

Multisensory Pre-Alarm System for Physicians



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Mystery Machine

Oral Report 5
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Problem Statement

- Distracting alarms and sounds in Intensive Care Units
- Leads to patient and physician fatigue
- No differentiation between different parameters



Needs Assessment

- **UX**
- Patient Efficacy
- Safety
- Hospital System Efficiency
- **Technical Needs**



Needs Assessment

- UX

- P

- S

- H

- T



Audio Input

ALARM

High
intensity
music

Soft
music

Silence

Soft
music

High
intensity
music

ALARM

Concerning

Abnormal

Normal

Abnormal

Concerning

Audio Input

ALARM

High intensity music

Soft music

Silence

Soft music

High intensity music

ALARM

Concerning

Abnormal

Normal

Abnormal

Concerning

Haptic Input on wrist and ankle

Audio Input

ALARM

ALARM



Concerning

Abnormal

Normal

Abnormal

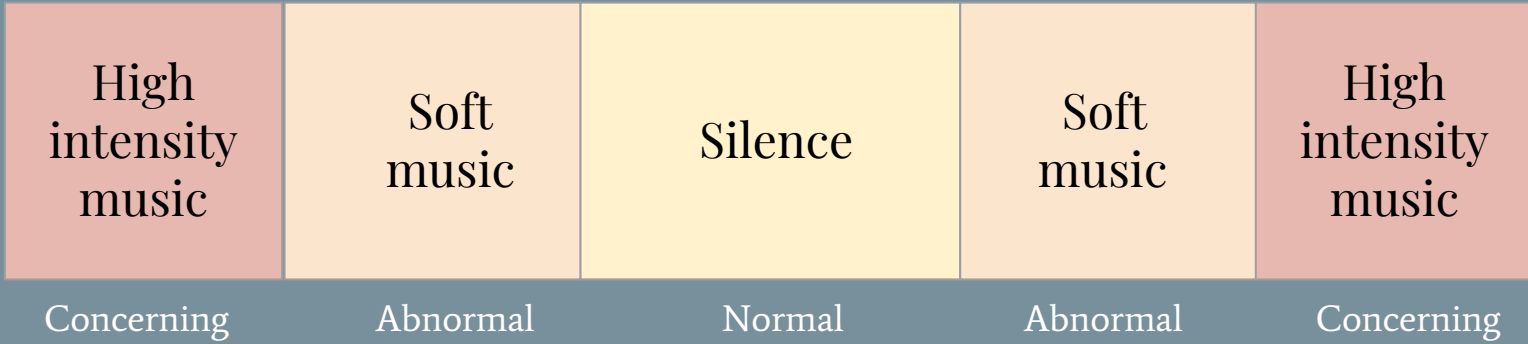
Concerning



Audio Input

ALARM

ALARM



Discrete

Haptic Input
on wrist and
ankle

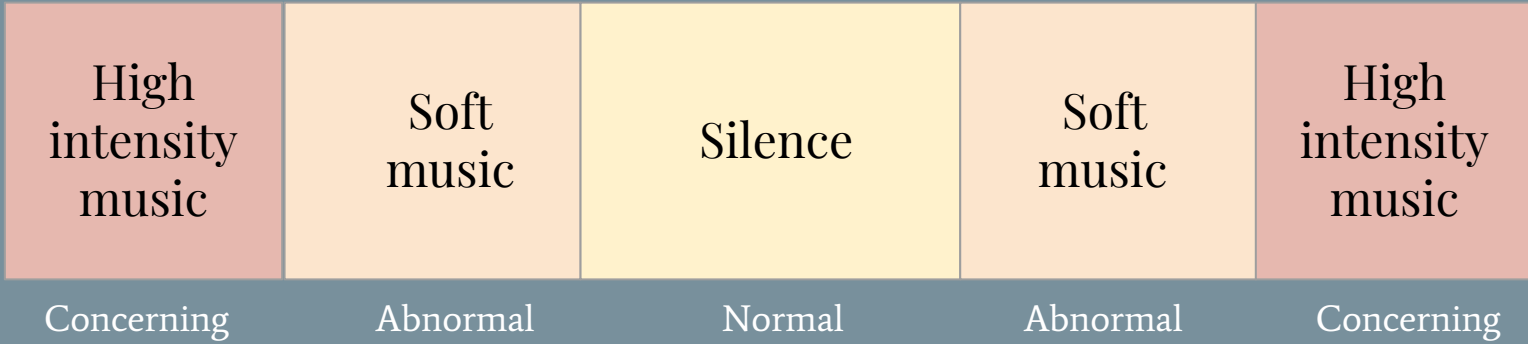
Continuous

- Brief pulses indicating a state change
- Convey information by length of pulse and number of pulses

Audio Input

ALARM

ALARM



Discrete

- Brief pulses indicating a state change
- Convey information by length of pulse and number of pulses

Haptic Input on wrist and ankle

Continuous

- Sounds reduced to very low, subwoofer frequencies (20-200 Hz)
- “Feel” the change in sound

Updates

- 1) Completed Steps
- 2) Feedback from Phase I
- 3) Phase II Planning

Completed Steps

- Basslets ordered and received
- Codes, clips, and sounds completed
- Phase I studies completed by 7pm today
- Phase II schedule and signup sent out

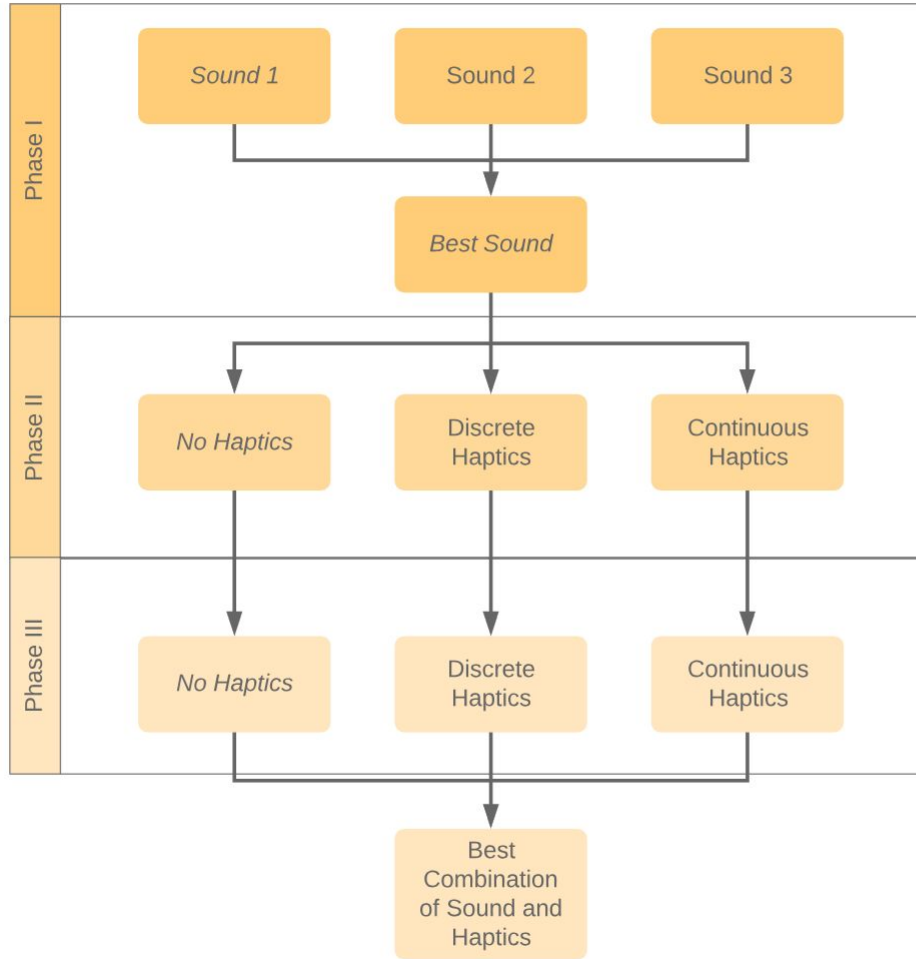


Feedback from Phase I

- Standardize volume/sound quality between training and test audio files
- Interactive training GUI
- Training scripts were repetitive
- Many found task difficult
 - Struggled with distinguishing directionality when changing from normal
 - Generally found sounds 2 and 3 more intuitive

Planning Phase II

...



Study Plan: Action Items

Accuracy

Response
Time

Comfort

Discernibility

Phase I:
Sounds



Best Sound

Study Plan: Action Items

Accuracy

Response
Time

Comfort

Discernibility

Phase II:
Haptics



Best Haptics
Application

Phase II Overview

Repeat for
Iterations 2
and 3

Haptics Training/Testing

2.1: Introduce Haptics

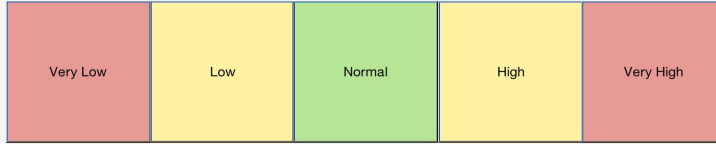
- Play training clip
- Exploration
- Quiz

2.2: Test

- Introduce block
- Give user full test

Qualitative Survey

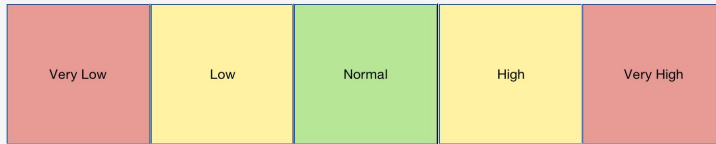
HR



BP



SpO2



Data to be collected:

Response Time

Accuracy

- Parameter
- Level
- Change detected

Next Steps

- Phase I data analysis
 - Response time
 - Accuracy
 - Statistical tests
 - Qualitative analysis
- Phase II implementation
 - Finalize haptics files
 - Finalize sign ups
 - Finalize training
- Phase III planning



Questions?

