Justin Fortner

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EDUCATION

University of California Santa Cruz — *BS in Computer Engineering : Robotics & Control Concentration*

September 2015 - December 2019

EXPERIENCE

Wencor, Glendale CA — *Software & Mechanical Engineering Intern*

January 2019 - June 2019

Software - Created software that collects performance data from the test apparatus and converts it to an easy to read plot. This plot allows for the engineer to efficiently determine whether or not the part had passed the performance test. The software was developed on a Raspberry Pi and interfaces with a PSoC microcontroller.

Mechanical - Created a precision test apparatus for commercial airline electro-mechanical hydraulic components. This apparatus is currently in use to test hundreds of parts sent for repair to Wencore by companies such as Southwest, United, FedEx, UPS, Ect. I developed and simulated this apparatus in fusion 360, rapid prototyped it using 3D printing and created precise schematics to hand off to our machinists for final fabrication.

Fortner Engineering, Glendale CA — *Mechanical & Network Engineering Intern*

June 2015 - September 2015 & June 2016 - September 2016

Mechanical - Created 30 specialized tools used to dismantle and assemble hundreds of unique precision made airplane parts for companies such as Southwest, United, FedEx, UPS, Ect. Schematics for these tools were created in AutoDesk and used by machinists to create the tools out of steel.

Networking - Set up an easily scalable physical internal network that allowed 50+ workers to electronically access a central database of manuals, forms, spreadsheets and other miscellaneous files. As of 2020 this network is still in use and as been scaled to fit the now 80+ workers within the company.

RELEVANT COURSEWORK

Robotics

- Mechatronics
- Bio-Inspired Robotics
- Feedback & Control Systems

Programming

- Computer Systems
- Assembly Language
- C Programming
- Algorithms
- Data Structures & Types

Hardware

- Computer Architecture
- Electronic Circuits
- Microprocessor System Design

SKILLS

Programming Languages

- OOP
  - Java
  - C/C++/C#
- Web Development
  - HTML
  - CSS
- Database
  - SQL
- Scripting
  - MATLAB
  - Unix Shell

Robotics Programming Frameworks

- Arduino

CAD Programs

- Fusion360
- AutoCAD
- Solidworks

3D Printing

Technical Writing

PROJECTS

Mechatronics Final Project - *https://bit.ly/2TF8vUP*

This project, as shown in the video link above, combines arduino hardware, custom built sensors, C programming and laser cut materials to produce a fully autonomous robot to deposit a ping pong ball inside of a correct hole within a beacon tower. A state machine coded in C software allowed the arduino hardware to communicate with the many custom build sensors. This robot was able to use an IR signal sensor to lock onto desired "towers", bumper sensors to signal arrival at the tower and easy circumnavigation, tank circuits to read the correct wire signal emitted by the wall and a tape sensor to locate the correct hole in which to deposit a ping pong ball. This project was the collaborative effort of myself and two other classmates. We were able to complete this project quickly and effectively through hard work and communication.

Soft Robotic Jellyfish Research Paper

This paper takes inspiration from a jellyfish bell in order to create a battery powered and autonomous bio-inspired soft robot. A jellyfish was chosen due to its combination of speed and efficiency. This is due to the natural aerodynamics of the jellyfish as well as their use of a toroidal vortex. In addition to the swimming characteristics of a jellyfish, the animal is also naturally soft and flexible allowing for an easy translation of the jellyfish kinematics to soft robot. A soft robot was chosen because the final intention of this robot is to aid marine researchers in their studies of fragile ecosystems such as coral reefs.

Terrastep - *IDEA Hub 2019 Pitch for Social and Creative Enterprise 1st Place Winner*

A team of engineers and I created a battery powered, portable prosthetic wearable capable of alerting the user if they were to take an abnormal step that may cause them harm. This is accomplished through the analysis of data collected by sensors in a shoe insert. The feedback of this data is then given to the user through the use of vibrational feedback in a comfortable band on the users thigh. This feedback has two specific modes. The first being a continuous feedback. In this mode light vibrations are given to the user so they are aware of the system. The second mode being an alert mode. This interrupts the continuous feedback mode on detection of hazardous step. High intensity vibration feedback is then given to alert the user to adjust their footing. Thus greatly reducing the risk of injury. I lead the mechanical engineering team in creating custom sensing arrays as well as custom micro controller and battery housings. I also assisted out lead software engineer in creating the algorithm behind analyzing the data from the sensors and detecting a hazardous step. This project was created during the fast paced senior design project course.

REFERENCES

Dr. Jeorge Hurtarte - Interim Professor at the University of California Santa Cruz

- jhurtart@ucsc.edu

Professor Mircea Teodorescu - Professor at the University of California Santa Cruz

- mteodore@ucsc.edu

Lake Merchen - Mountain View Volleyball Beach Club Director

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