

4590 Simulator Plan

1. User Manual
 - a. How to use the simulator, how to experience all of the different scenarios/data ranges
 - b. Describe the sonification scheme (how the data modify the sounds)
2. Simulator Appropriateness
 - a. Overall design and functionality of simulator is effective
 - b. Allows the user to experience all the different ways the system would sonify data (depending on the data types, values, and context)
 - c. Allows for reproducibility and consistency in the experience
3. Data and Event Handling Functionality
 - a. System receives JSON data in real time
 - b. Events/data must be triggered and manipulated via researcher UI controls in real time
4. Data Handling Thoroughness and Quality
 - a. Does it receive and dispatch data correctly?
 - b. Does it explore all the possible scenarios that the user could create/encounter?
5. Sonification Functionality
 - a. The simulator must create continuous (or semi-continuous) real-time sonifications based on the sensor data inputs
 - b. The sonification engine must do more than just immediately triggering binary sounds based on sensor data, instead a sophisticated system will modify the sonification scheme based on context, will prioritize and schedule how data is sonified depending on sensor data values, may filter or aggregate data so as to avoid overwhelming or overloading the user, and will mix multiple continuous streams of sonifications.
6. Sonification Sound Design
 - a. The sonifications must change in sophisticated ways based on changes in the data
 - b. Sound designs that create pleasing individual sonifications which convey the data effectively to the user
 - c. Sonically and thematically the various channels of sound fit together
7. Text-to-speech
8. Programmatic Sounds
 - a. Some aspect of the sound environment is created by the generation and manipulation of base waveforms (e.g. WavePlayer in BEADS) rather than playing wav files
9. Filters & Effects

- a. Your simulator must make use of filters (e.g. LPF) and/or effects UGens (e.g. reverb) to manipulate your sound environment in some manner.
10. Amplitude Envelope
- a. Your simulator must use amplitude envelopes to modify your base sounds in some manner.

Questions:

1. By design, are we expected to implement a new kind of design separate from the interfaces we've seen before (like for the class exercises)? Or does design mean the layout and placement of the buttons to improve usability?
 2. Since we are designing the system to receive input via JSON data, are we not allowed to also receive live mic input? I was planning to also implement a live feed of sound (modified with a filter) that can be turned on and off with a button in my design.
 3. Do you think this functionality of the system would satisfy all the requirements, given that my system is designed to help doctors improve the quality of telemedicine general checkups?
 - a. A live mic input feed that the doctor can turn on and off, and using different toggle buttons, can apply a low-pass filter, a high-pass filter, and a band pass filter for (to help the doctor receive different information or hear the patient better)?
 - b. Have a WavePlayer element to generate sounds that correspond to specific health metrics. The waveform characteristics can convey information about the patient's health state.
 - c. Have a start/pause button that stops and resumes the sonification of data (using a visual graph), since the doctors/researchers can visually see any patterns in the sound
 - d. Use text-to-speech to convert textual health information, such as patient symptoms, vital signs, or medical instructions, into spoken words.
 - e. Apply an amplitude envelope to dynamically modify the volume (amplitude) of the sonification. This can make the auditory experience more natural and responsive.
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1. Use the Low Pass Filter to smooth out sudden changes in the sonification, letting the doctor/researcher better hear abrupt changes in the patient's audio and alert the doctor if those happen. If the doctor hears/sees something out of the ordinary on the visual display, they can act on it.
 2. Use the high pass filter to filter out low-frequency background noise, letting the doctor/researcher better hear higher sounds from the patient. If the
 3. Use the pitch changer for the voice tremor intensity (using JSON data). If the voice tremor data is high, then the pitch changer will emit a higher pitch sound using both the amplitude envelope, a gain element, and the WavePlayer.

4. Finally, the text-to-speech will be used for any tapping from the patient. If there are sounds that are repeated or indicative of tapping or shaking, the text-to-speech feature will alert the doctor to address that.