



B.O.N.D.



BABY OBSERVATION NOTIFICATION DEVICE

Tracking every breath and every beat to bring parents peaceful sleep.

Problem Statement

Parents of infants regularly face anxiety over unexpected sleep-related deaths, highlighting a global need for increased access to affordable health monitoring devices for young children.

Objectives

Primary: Offer parents real-time access to child's health and well-being

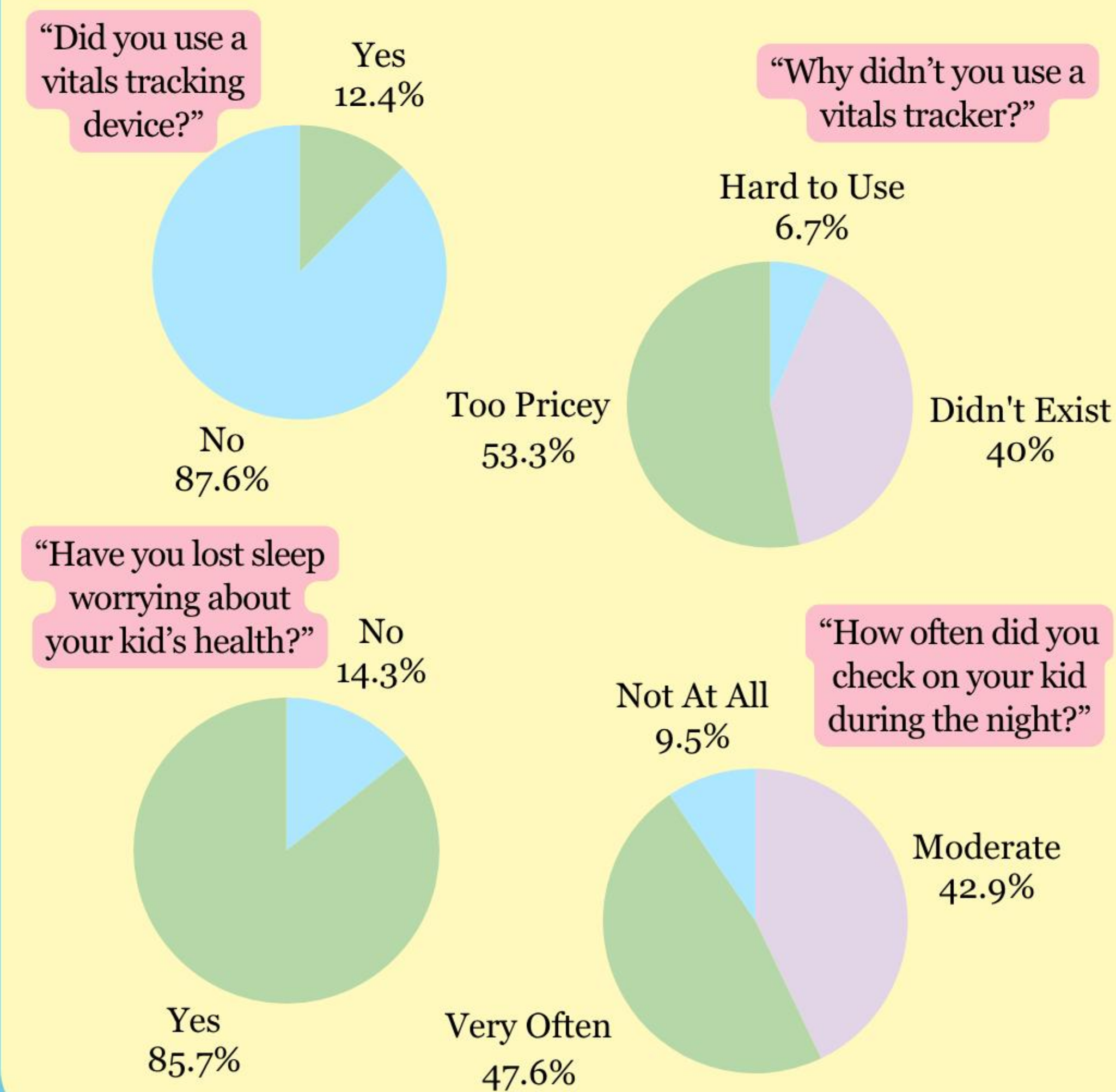
Secondary: Provides parents with piece of mind while sleeping by giving them a faster reaction time if their child is in distress.

User Requirements

- A quick way of knowing if their child is in distress
- A device that is compact and accurate
- Technology that is accessible and affordable for all families

Data 1: Interviews

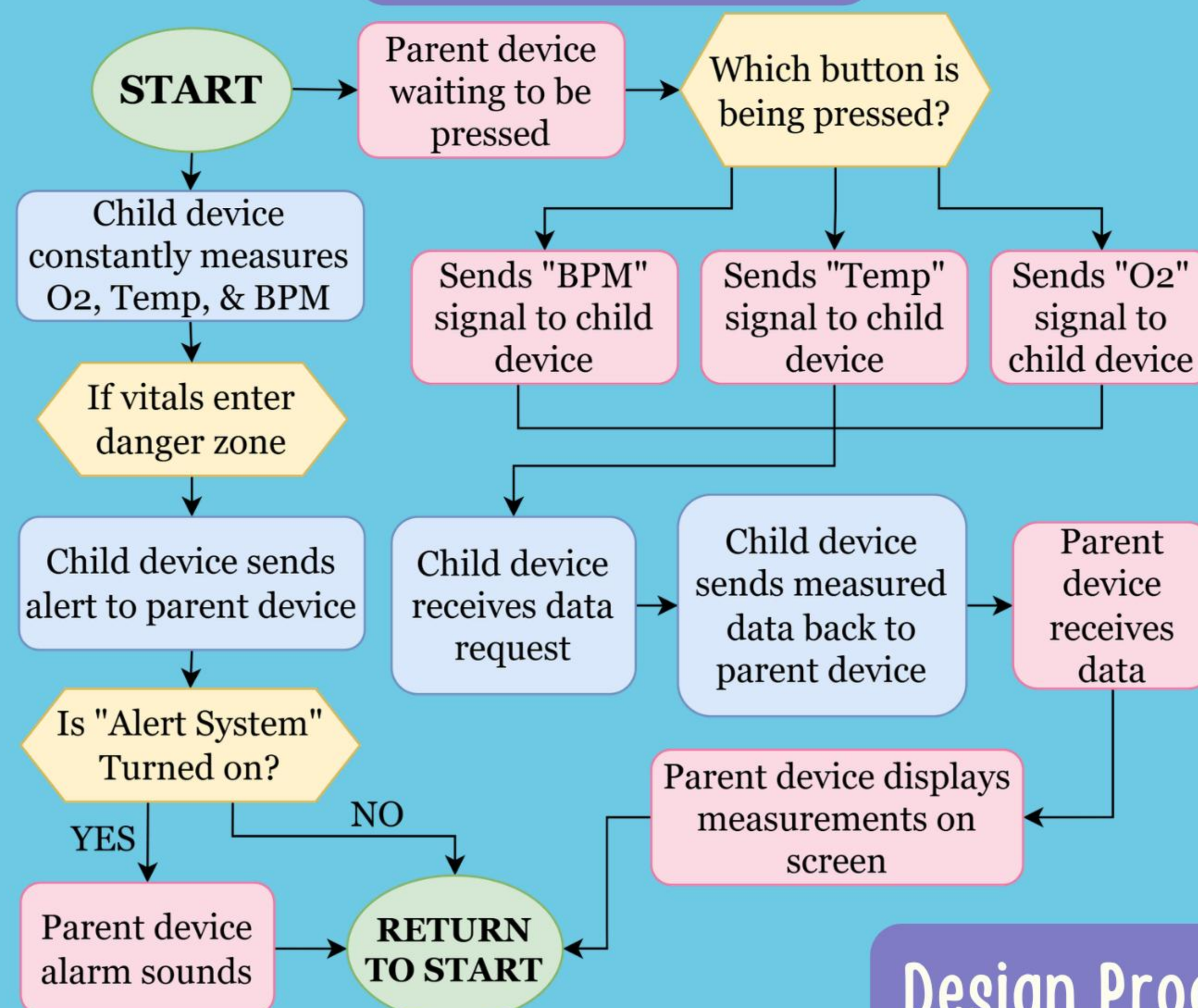
We surveyed real parents in our community and found...



Citations

- Owlet. (September 2024), "State of Parenting Report."
- KHQ (February 2025), "Rising costs challenge Spokane County families living paycheck to paycheck."
- Westwood Middle School Staff (2026), Personal interview.

Logic Flow Chart



Design Process

DEFINE THE PROBLEM

Parents are losing their children in the middle of the night due to diseases such as SIDS.

RESEARCH

We researched both online and in person the struggles and concerns of parents when it is night time.

USER REQUIREMENTS

Our device needed to be easy to use, accessible to people of low-income, and reliable in all aspects.

DESIGN

We planned to make our prototype a 2-part alert system that would track sound and health status.

TEST

We tested the accuracy of our prototype by comparing it to a pulse oximeter and infrared thermometer.

IMPROVE

We improved the accuracy of our device and started planning future improvements to enhance its comfort and usability.

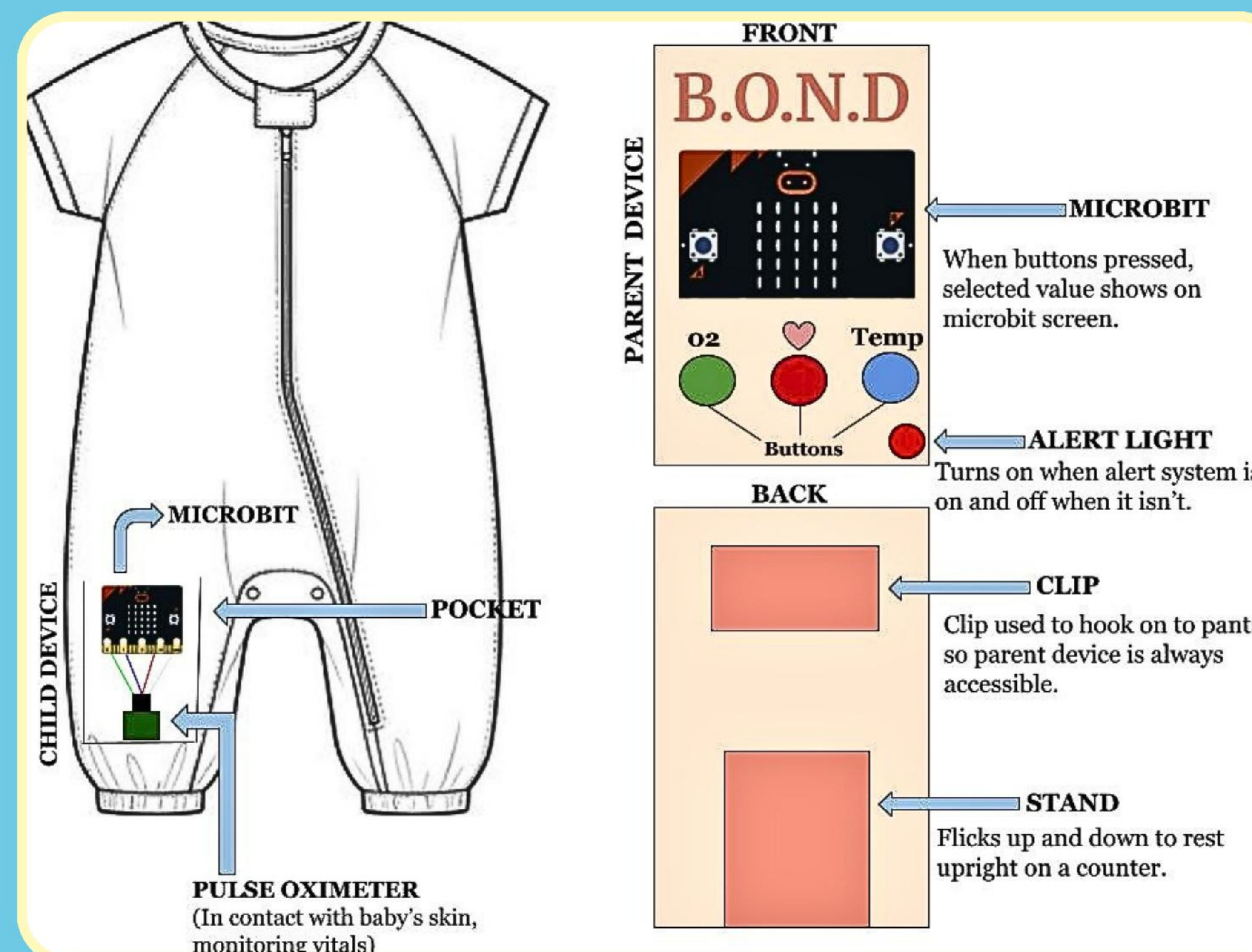
Prototype Details

CHILD DEVICE:

Monitors the baby's temperature, heart rate (BPM), blood oxygen levels (O₂), and sound levels. Sends alerts to Parent Device when vitals spike/drop. Encased in a pocket of the child's onesie so it is removable.

PARENT DEVICE:

Small device that clips onto pocket. Receives data from the Child Device and displays selected readings when the corresponding button is pressed. "Alert" feature can be turned on/off if additional awareness is needed.



Prototype Iterations

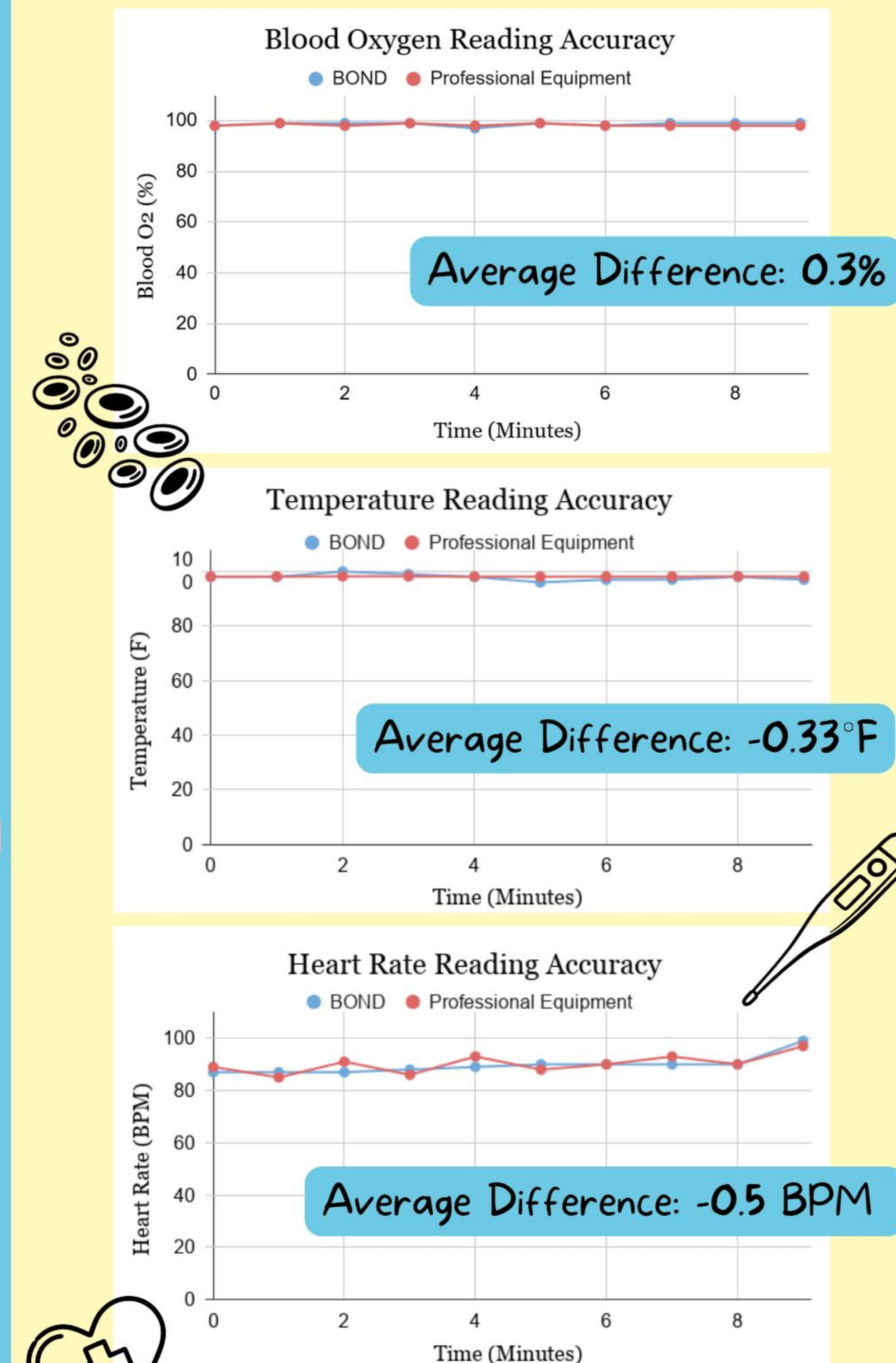
ITERATION I
Coded the heart rate, temperature, and O₂ levels individually to ensure MAX30105 worked properly.

ITERATION II
Combined coding for all 3 vital readings and included radio communication between parent and child devices.

ITERATION III
Coded Alert System and integrated technology into a 3D printed parent device and onesie for child device.

ITERATION IV
Tested device readings and adjusted code to improve accuracy of reported vitals.

Data 2: Device Testing



TESTING PROCESS:

We compared B.O.N.D. against a medical-grade pulse oximeter and infrared thermometer by recording readings from both devices every minute for 10 minutes and measuring the differences.

Results

B.O.N.D. delivers highly accurate vitals (within 0.5 units of professional-grade equipment) while using low-cost components to keep it affordable for all families. With this real-time health monitoring, parents can have greater peace of mind while their child sleeps.

Conclusion

B.O.N.D. is a simple, low-cost system that accurately tracks a baby's heart rate, blood oxygen, and temperature, alerting parents to dangerous changes for faster responses and peace of mind.

Next Steps

In the future, our users want to see...

- More compact design and added padding to ensure child's comfort
- Improvements in the sensor's precision and security
- Adjustable alert volume and improved speakers
- Further testing to ensure safe use
- Onesie options for warmer weather