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Noah Crouch

EDUCATION

B.S. Electrical Engineering, Embedded Systems Pathway - University of Washington - Seattle, WA
Graduation: December 2023
A.S. MechaTronics Engineering - Clover Park Technical College - Steilacoom, WA
Graduation: Fall 2019

RESEARCH EXPERIENCE

Research Assistant | Ubiquitous Computing Lab | Faculty Advisor: Shwetak N. Patel | March 2023 - December 2023

Accessible Eye Dropper

Goal: Assess how current Eye Dropper aids counteract lack of finger strength and dexterity errors caused by compounding musculoskeletal disorders and make improvements

- Using OnShape CAD, rapidly designed and produced device prototypes and assessed their feasibility.
- Researched mechanical actuation methods and integrated them into future prototypes.
- Sought out literature that enhanced our perspective of the current technologies already being integrated into other assistive technological solutions.
- Produced solutions based on prior mechanical actuation research and literary review.
- **Current Status:** Mechanical actuation to lessen the required pressure needed to administer a drop of medication has been finalized. Future work is needed to address dexterity problems caused by muscle spasms.

Mobility Device Augmentation

Goal: Assess current augmentation techniques that users implement into their mobility devices and create means to lower the skill ceiling for those techniques via digital fabrication.

- Sourced user opinions and augmentation techniques from several communities using advanced search query techniques.
- Sourced information on current medical technologies implemented to address user needs.
- Prepared an IRB protocol for the initial user study, constructed the user study protocol, and aided in constructing the user study questionnaire.
- **Current Status:** We are running a user study to gather opinions from users about current augmentation techniques and how satisfied they are with them. We aim to understand users' thoughts when approaching device augmentation and what we can do to streamline the process.

WORK EXPERIENCE

Lead Engineer, Team Manager | Husky Coding Project – Java Game Engine Team | September 2022 – October 2023

- Led a team of 8 engineers using Java and JavaFX to create a configurable version of Pacman which allows users to create personalized versions of the indie game Pacman.
- Developed critical game logic including Ghost AI, map boundary logic, Player control logic, and Game state logic in addition to JavaFX graphical user interface components.
- Led the team in conducting consistent stand-up meetings, encouraging pair programming sessions, in addition to constructing and leading progress reports.

Front End Software Engineer | UW S.E.A.L Lab | November 2022 – March 2023

- Worked in a team of 3 to develop a website for an in-lab technical writing application that was used by 125+ lab personnel.
- Utilized Figma to design the structure of the home and search page.
- Utilized JavaScript and React to implement the designs and the document search engine.
- Constructed and led 13 progress reports demonstrating to lab personnel including the lab director.

SAT Math Tutor | Self Employment | August 2022 – December 2023

- Tutored a student on algebra, geometry, and trigonometry fundamentals for 8 hours every month

SELECTED PROJECT EXPERIENCE

Fall Assessment and Safety Tracking F.A.S.T | Capstone Project | September 2022 – December 2023

- Led a team of 4 to create a discrete data safe wearable to ensure safety and wellbeing of elderly people and their families.
- Leveraged 2 publicly available packages to retrieve data over a serial connection via the android phone's USB-C port, then over a Bluetooth connection.
- Utilized Google Co-lab and Python to plot our negatively and positively associated falling data in 3 dimensions using the Matplotlib package to set necessary lower bound thresholds.

- Created a Java Webserver to host a TensorFlow model using the TensorFlow Java API. Additionally wrote a function to send a text message using the Twilio Developer API to a stored phone number upon a successful classification.

SELECTED PROGRAMMING EXPERIENCE

Quizlet-Like Flash Card Back End | Personal Project | March 2024

- Created a back end RESTful microservice with Java, Spring Boot, AWS, Docker, and a Cassandra database.
- Leveraged knowledge in Spring Boot MVCs to learn Cassandra, Docker, and AWS Deployment.
- With exposed endpoints users can create, read, update, or delete data in the database via individual deck creation, deck importation from Quizlet, deck replacements, additions to decks, and removal of decks.

Cinema Back End REST Service | Personal Project | January 2024

- Created a back end REST service utilizing Java, and Spring Boot to create, read, update, and delete information from a pseudo database.
- Learned how to create models and controllers with the Spring Boot MVC framework in creating REST services.
- With exposed endpoints users could view seats, purchase seats, or return seats. With admin credentials a user could also see revenue and statistics.

Arduino Madlib Generator | CSE 474 Final Project | June 2023

- Developed a Madlib generator using Arduino, C/C++, Python, ChatGPT, FreeRTOS, and various hardware components.
- With the signals collected over I2C/SPI communication protocols and information stored on the system users chose five descriptive adverbs which were sent over a serial connection to a laptop computer with PySerial.
- Using the ChatGPT API the five descriptive adverbs were then constructed into a prompt and a Madlib string was generated by the ChatGPT LLM.
- Using the same PySerial connection, the Madlib string was then sent back to the Arduino and displayed to the user over a standard LCD screen.

File Search Engine Web Server | CSE 333 Final Project | August 2023

- Developed a web server in C/C++ with capabilities to index files and search them via a search engine.
- Learned basic network programming concepts including communication protocols and socket programming, and safe practices in handling shared data in concurrent/parallel programs.
- Users would query the server which would then rank the files based on a custom ranking algorithm. The server would then send an html page result with the files in decreasing rank order.

Campus Maps Web Application | CSE 331 Final Project | August 2023

- Built a web server with Java and TypeScript to host a map and navigational service based around the UW campus.
- Utilized a Spark Java webserver to handle mapping and path construction based on locations given by the user.
- Utilized Node to locally host the front-end service serving HTML, CSS, React, and Typescript
- Utilized Spark Java to locally host the back-end service which constructed and served navigational information.

LEADERSHIP EXPERIENCE

Project Lead | Husky Coding Project - Java Game Engine | September 2022 – Current

- Led an eight-person team to develop a game engine using Java.
- Responsibilities included motivating team members, preparing for team meetings, scheduling meetings, and researching Java frameworks and technologies.

SKILLS & TECHNOLOGIES

- Java (3+ years), C/C++ (2+ years), System Verilog (1.5 years), Python (1.5+ years), JavaScript/TypeScript (1.5+ years), Bash (1+ years), Rust (1+ months)
- Tools: Git, IDEs, Linux, Windows, Gradle, Maven, Postman, Spring Boot, Junit, Makefile, GoogleTest Suite, GNU, Cargo, Communications Protocols (I2C, SPI, TCP/IP, HTTP, UART), Docker, Databases, Django, React, Node, Yarn, NPM
- Welding, 3D Printing, 3D Resin Printing, Wood Working, Composite Fabrics, Robotics, Hydraulics, Drivetrains, Aerodynamics testing

RELATED COURSEWORK

- Electrical Engineering Coursework
    - EE 371 - Design of Digital Circuits and Systems
    - EE/CSE 469 - Computer Architecture I
    - EE/CSE 474 - Introduction to Embedded Systems
    - EE/CSE 475 - Embedded Systems Capstone

- Computer Science Coursework
    - CSE 331 - Software Design and Implementation
    - CSE 333 - Systems Programming
    - CSE 373 - Data Structures and Algorithms
    - CSE 374 - Intermediate Programming Concepts and Tools
    - CSE 415 - Introduction to AI
    - CSE 417 - Algorithms and Computational Complexity

ACADEMIC EXCELLENCE

- Deans List
    - Fall 2022, Spring 2023, Fall 2023