Keeping Labor Safe LLC
The Fetal Reserve Index-Voice Recognition Summer 2023
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:

To add voice recognition features and capabilities to the web app created by the CS Mines Fall 2022 field session. This will turn the Fetal Reserve Index algorithm into an Intelligent Cloud Platform and Bedside Web Application allowing for handsfree use while medical personnel is with the patient. There are currently many voice recognition software solutions on the market today (there is a short list in option #1 below). Ideally you will choose a few of the solutions (5-10), create the API's, test with the current Application built by the summer field session students, score and rank each solution to come up with a recommendation for future use. Upon review of your rankings, as a group we will then decide which one will be the chosen one to add to the application. The chosen software will be added and trained to understand the language used in the labor and delivery room. The second option is to build one using open-source speech to text libraries, a brief list is listed below.

Application Requirements: Two Options

- Option #1: Work with some off the shelf Voice Recognition Software solutions: Starting with the free ones
  - Deepgram: https://deepgram.com/
  - Express Scribe: https://www.nch.com.au/scribe/index.html
  - AssemblyAI: https://www.assemblyai.com/
  - IBM Watson: https://www.ibm.com/watson/products-services
  - Scribbl: https://www.scribbl.co/
  - Etc., more can be found here: https://www.g2.com/categories/voice-recognition/free
  - There are additional version such as:
    - Dragon Naturally Speaking
    - Microsoft Speech API
    - Google Cloud Speech to Text
  - Create the appropriate API's
    - Testing and grading the chosen versions to see which ones will be the best fit.

- **Option #2**: is to build your own, using some open-source speech to text libraries:

    - Project DeepSpeech
    - Kaldi
    - Julius
    - More can be found here: https://fosspost.org/open-source-speech-recognition/
- HIPAA compliant
- Built to allow expansion

Technologies and Desired Skills:

- Python (Python Flask, Micro framework)
- C++
- C#
- NodeJS
- 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