Machine Learning for Human Biometrics

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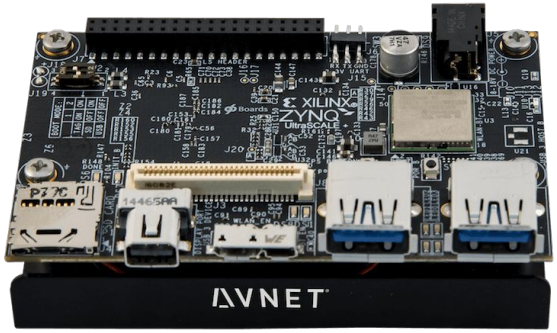
Problem Statement

- Surgeons tend to get tired if operate for long periods of time
- They also get stressed when something goes wrong in the surgery
- Our project aims to create a device to identify any abnormalities in the surgeon’s eye movement, and provide appropriate advice to the surgeon to prevent potential human error

Requirements



- Perform analysis in real-time
- Provide appropriate prompt for the surgeon to take a break or incorporate stress reduction behaviors
- The prompt should be obvious, but not serves as a distraction for surgeon.
- A camera/algorithm that has the ability to analyze the eye movement data of a surgeon in any room condition and with various degrees of noise
- A survey after the surgery to see the accuracy of analysis
- A way to securely transfer data to and from the device to a database

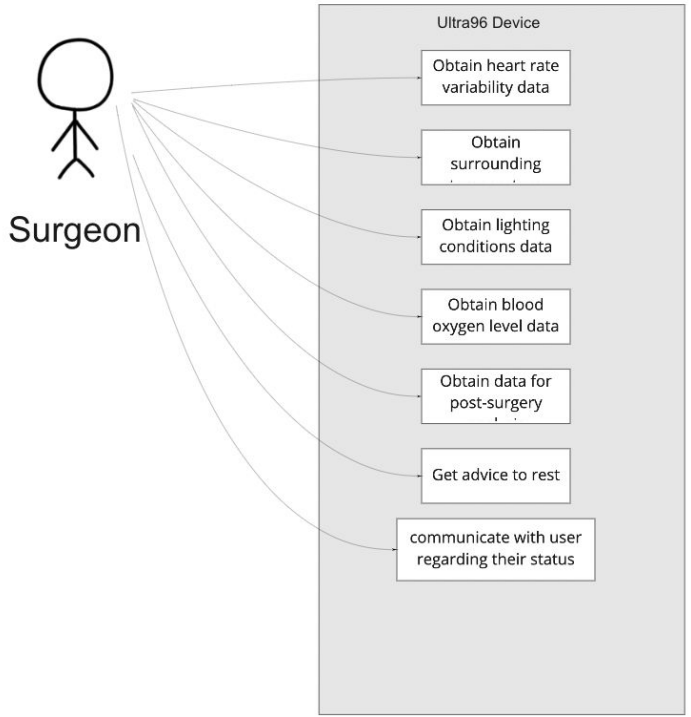
Constraints

- Lighting condition of the surgery room
- Surgeons might ignore the prompt
- Glares, e.g., from wearing glasses, might affect the reading of the eye movement

Engineering Standards

- Computer Technology Standards
  - To integrate multiple devices and technologies
- Communication Standards
  - To properly display messages and prompts
- Cybersecurity Standards
  - Data isolations to ensure security

Intended Users (Use-Case diagram)



Intended Users (Personas)

Persona Profile

Surgy McSurge

Profession: Surgeon
Age: 69
From: Alaska

Challenges & Frustrations

- Long operating hours
- Always working OT
- Stress due to working with human lives
- Mental health declining
- Frustrated with incompetent nurses

Goals

- save as many ppl as possible
- help technology advancement that impacts the medical world
- Reduce human errors

Influences

- Patient
- Family
- Friends

Intended Uses

- Predicting the condition of surgeons
- Providing prompts for breaks
- Decreasing human error in surgery
- Providing data for analysis
- Training new surgeons

Thank You

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