

Keeping Labor Safe LLC

The Fetal Reserve Index-Voice Recognition Fall 2024

Mark I Evans MD OB/GYN

Gregory F. Ryan MBA

The Need:

Childbirth should be a time of great joy, but it can also be perilous. Electronic fetal monitoring (EFM) has been used for >50 years to predict and prevent compromised babies who can have neurodevelopmental delays including cerebral palsy. Unfortunately, EFM has performed poorly – missing as much as 50% of problematic cases. As a result, medical liability costs around labor have reached \$40 Billion per year in the USA. Outcomes have been substantially worse in minority populations. We have developed a very disruptive technology called the Fetal Reserve Index (FRI) to provide improved and earlier assessment of clinical risk to prevent damage rather than react to it. We need to move the FRI into a deployable platform for clinical introduction, refinement, and world-wide implementation. We need help to create the app for clinical implementation.

Company Background:

Keeping Labor Safe, LLC (KLS), is a start-up medical technology company, developing technology and software that will make labor and delivery (L&D) and immediate postpartum care (L&D/PC) safer for mother and newborn infant. Our team is primarily comprised of medical professionals who have spent our careers working in maternity hospitals in Detroit, Chicago, Augusta, Dayton, Philadelphia and New York City where we have seen firsthand the need to make childbirth safer for all parties involved. We have developed the Fetal Reserve Index (FRI) a contextualized, quantitative metric to identify distressed fetuses earlier in the course of developing compromise. Earlier identification potentiates earlier intervention to help produce better medical outcomes for mother, fetus, and baby. We have multiple papers and patents and have developed the computer algorithm to “read” the tracing and produce a quantitative score.

The Project: Voice Recognition

To improve upon the voice recognition features and capabilities created by the CS Mines Fall 2023 field session, and ultimately interface it with the web application created by another CS Mines Fall 2023 field session team. This will turn the Fetal Reserve Index algorithm into an Intelligent Cloud Platform and Bedside Web Application allowing for handsfree use while medical personnel attend to the patient’s needs. There are currently many voice recognition software solutions on the market today, the previous team has chosen the following two, Microsoft Azure Speech API for the cloud-based version and PocketSphinx for the locally based version for when there is no internet availability. We would like to see the throughput (currently at 58.5 words/29.1 Phrases per minute) and accuracy (currently 90.6% and 89.7%) of the above chosen software improved upon. We would like to have additional words added and trained to better understand the language used in the labor and delivery room. Then have it integrated into the current FRI web application being updated by another team.

Application Requirements:

- **Cloud-Based:** Work MS Azure Speech API
- **Locally Based:** PocketSphinx
- HIPAA compliant
- Built to allow expansion.

Technologies and Desired Skills:

- Python (Python Flask, Micro framework)
- C++
- C#
- React
- Heroku
- WebSocket
- SQL Database

- JavaScript, TypeScript
- HTML/CSS
- Others as appropriate

Preferred Team Size: 4-5 Students

Preferred Work Location: Remote

- Meeting regularly via Zoom

Intellectual Property: All intellectual property developed as part of this project will be owned by Keeping Labor Safe, LLC.

NDA: Signed NDA will be required