Griffin Revis

AR Firefighter Mask: Final Project

HCI

PROT INT SYSTEMS

2026

INTRO: Project Scenario

Firefighters operate in intense high risk, low visibility environments. Quick decisions are necessary and critical for the survival and safety of all. This project explores how an AI/AR powered mask can increase awareness and safety.

INTRO: The Problem

Firefighters are often exposed to hazards with very limited visibility and constantly relying on overwhelming information or thinking unexpectedly fast. Current tools do not effectively help navigate, filter, and give priority to critical information and data in real time.

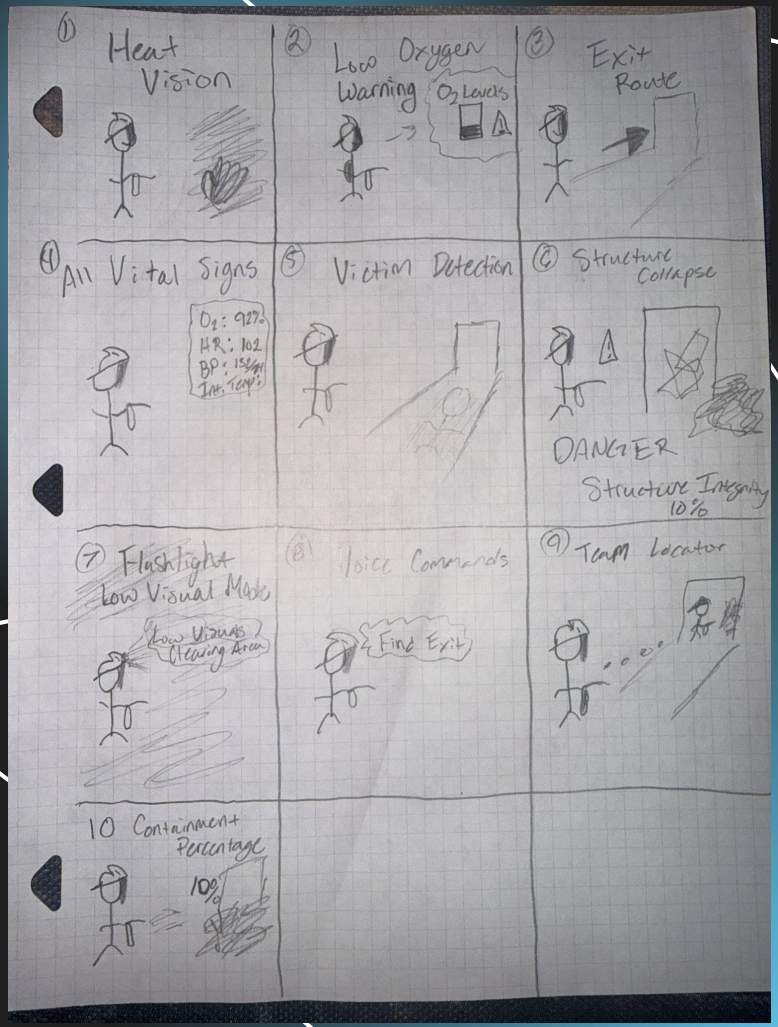
The Concept

The concept of this project is to showcase the creation of an AI-powered AR mask that uses IoT data, which consist of heat, oxygen, and structural integrity. This data is collected to determine and detect potentially hazardous problems and can assist to guide firefighters though treacherous environments.

10x10 Ideation

These are the 10 Ideation ideas that were used initially to select a specific scenario based action. Most of these ideas were necessary for the IoT aspect of this project.

These are much needed/useful ideas during a high stress situation like this.

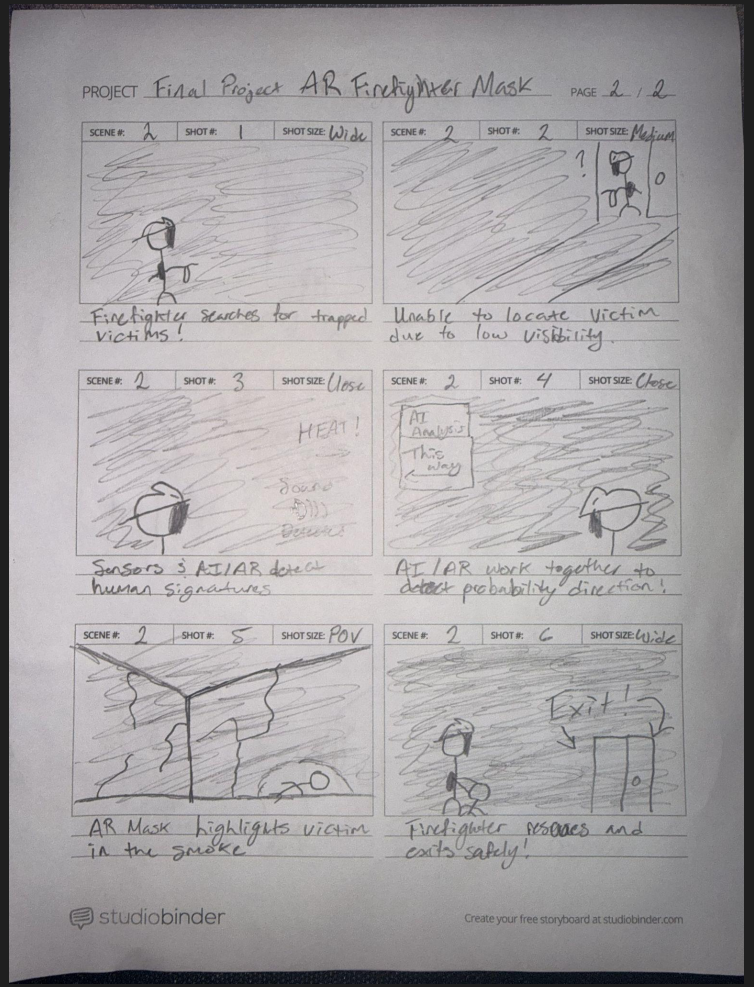


Storyboard 1

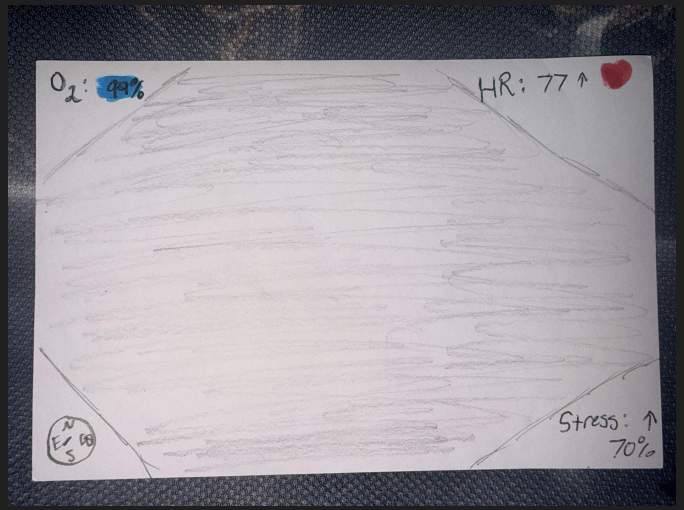
This storyboard focuses on a firefighter entering a structure in a real-world situation and plays out hazard detection and navigation.

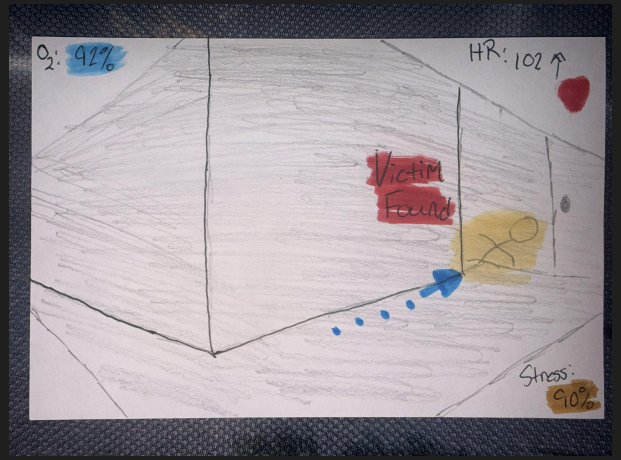
Storyboard 2

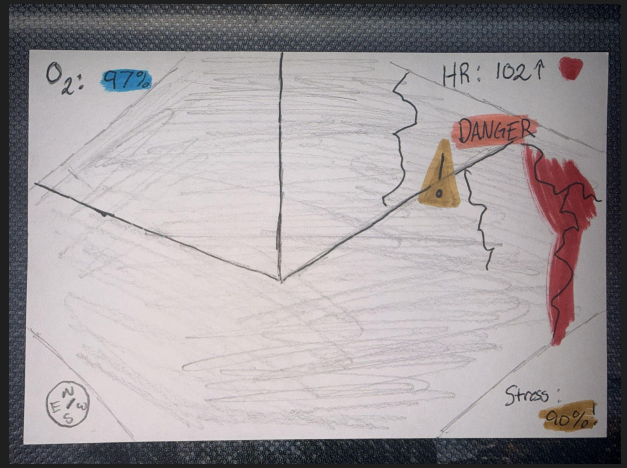
This storyboard focuses on a firefighter entering a structure in a real-world situation and plays out navigation and victim identification to successfully rescue and individual.



Paper/Physical Prototypes



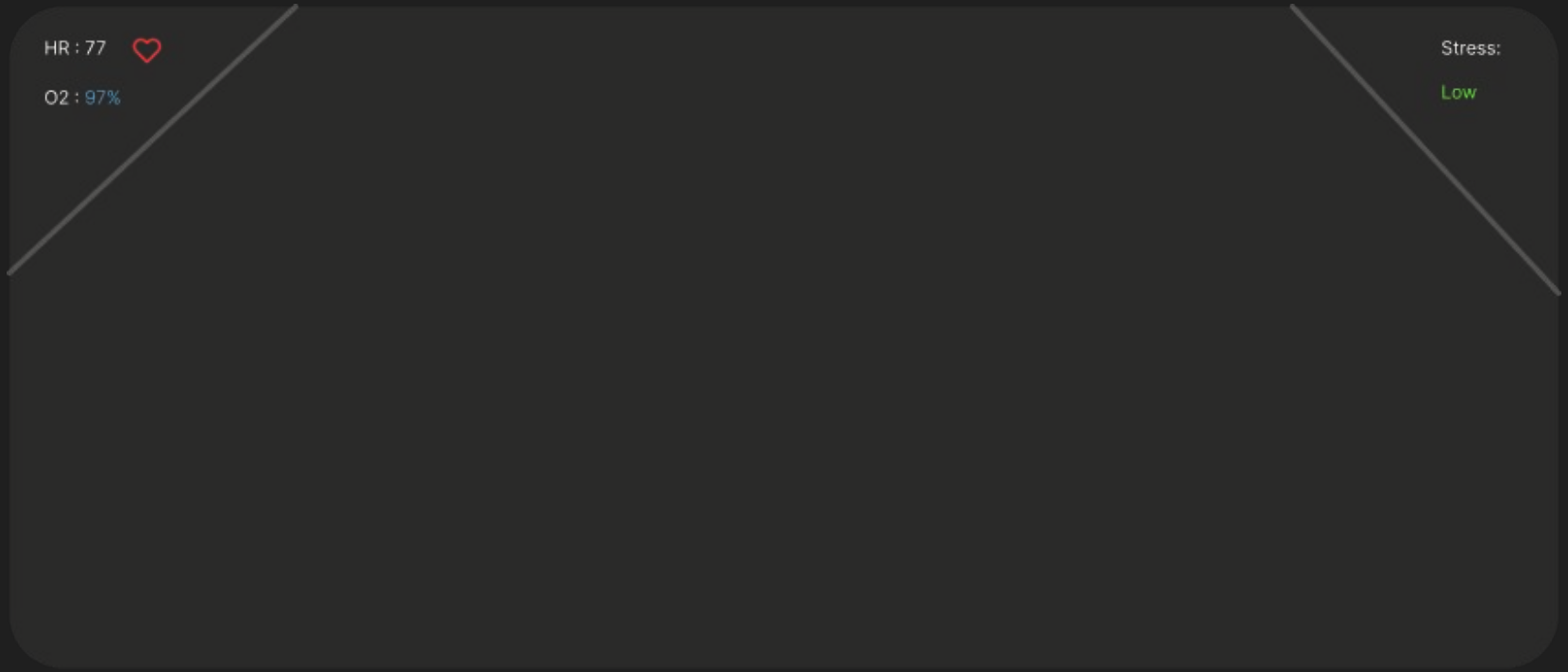




The Mid-Fidelity

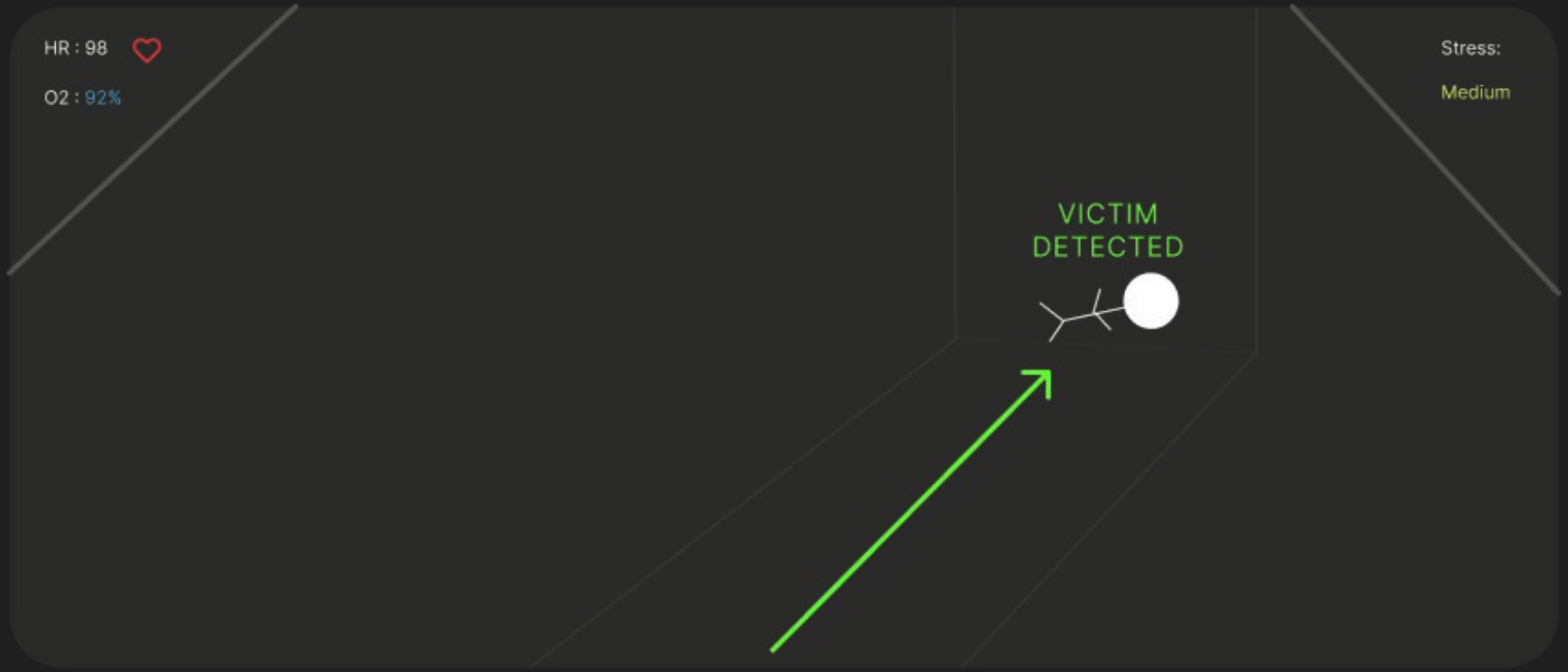
The Mid-Fidelity prototype explored how multiple informational layering could be displayed simultaneously. Including, hazard detection, environmental situational awareness of problems, and navigation guidance within a single viewpoint interface (mask).

The Mid-Fidelity



The Mid-Fidelity

The Mid-Fidelity



User Feedback

User 1

User 1 said that while the hazard alerts were clear, there was was too much going on at one time.

Making a good point that when in stressful situations it would be too much overwhelming information.

User Feedback

User 2

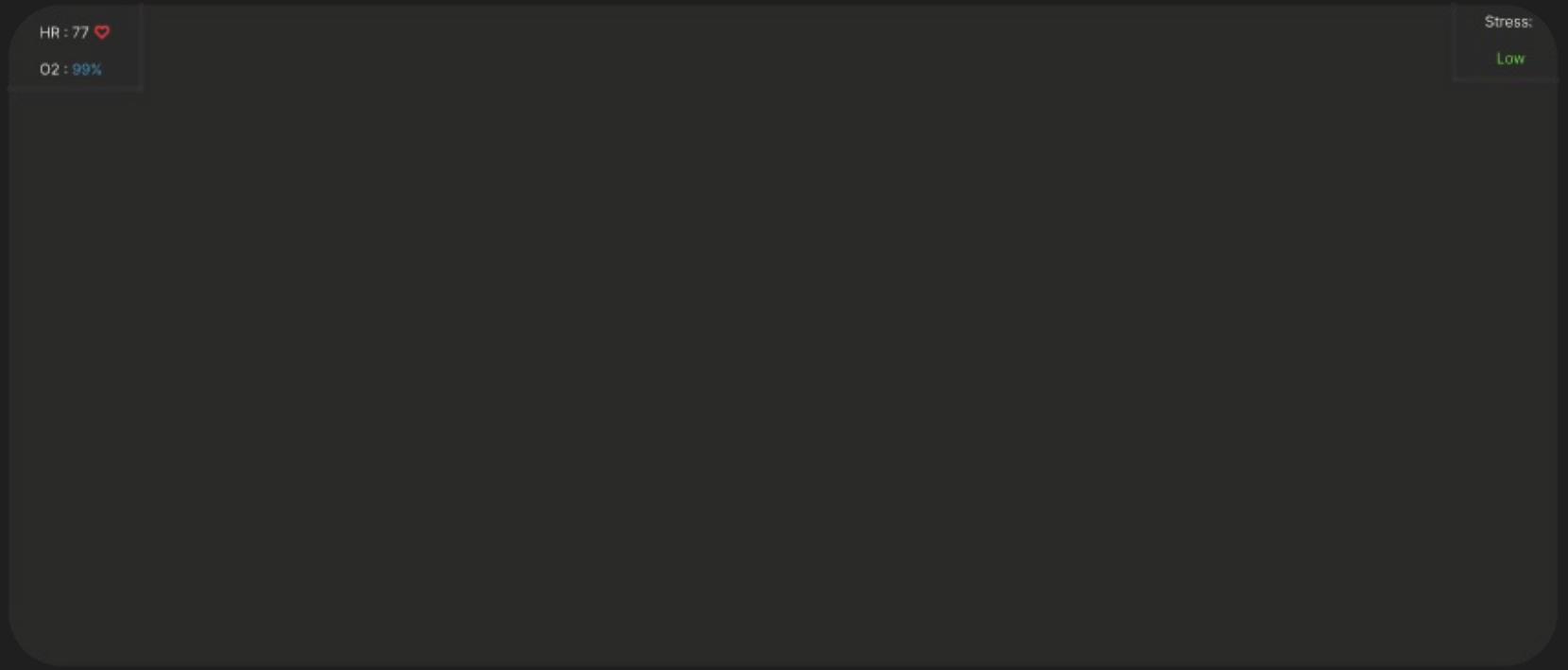
User 2 stated that the viewpoint was useful for navigation and really didn't find many problems with it. They did mention that the Collapse Risk was overly large and could cause complications if it were a high stress situation.

User Feedback

User 3

User 3 stated the navigational arrows were useful but the visual aspects otherwise made it difficult to pinpoint exactly what was going on/ and or to follow.

The Final Prototype



The Final Prototype

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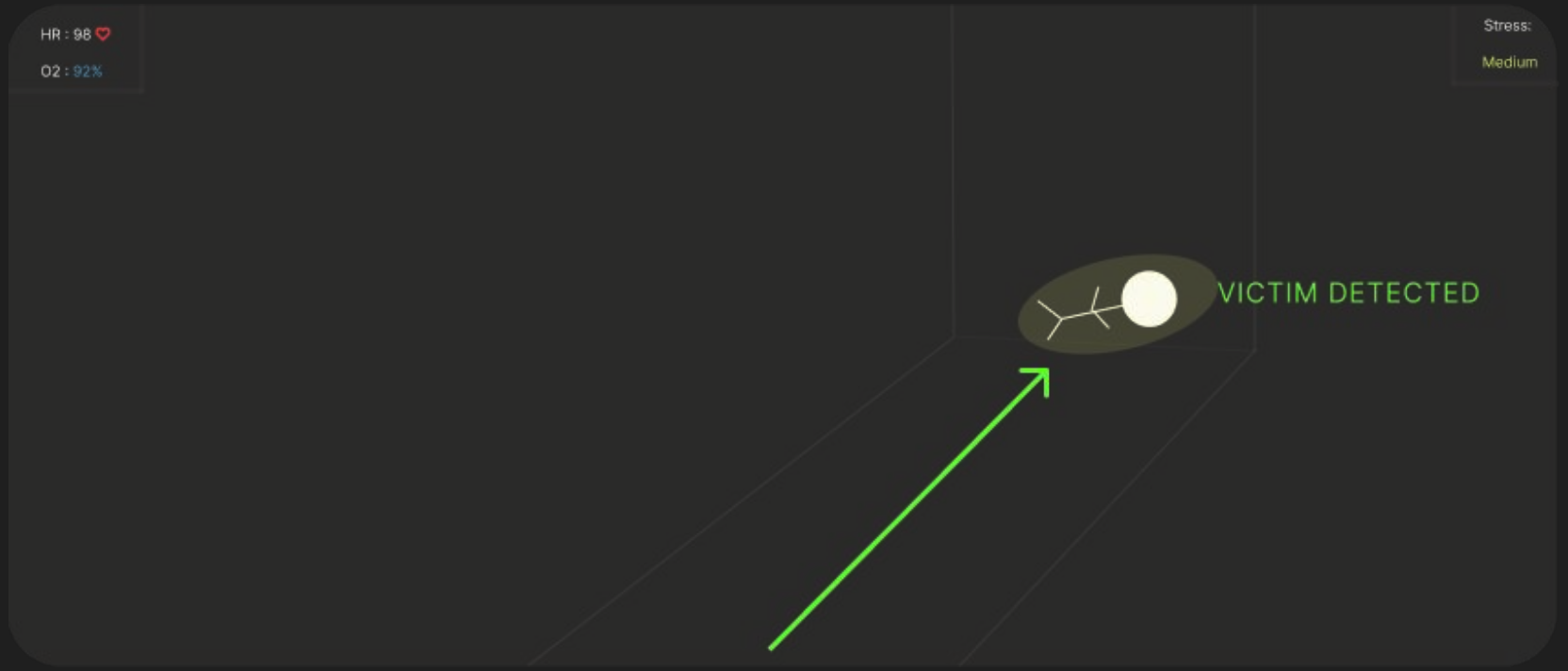


User Feedback

User 1

User 1 stated that the final iteration of the interface was easier to understand the and earlier one. They were quickly able to find necessary aspects without feeling cluttered/overwhelmed.

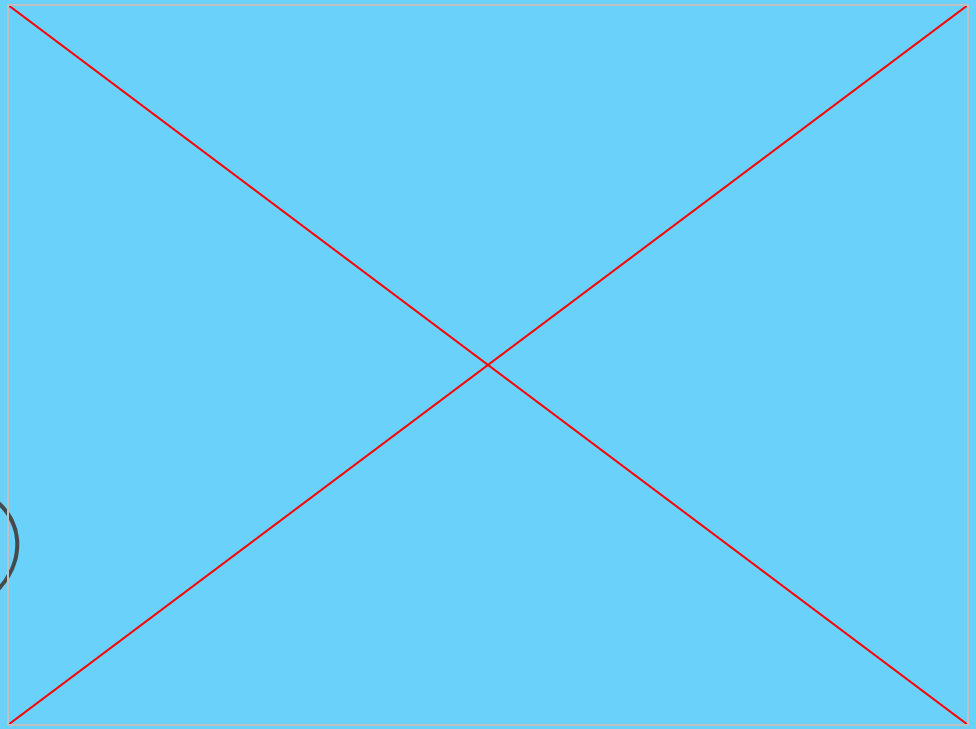
User Feedback

User 2

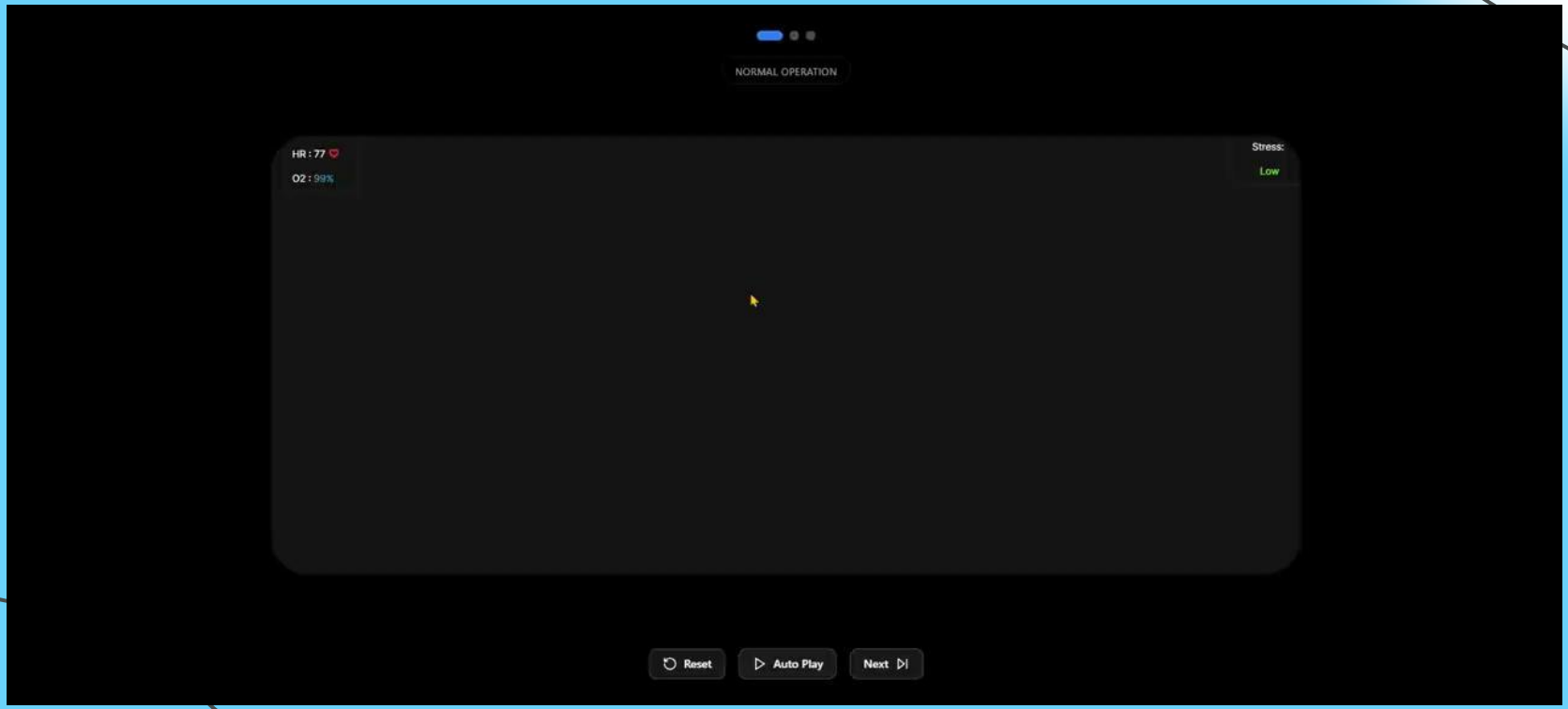
User 2 noted that the simple layout made it easier to find the information needed in the moment. They did point out that the separating of the hazard alert and guidance made it helpful for high pressure decision making.

Interactive Slideware Prototyping

Interactive Slidware



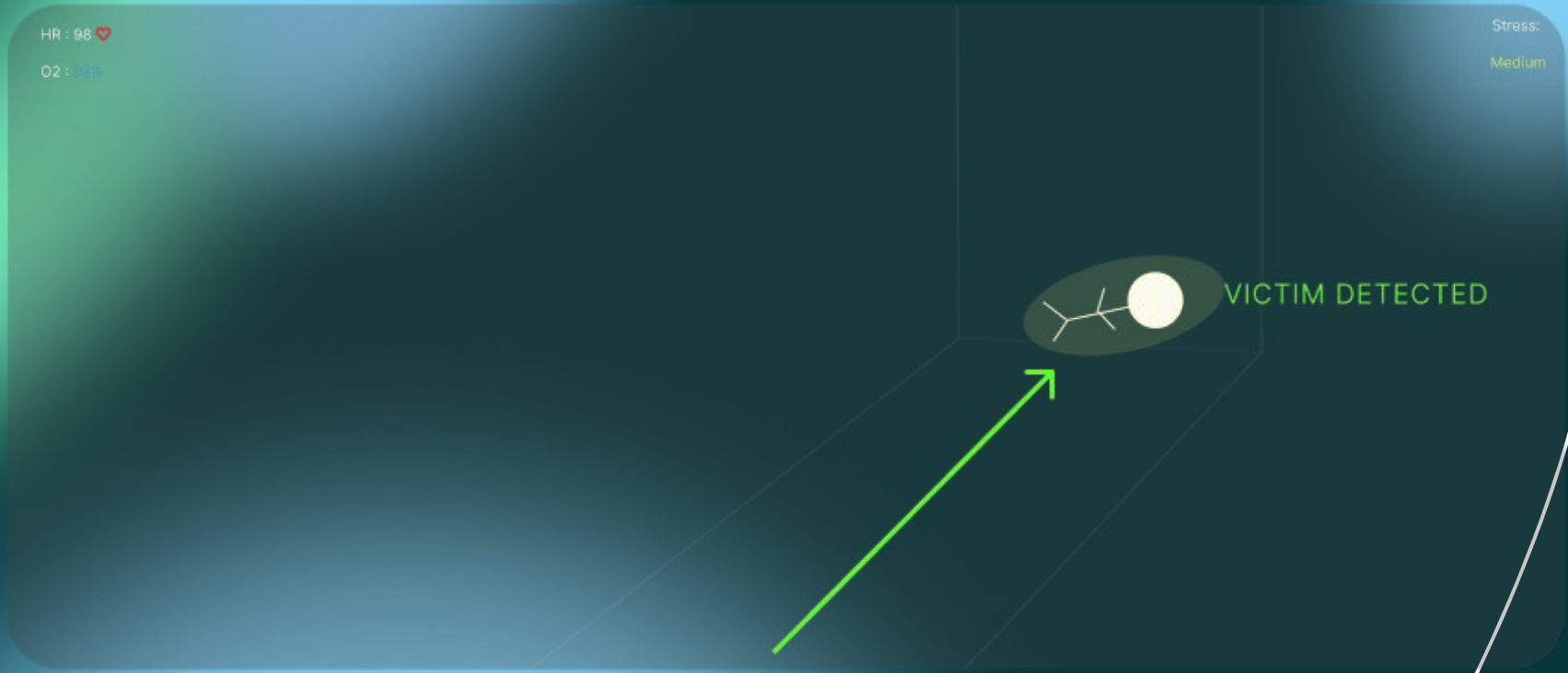
Honorable Mention: Exploration with AI



Video Prototyping


EASTSIDE
NELSO


HR : 77
O2 :
Stress:
Low


HR : 98
O2 :
Stress:
Medium
VICTIM DETECTED


HR : 115
O2 :
Stress:
HIGH
COLLAPSE RISK
EXIT NOW!


CẢNH SÁT PCCC & CNCH HƯNG YÊN
MAGIRUS

Future Improvements

I would integrate more current real life data sources to make the system more accurate and sustainable. Improved environmental sensors, more AI predictive outcomes/situations and fire spread or a stronger collapse detection system.

Next Iteration

Honestly I did ask a ex-firefighter for one of my user testing, although if I were to continue this project. I would conduct and closely work with a current firefighter to make sure that I am getting more realistic situations and outcomes.

AI Reflection

AI played a quite important role in the development of this project. Most idea generation was done working together with AI, and creating new ideas was mostly things that were coming to mind from myself when editing things over. Human viewpoint and judgement will always be essential in projects like this which is how I always try to approach UX/UI design but limiting my use of AI. AI is great for a tool and idea generation, but humans need to make the design decisions ultimately.

Lessons Learned

- Too much information does not always improve the usability of something
- Iterative Design Importance in the process
- When designing something like this start with feedback and ideas that lead into early prototype design iterations.
- Work with your own design, make it have meaning and a purpose.