Vitalize is redefining the future of perinatal care with a customer-focused, sustainable, and user-friendly mobile app, providing expecting mothers and healthcare providers seamless and continuous fetal monitoring. Embrace peace of mind and elevate your pregnancy journey – Vitalize isn’t just a product; it’s an experience where inclusion and accessibility is the priority.

**THE VITALIZE MISSION**

Vitalize is an AI-enabled, cloud-based fetal monitoring platform that provides real-time monitoring and alerts for mothers and healthcare providers.

**THE PROBLEM**

- Limited access to continuous fetal monitoring
- Lack of safe and portable fetal monitoring solution
- Limited solutions within the Canadian market.

**THE SOLUTION**

- Remote fetal monitor
- Comprehensive remote monitoring

**KEY FACTORS**

- Temperature consideration (limit: 35°C)
- Pressure management (fetal health)
- Adjustability (ease of USB and sensor placement accuracy)

**MECHANICAL DESIGN PROCESS**

1. **DEFINE**
   - Major Considerations: Safety Insulation, Adjustment, Ease of USB, and Sensor Placement Accuracy

2. **ANALYZE**
   - 2 Million Stillbirths
   - Neonatal Asphyxia by 24%

3. **CREATE**
   - First Iteration
   - Second Iteration

4/5 **P & T**

**ABOUT THE DESIGN**

Our major considerations: Safety, Function for Hardware, Comfort, and Aesthetics.

- In addition to the housing electronics, the enclosure includes optical paths to LED lights and a button to allow the device to be integrated with a cotton band mask which wraps around a woman's belly, the aim is to provide mothers with comfort for 24/7 USB.

**HARDWARE DESIGN**

- The core PCB features an STM32 microcontroller that gathers data, while the charging system is comprised of a rechargeable 3.7V lithium ion polymer battery with a 2-pin connector, which plugs into a pre-built driver charging module with USB-C connection.

**SOFTWARE ARCHITECTURE**

Within the capstone period, the Vitalize team developed a full-stack application including a React Native mobile app, cloud architecture on AWS, including EBS, Lambda functions, and DynamoDB, and finally established a BLE integration with Arduino.

**SOFTWARE LOAD TESTING**

Assessing lambda function performance through artillery and cloud watch, simulating 10 users over a 3-minute interval requesting BPM data.

**FETAL MARGINATION**

The filter design consists of an amplification stage, followed by a 4th order active low pass filter using a traditional Sallen Key layout (accomplished by cascading two 2nd order filters in series).

**HEALTH & SAFETY FUTURE CONSIDERATIONS**