SimNext Intern for Laerdal Medical

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LAERDAL MEDICAL AND SIMNEXT

Laerdal Mission: No one should die or be disabled unnecessarily during birth or from sudden illness, trauma or medical errors. Laerdal's goal is to help save a million lives each year until the year 2030.

Simnext Mission: Create cutting edge medical simulation programs that don't sacrifice immersiveness or realism for cost. My team's goal is to create a robust patient simulator (mannequin) mixing virtual and physical capabilities for training healthcare students at a cost of less than $1000. Being in the very early stages of development, my role as an intern was to lay a groundwork proof for certain software ideas.

SIMULATED DEVICES

Virtual Harvey: Part of the final simulation is a virtual model that can be interacted with in the same way as a physical mannequin. I helped create a working version of this virtual model with full stethoscope interactivity. A user can check the heartbeat and lung sounds of any part of the body, and the virtual patient can be customized for different heart/lung rates and diseases.

Phone Simulators: Other departments work on building realistic bluetooth devices, but many hospital tools can be simulated with a phone as well. I created an app that can send bluetooth in the same manner as the physical devices created by the rest of the team.

ACTIVITIES

Website: We used PlayCanvas, a game development program, to create our virtual model. Consulting with Dr. Barry Issenberg from the University of Miami, we uploaded the model with hundreds of heart and lung sound files for different disease cases.

Device Manager: Part of creating a robust simulation is including the usability of everything in a doctor's toolkit, including ways to interact and monitor with the patient. My job was to lay the groundwork for the connectivity and simulation of all these devices. I created a Device Manager app that could receive bluetooth signals from other devices. These devices included CPR mannequins, devices made by rest of the team, and other mobile devices. With this set up, all the separate parts of the simulation are connected, and a team of trainees can run a full patient simulation by running the devices on their phones.

IMPACT

Advising: The team is in its very early stages of product development. One of the challenges in this stage is judging the feasibility and starting point of many different project ideas. During meetings, when another person suggested an idea, it was part of my responsibility to judge the realism of their idea and how long it would take to implement it.

Proof of Concepts: I was able to implement certain aspects of the final product to give the team a very clear idea of how realistic their ideas are. Additionally, as I was one of the few software developers on the team, my code served as the starting point for newly hired software engineers to understand from a technical point of view what the team was aiming to do.

GROWTH

Technical Skills: From the virtual Harvey website development, I had the opportunity to work both front and back end website design, gaining more experience in JavaScript, HTML, and CSS. From the device manager app, I had to learn swift to develop in iOS and the bluetooth and HTTP frameworks for implementing connectivity. These skills will give me opportunities for jobs in app development, bluetooth connection, and back-end server side engineering.

Soft Skills: I previously had never coded collaboratively, so now was a good opportunity to learn necessary skills in clear communication, readable code, and version control. Working with the entire SimNext team, where different departments needed to plan together, was also a valuable experience

ACKNOWLEDGEMENTS, FUTURE WORK

Mentor: I want to acknowledge my supervisor, Lucas Huang, who provided direction and guidance for the other interns and I. He gave us projects with complete discretion in how to go about them, letting us flex our research and creative muscles to get the task done. He knew we were busy with college, and was also very flexible with keeping us in the loop even during busy school periods.

Future Work: This summer I hope to be able to go to Norway to continue my internship with the rest of the Simnext team. I want to continue working on the device manager app, focusing on app stability and Android integration. The rest of the team is also developing physical simulation devices as well, and I will be a part of creating their connectivity.