforward to imagine how easy it is to market our product via contracting major manufacturers.

5. BUDGET

An estimate of the budget for the portable UVB monitoring system project is presented in table 5.1. We have taken into account a 10% error in our estimate, so the figures in table 5.1 are an overestimate by 10%. This leaves us a safe margin of error and ensures, to some extent, that we are not going to go over the proposed budget.

Table 5.1: Tentative Budget

Quantity	Item	Estimated Cost
1	Atmel AVR Butterfly development board	$70
2	UVB sensor	$50
1	USB-to-serial connector cable	$40
1	Female DB-9 serial connector	$5
1	PCB board	$80
various	Electrical components on PCB	$110
1	Custom LCD	$90
1	Watch case	$40
Total Cost		**$485**

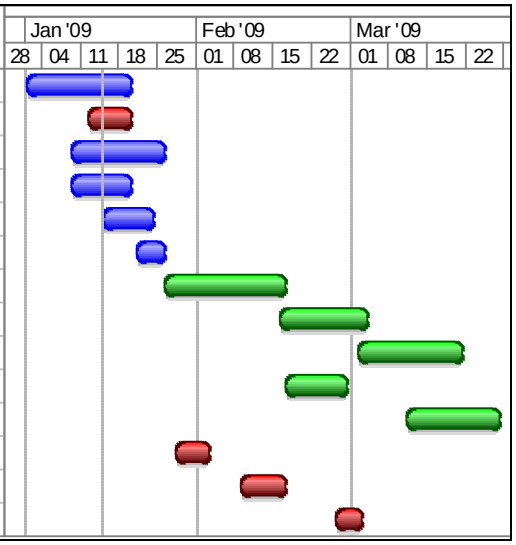
6. TIME SCHEDULE

The main timeline estimate for all the major tasks involved in the project are shown in the Gantt chart below (Table 6.1). Also the Milestone diagram in figure 6.1 shows the important deadlines for papers and demonstrations for this project.

In the following Gantt chart (Table 6.1), purple denotes the proof of concept design and implementation which is the first phase of our project. We intend to finish this phase by 25th of January 2009. Green bars in table 6.1 denote the second phase of our project which concentrates on designing a PCB to reduce the size of our device. This phase is intended to finish by March 27th 2009. Red denotes all the major documentations for this project and their corresponding time lines.

Table 6.1: Gantt chart

ID	Task Name	Duration	Start	Finish
1	Background Research	13 days	Thu 01/01/09	Mon 19/01/09
2	Proposal	6 days	Mon 12/01/09	Mon 19/01/09
3	Research and Design	11 days	Fri 09/01/09	Sun 25/01/09
4	Part ordering	7 days	Fri 09/01/09	Mon 19/01/09
5	Assembly and Programming	7 days	Thu 15/01/09	Fri 23/01/09
6	Testing & Debugging	3 days	Wed 21/01/09	Sun 25/01/09
7	PCB Design	16 days	Mon 26/01/09	Mon 16/02/09
8	PCB Ordering	12 days	Mon 16/02/09	Tue 03/03/09
9	Assembly and Programming	15 days	Mon 02/03/09	Fri 20/03/09
10	Mechanical Integration	9 days	Tue 17/02/09	Fri 27/02/09
11	Testing & Debugging	13 days	Wed 11/03/09	Fri 27/03/09
12	Progress Report	4 days	Wed 28/01/09	Mon 02/02/09
13	Function Spec.	6 days	Mon 09/02/09	Mon 16/02/09
14	Design Spec.	3 days	Thu 26/02/09	Mon 02/03/09



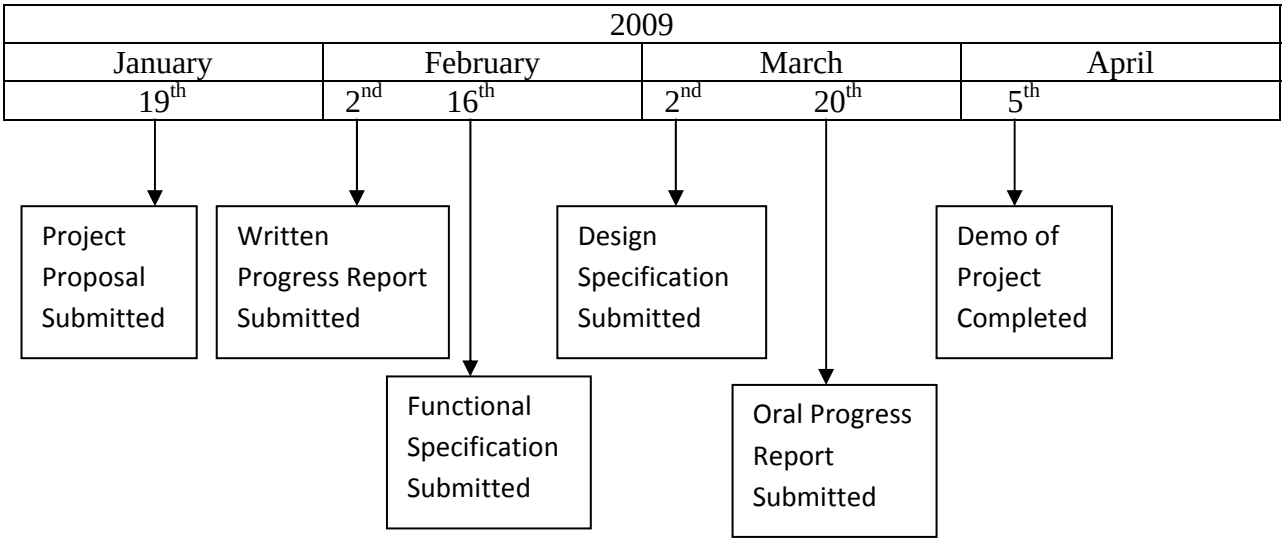


Figure 6.1: Milestone chart

7. TEAM ORGANIZATION

In this section we will provide an overview of the highlights of each of the project member's main expertise.

Nima Edelkhani has extensive programming experience in various programming languages. He has worked with microcontrollers before and has been involved with digital and analog design procedures. He also has previous experience in writing various formal documents for research and development projects. Kimia Nassehi is a 4th year student of electronics engineering that specialises in microelectronics and software testing. She is also experienced with both digital and analog circuit design. Kimia is also competent in composing technical reports and analysis. Dariush Sahebjavaher has experience in both analogue and digital circuits deign. He has released several PCB boards into mass production, assembled and tested prototype PCB designs, and has excellent soldering skills. He is also experienced in mechanical design and has superb hands on skills.

We will try to assign each member duties and tasks that ate related to the mentioned abilities. This way we will ensure the maximum use of our technical resources in Sun Smart project.

For further information about each member's technical background please refer to appendix for each member's resume.

8. CONCLUSION

Sun Smart's revolutionary Portable UVB Monitoring System raises awareness and protects people against harmful UVB rays. We are confident that this alerting system would help people to effectively apply proper level of sunscreen and thereby reduce chances of skin cancer.

This device is marketable because it's inexpensive, small in size, portable and easy to use. Anyone can use this device in any location due to its user friendly interface. In addition, this device can be implemented on other devices like cell phones, GPS, cars and watches therefore it can be mass produced by different companies. The other benefit is that the design is not regional and can be used any where around the world since it only measures UVB at location and nothing else. This device can be sold internationally with applicable language.

Sun Smart has conducted ample research in preparation for this 4-month project to overcome organizational and technical challenges. Careful distribution of the tasks in accordance with each team member's expertise ensures that we will be able to deliver the project on the proposed time and budget. Although we will face obstacles during this project, we plan to overcome them by dedication and use of resources available to us such as consulting with our professors.

REFERENCE

[1] BC Cancer Agency, “Prevention”, BC Cancer Agency, September 25, 2008, Available: http://www.bccancer.bc.ca/PPI/Prevention/sunsafety/default.htm [Accessed on January 10, 2009]

[2] Skin Cancer Foundation, “2009 Skin Cancer Facts”, Skin Cancer Foundation, 2008, Available: http://www.skincancer.org/2008-Skin-Cancer-Facts.html [Accessed on January 10, 2009]

[3] BC Cancer Agency, “Sun Safety”, BC Cancer Agency, October 07, 2008, Available: http://www.bccancer.bc.ca/PPI/Prevention/default.htm [Accessed on January 10, 2009]

[4] HCOP Newsletter, “Skin Cancer”, El Paso Community College”, May 2007,Available: http://start.epcc.edu/health/Navigation/Attachments/News/May07.pdf [Accessed on January 12, 2009]

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[7] Michael Oryl, “Review: Samsung Upstage-Jekyl and Hyde Music Phone”, April 16, 2007, Available: http://www.mobileburn.com/review.jsp?Id=3304 [Access on January 17, 2009]

[8] Skin Cancer Foundation, “Sun Fitness for Kids and Teens”, The Skin Cancer Foundation, 2009, Available: http://www.groupeproxim.ca/image/fr/photo/alerte.jpg [Accessed on January 18, 2009]

[9] Think Geek, “imobile cell phone watch”, Available: http://www.thinkgeek.com/images/products/zoom/imobile_cellphone_watch.jpg [Accessed on January 16, 2009]

[10] FDA, “Consumer Update”, August 23, 2007, Available: http://www.fda.gov/consumer/updates/sunscreen082307.html [Accessed on January 17, 2009]

APPENDIX

NIMA EDELKHANI

1535 Pinecrest Drive
West Vancouver, BC V7S 3E8
E-mail: nedelkha@sfu.ca
(604) 992-1364

EDUCATION

Sept 2004- present

Simon Fraser University, Burnaby, BC
Fifth year, Electronics Engineering

AWARDS

Summer 2005- present

- Dean's Honor Roll
- 9 Consecutive Undergraduate Open Scholarships

Fall 2005

- SFU Alumni Scholarship

WORK EXPERIENCE

May 2007- Dec 2007

Tools Engineer, NOKIA, Burnaby, BC

- Designed, implemented and tested a new branch to a web-based tool, developed by NOKIA.
- Learnt Pearl programming and started finding errors and fixing bugs in the scripts very fast.
- Programmed in Java and HTML as well as Pearl.
- Got assigned a whole project to be delivered on my own.
- Wrote estimate 4000 lines of working code.
- Delivered the project on-time and wrote various documents.
- Showed excellent time-management, problem solving and self-motivation skills.

TECHNICAL PROJECTS

Jan 2009- present

Project Member, Portable Ultra Violet Monitoring System, Simon Fraser University, Burnaby, BC

- Ongoing project of designing and building a prototype UBV monitoring device.
- PCB design and intensive electronics laboratory experience
- Microcontroller programming in C language.

Nov 2008- present

Research Assistant, Resonance based Measurement Technique for Detection of Ferromagnetically Tagged Bio-molecules Research, Simon Fraser University, Burnaby, BC

- Approached Dr. Ash Paramesvaran for a volunteer research assistant position.
- Designed, implemented and tested a portable electronic device.
- Device recognizes any change in magnetic properties of sample.

TECHNICAL PROJECTS CONT'D

May 2008- Nov 2008 — **Research Assistant, Campaniform Sensilla Research, Simon Fraser University, Burnaby, BC**
- Volunteer research assistant position with Dr. Ash Paramesvaran and Dr. Carlo Menon.
- Topic of designing a new MEMS strain sensor.
- Both supervising professors very satisfied with my contributions.

May 2008- Aug 2008 — **Project Member, Microelectronics Project, Simon Fraser University, Burnaby, BC**
- Designed, implemented and tested a multi-stage electronic device capable of detecting metals - Received A+.

Jan 2006-Mar 2006 — **Software Developer, Real Time and Embedded Systems Project, Simon Fraser University, Burnaby, BC**
- Responsible for developing software to control a robotic arm.
- Volunteered to take a more challenging project.
- Generated real-time responses to different events.

SKILLS

Software
- Experienced with Perl, Java and HTML, C++ and VHDL.
- Familiar with DOS and Windows and UNIX/Linux OS.
- Experienced with MATLAB and P-spice.
- Familiar with OPNET and SOLIDWORKS.

Hardware
- Familiar with microcontroller architecture.
- Experience with Motorola HC12 and Atmel microcontrollers.
- Laboratory techniques in digital devices and Hardware/Software interfacing and electrical circuit design and assembling.

Other
- Very good communication skills.
- Outstanding leadership ability and sense of responsibility.
- Excellent time management and problem solving skills.

VOLUNTEER AND EXTRA-CURICULAR ACTIVITIES

Dec 2007- Feb 2008 — **Volunteer, Providence Health Care, Brock Fahrni Pavilion care facilities, BC**
- Weekly gathering in which I performed piano pieces.
- Socialized with 150 elderly residents of Brock Fahrni Pavilion.
- An excellent practice for my communication skills.

June 2006 — **Volunteer, Simon Fraser University Open House,**
- Cooperated with volunteers to present an engineering project.

INTERESTS

Music: Played classical piano for eleven years (Grade 10). Performed in Centennial Theater.
Sports: Tennis, Squash and Swimming.

1903-4250 Dawson St.
Burnaby BC V5C 4B1

Kimia Nassehi

E-mail: knaeinit@sfu.ca
Cell: (604) 809-1364

Education

Jan 2004-Present **Simon Fraser University, Burnaby, BC**
Fourth year electronics engineering student

Skills

Software
- Competent with Microsoft Office
- Programming in C/C++, JAVA and VHDL
- Experienced with COMSOL and MATLAB
- Programmed in Assembly on microprocessor Motorola HC12

Hardware
- Electronic circuit design, assembly and testing
- PCB design and testing
- Laboratory experience with multistage electronic systems design and testing

Other
- Fluent in Farsi
- Excellent communication skills
- Excellent management skills

Work Related Experience

May - Dec 2007 **Software Developer-Tester, Tatara Systems, Burnaby, BC**
- Tested the product of Tatara Systems (a connection manager)
- Pointed out inaccuracies, inefficiencies and errors regarding the product
- Arranged technical reports outlining the software issues and suggested different solutions to solve the problem, Communicated between QA and software development to have defects solved as fast as possible
- Wrote reports reviewing QA's accomplishments and future responsibilities regularly
- Documented new test environments and testing steps of different testing methods for new QA employees and for further reference

June 2004- Sept 2005 **Customer Service Rep., Shell, Coquitlam, BC**
- Received financial award for excellent service, company sent anonymous costumers called "mystery shoppers" to check on service levels, scored 100%
- Ordering and inventory, cash register, full service pumps
- Worked 30 hrs./wk while student at SFU

Technical Projects

Sept-Dec 2008 **Communication systems, SFU**

- Put together various communication system components and experimented transmission and reception of data using main communication techniques such as AM, FM and PM involving modulation and demodulation of all signals of interest

Jan-Apr 2007 **Microelectronics, SFU**

- Analyzed different IC circuits and calculated gains, impedances and other characteristics of the circuit and also designed a metal detector

Sept-Dec 2006 **Computer Architecture, SFU**

- Implementation of MiniMIPS microprocessor in VHDL, tested in Xillinx, created input/output waveforms

Jan- Apr 2005 **Assembly Language Programming, SFU**

- Role as white Hacker, found out Assembly language programming problems and bugs, solved them to create a game on Motorola HC12 board in a group of four
- Demonstrated the working copy of the game to instructors and students, through Power Point presentation and live demo, the project received an A

Volunteer and Extra Curricular Activities

Sept2007-Present **Engineering Mentorship Program, SFU, Burnaby, BC**

- Volunteer in SFU engineering mentorship program for women in engineering, mentor first year female students to help them get started in the engineering program

Sept2007-Present **BC Cancer Society, Coquitlam, BC**

- Community support volunteer, attend fundraisings and cancer awareness events including: Daffodil days, Sun-Squad, Cops for Cancer and raising awareness for college students in BCIT, all these events include interacting with people and giving them pamphlets in regards to cancer, prevention and etc.

Feb 2007 **Discover Applied Science, SFU**

- Tour guide, showed engineering department and applied science department to SFU visitors and stated facts and history of SFU

June 2006 **SFU Open House, SFU**

- Volunteered for engineering department to demonstrate our Motorola HC12 Assembly software programming to SFU visitors and staff

Interests

- Reading books
- Playing soccer and volleyball

Daryoush Saheb Javaher

396 Stevens Drive
West Vancouver, BC
V7S1C6
E-mail:dsahebja@sfu.ca
(778) 895-1271

EDUCATION

Sept 2004-present **Simon Fraser University**, Burnaby, BC
Fourth year Engineering, Electronics option -Summit Entrance Scholarship

TECHNICAL PROJECTS

Electronics: **EMG**

- Designed and tested a portable EMG device that could record the activity of the hand and arm muscles using non-invasive methods.

ISA Bus

- Created an ISA bus using Altera Flex 10K FPGA chip to communicate data between PC and a simple Black Jack game implemented on an Altera MAX7000 EPLD chip.

Micro MIPS Microprocessor

- Designed a thoroughly working Micro MIPS Microprocessor using VHDL and simulation tools.

Mechatronics: **Hand force distribution measuring devices**

- Objective was to measure the force distribution of the hand when opening a jar in real time.
- Designed a system consisting of 16 Force Sensitive Resistance (FSR) sensors mounted around a cylinder, giving real time force and position readings through a DAQ card.
- Designed a second system that had a more complicated mechanical structure and able to output real-time force and torque readings of the hand more accurately.

Power supply test jig

- Built a user friendly, safe and good-looking test jig for production at Omnex that tested the power supply boards for new products.

Other: **Image processing**

- Programmed a low level program in MATLAB which used fuzzy logic to segment an MRI brain image.

Modem

- Programmed the UART chips of two computers in real time C++ to simulate a modem by connecting the two computers in accordance with the X-modem protocol.

Stationary Drill Press CAD Modeling

- Created Solid Works model of a stationary drill in thorough detail.
- Created mold design of the drill's base and working table.
- Simulated the drill's transition line from motor, through the gear shaft and to the bit.

SKILLS

Hardware:
- Experienced with sensors, actuators and instrumentation circuits.
- Good knowledge of C/EPLD, FPGA chips.
- Excellent Micro electronic circuit understanding and designing skills
- Proficient in PCB design and fabrication
- Good understanding of Feedback control systems
- Experienced with RF and filtering circuits.
- Experienced with basic biomedical image processing techniques and algorithms

Software:
- Proficient in C++ and concept of object-oriented design
- Experienced in QNX Neutrino for real-time programming
- Proficient with Assembly and VHDL
- Experienced with MATLAB
- Familiar with LABVIEW
- Proficient in PCAD, ORCAD, PSPICE, EAGLE, Protel and Altium
- Familiar with G-code, APT, CAMWORKS

Mechanics:
- Strong hands on and machine shop skills.
- Proficient in Solid works

Other:
- Excellent communication and teaching skills

CO-OP WORK EXPERIENCE

Sep 2007- Dec 2007 **Electrical Engineer**
Kodak Graphical Communication Company, Delta, BC
- Worked on a Complex 16-axis Control unit associated with an Industrial Imaging System (IIS) and was responsible for part of the schematic design, PCB design and a customized enclosure assembly.
- Designed and installed an adaptor plate on the IIS located in the clean room after receiving basic clean room training.
- Supervised a contractor on a CAN Open repeater PCB board and released it into mass manufacturing process.

May 2007- Aug 2007 **Analog Designer**
UBC Micro Metrology Lab, BC
- Designed a High Power Gradient Current Amplifier for an MRI machine under minimal guidance.
- Main challenge was to design an amplifier that could output up to 100A in the range 0-40KHz linearly.
- Used PSpice to simulate design, and Solid works for designing mechanical enclosure and heat dissipation system.
- Learned how to produced PCB Board using a Prototyping PBC Etching Board.

May 2006- Aug 2006 **Manufacturing Engineering Assistant**
Omnex Control Systems Inc. Port Coquitlam, BC
- Created/updated manufacturing procedure documents for new/developing wireless I/O products.
- Performed repeated prototyping experiments and discussed results in weekly meeting to help developing more durable products.
- Created new test jigs for developing products and debugged old test jigs.