

MoHSES Scenario Creation Tool

Jake Flynn, Sanika Joshi, Megan Luu

Abstract

The UW CREST Lab has developed a Modular Healthcare Simulation Education System (MoHSES) that is used to train emergency medical responders through patient simulations. Currently, the MoHSES lacks an interactive interface to create new simulated patients and training scenarios, which leads to a lack in flexibility and customizability in paramedic training using the MoHSES. Our project addresses this problem with a user-friendly web interface that simplifies the process of generating BioGears-compatible and MoHSES-compatible patient state files and medical scenarios, to allow for the creation of these files without any prior knowledge or technical expertise. This will result in a more inclusive and thorough simulation training experience for medical providers using the MoHSES, which will ultimately better prepare paramedics for patient scenarios they may encounter on the job and thus increase emergency care quality.

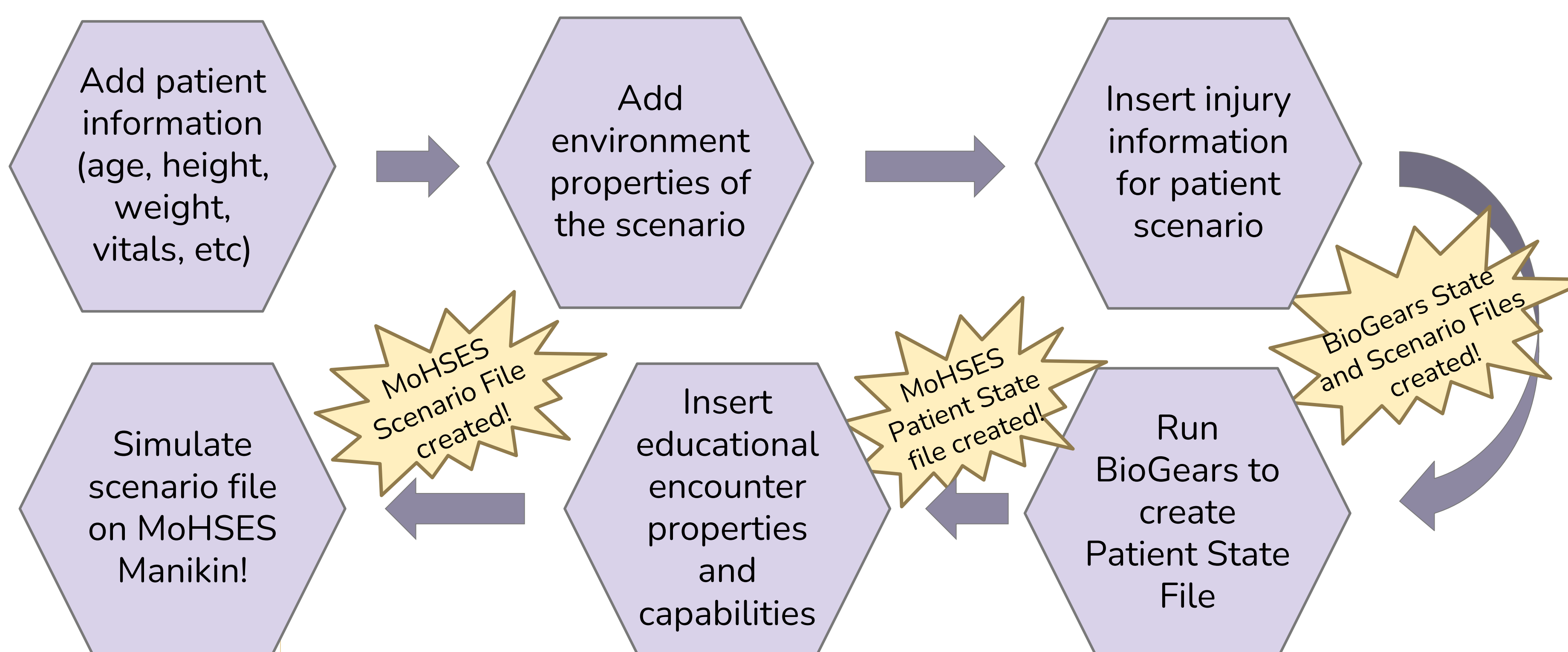


UW CREST Lab MoHSES used for King County paramedic training.

Scenario Creation Tool Capabilities

- Generate patient state file, environment, and BioGears scenario file
- Generate MoHSES scenario file to drive manikin simulation
- BioGears plotting tool allows users to interact with simulation results
- Installable desktop application allows users to easily get started with using the tool

User Flow Chart



Output Files: Graphs & XMLs



From top to bottom: Vitals plot generated by BioGears Plotting Tool, Custom BioGears-compatible Patient Scenario file, Custom MoHSES-compatible Scenario file.

Development Methods



Vuetify is a JavaScript UI framework that we used for front-end ready-to-use components. We also used Node.js as our JS open-source server runtime environment.



Our primary coding language to building our application was JavaScript.

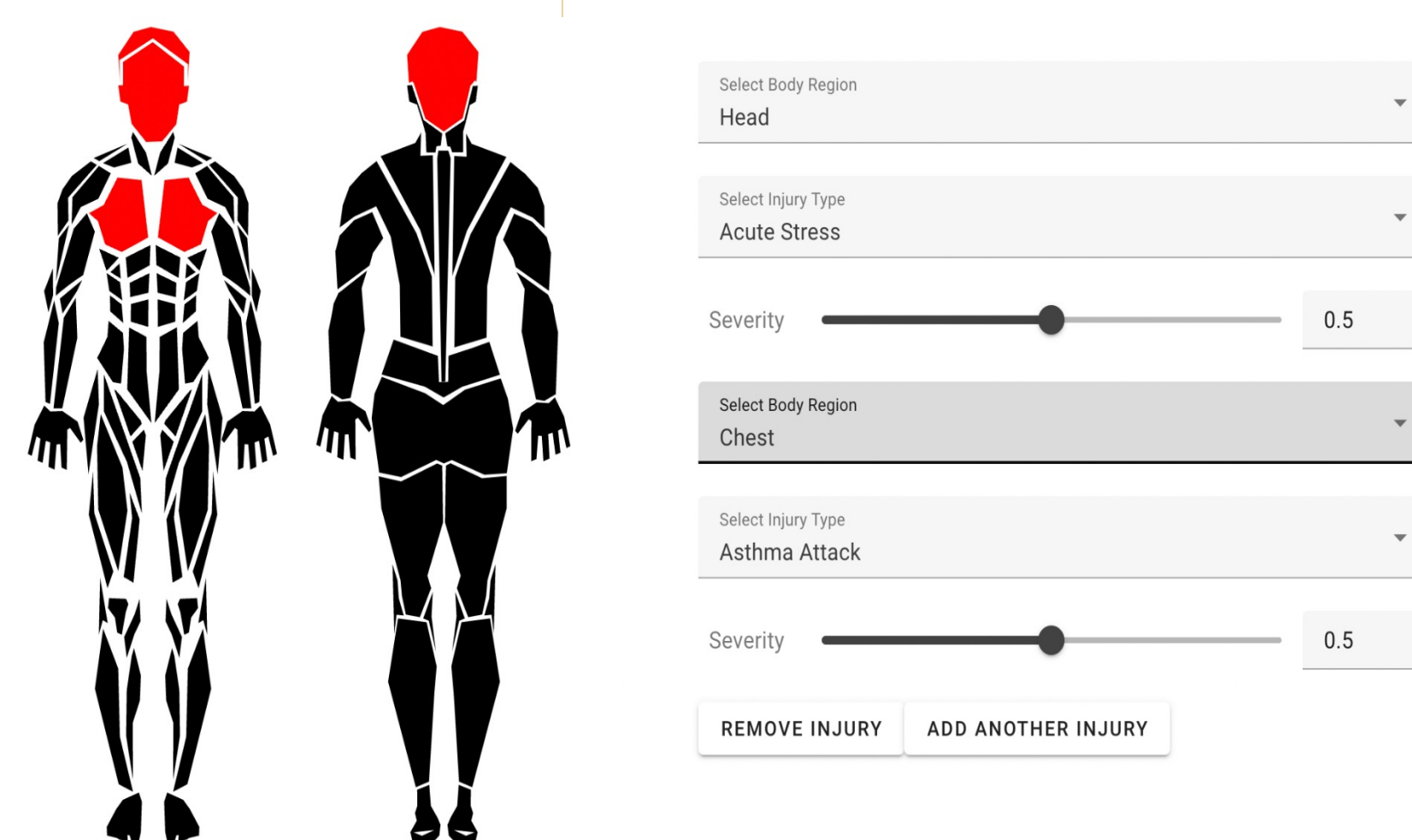


BioGears is an extensive, open-source human physiology engine that we utilized to drive medical scenario simulations on the MoHSES.

We used Electron as our software framework to build an executable desktop app via JavaScript



Manikin Visualization



Manikin Visualization allows for easy and intuitive input of simulated patient injuries.

Testing

In terms of testing our web interface, we conducted user interviews with various professionals including Dana Yost, a King County Paramedic Training Officer, and Tod Levesh, a King County Clinical Operations and Training Officer. Through our interviews with Dana and Tod, we gained a better understanding of the thought process of defining a paramedic training scenario, along with interface features that users thought would be helpful or necessary. We presented them with iterations of our interface design and had them provide numerical feedback on a scale of 1-10 on the usability and aesthetic appeal, which allowed us to further iterate to improve our application. To test our output files, we ran our custom patient state, scenario, and environment files with BioGears to ensure that it could correctly create a MoHSES patient state file.

Discussion & Future Work

Over the course of the last two quarters, we successfully created a MoHSES Scenario Creation application. Unlike previously, medical officers can now utilize this executable tool to smoothly run customized scenarios on manikins for their educational training. Some potential ideas for future iterations would be creating platforms specific to various professionals including nurses, clinicians, and paramedics. We could also integrate BioGears into the application. Additionally, creating a mobile version of this application would make it further accessible.

Acknowledgements

We want to thank our mentors, David Hananel, Austin Baird, Rainer Leuschke, and our professor Dr. Chris Neils for their valuable guidance and support throughout this process. We could not have come this far without their help.