Robert S. Carson

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Education

B.S. Biomedical Engineering and **Computer Sciences**, December 2014
University of Wisconsin – Madison
GPA: 3.51/4.0

Related Coursework
- Mobile Applications, Algorithms, Operating Systems, Data Structures, Computer Architecture, Computer Systems, Discrete Mathematics, Linear Algebra, Artificial Intelligence , Computer Graphics, Computational Problem Solving, Signal Processing, BME Design

Academic Engineering Design Projects (Detailed project experience on 2nd page)
- *Active monitoring system for alpine skiers*
- *Smart cigarette case to help severely mentally ill individuals quit smoking*
- *Wireless armband gesture-based controller*

Study Abroad Experience
Zhejiang University, Hangzhou, China, Summer 2013

Experience

Tack Mobile
Mobile Developer, February 2016 – Present
- Lead Android developer on home automation application to control Zigbee enabled smart devices
- Communicated with custom hardware using UDP for fast device control on a local network
- Integrated with a cloud service to remotely control smart devices
- Utilized common Android libraries such as Otto, Retrofit, and ActiveAndroid

Plexus Engineering Solutions
Embedded Software Engineer, February 2015 – February 2016
- Real-time embedded software development on class III medical device (C++)
- Documented requirements and test procedures to FDA standards
- Leader of automated continuous integration platform development (C++)
- Ran formal software verification test procedures

Plexus Engineering Solutions
Embedded Software Engineering Intern, May 2014 – August 2014
- Worked on multi-disciplinary engineering team
- Communicated directly with clients throughout development of a class III medical device
- Learned the FDA and IEC 62304 standards for medical software development
- Driver development and modification for custom Linux platform (C and C++)

University of Wisconsin – Madison
BME 201 Student Assistant, December 2011 – December 2014
- Helped design and facilitate laboratories for peers
- Instructor for basic electronics, methods of electrical measurement, LabVIEW programming, microcontroller programming, and MATLAB

Computer Skills

Languages: Java, C++, C, C#, Verilog, VHDL, MATLAB, LabVIEW
Technology and Software: Android Studio, Linux, Eclipse, Keil, CCS, Visual Studio, GCC, Solidworks, MS Word, MS Excel, Photoshop, Dreamweaver, After Effects

Leadership

Boy Scouts of America - Eagle Scout, Senior Patrol Leader
Biomedical Engineering Society – Social Chair, Webmaster
Engineering World Health – Global Outreach Chair

Detailed Project Descriptions

CaRe Monitor – Infant Cardiac Respiratory Monitor
Helped develop a low-cost, low-power infant cardiac respiratory monitor for use in developing countries to combat sudden infant death syndrome. The system consisted of an Atmega328 microcontroller, high-frequency signal generator, multiple lead electrode interface, power monitoring circuitry and indicator LEDs. I also developed a semi-automated test system to be used for the CaRe monitor. The CaRe monitor is currently being transitioned into manufacturing in India.

Wireless armband gesture-based controller
Developed a wearable device that used body movement to wirelessly control some simple video games. The armband consisted of two EMGs (muscle sensors), an accelerometer, a flex sensor, and a TI CC1101 Microcontroller. The CC1101 is an MSP430 with a TI 1101 RF module included in the package. The armband communicated with another CC1101 that was connected to a Xilinx ARM-based platform running real-time Linux. Actions from the armband were translated into computer controls that were used to control Tetris, Asteroids, and a simple platformer.

Active monitoring system for alpine skiers
Worked on a team to create a system that tracked the relative orientation and velocity of an alpine skier's legs. This was in an effort to minimize common ACL injuries associated with certain falling positions. The system would could ultimately determine a proper DIN threshold (how easy it is for the skier to come out of the bindings) based on the relative information that was gathered. The system consisted of two Atmega328 microcontrollers that communicated via xBee wireless protocol. Each micro contained a 3-axis accelerometer and 3-axis gyroscope that were used to determine relative orientation and velocity.

Smart cigarette case to help severely mentally ill individuals quit smoking
Joined with psychology professors at Dartmouth College to develop a system that would aid individuals with severe mental illness quit smoking cigarettes. The system was comprised of a smart cigarette case based around an Arm Cortex-M0+ microcontroller. It contained sensors to count the cigarettes and communicated with an Android application via Bluetooth. The Android application was designed to interact with the patients as they were about to smoke and help them find alternate coping methods. It also saved data such as time, number of cigarettes in the case, and location so that healthcare providers could help patients track smoking habits.

Maze solving robot
Programmed robot to solve a black-line maze in as few turns as possible. It also remembered the turns it made so that once it completed the maze it could be placed at the beginning and run the entire maze without making a wrong turn.

Hand Dynamometer to measure the rehabilitation of stroke patients
Designed a device used to measure the grip strength of elderly patients that were going through stroke rehabilitation. The grip meter used a strain gauge to measure grips between 0.0 – 20.0 lbs. to the 0.1 lb and was based around an Arm Cortex-M3 processor.

Parafoil landing system for Apollo style capsule
Designed and built a scaled model of an Apollo style landing capsule that could navigate to a pre-designated landing area using a steerable parafoil. As part of the Guidance, Navigation, and Control team I programmed the system to be completely autonomous. The capsule used a GPS and accelerometer to track it's current location and track it's trajectory. Data was streamed live via xBee wireless communication to an application that would report current location, trajectory, and graph velocity and altitude. The capsule also contained an RC override so that it could be controlled by a person.