# Heart Rate Variability Analysis

## Data Analyst: Aidan O’Keeffe

## Client/Sponsor: Joshua Chang

## Purpose:

*The purpose of this project is to investigate heart rate variability (HRV) statistics in preterm infants to see if they show anomalies in the lead up to sepsis, the hope being that this may lead to predictors of sepsis detection.*

## Scope / Major Project Activities:

*What are the major parts of this project? List out the high-level steps, activities, or stages of the project, and give a brief description for each.*

| Activity | Description |
| --- | --- |
| Build ECG data processing pipeline | The pipeline will take vital sign signals in the form of a series of files, extract the ECG signal, remove noise that impedes the QRS complex detector, detects the QRS complexes, calculates RR intervals, breaks up multiple beats, and stores the results in a usable format. |
| Implement HRV statistics | A collection of HRV statistics (mean RR, sd RR, RMSSD, SD1, SD2, pn50, ULF, VLF, LF, HF, VHF, UHF, and if we return to this step, entropy measures) will be implemented in standard form and in a normalized form (recent/longterm baseline), and will be run on the RR intervals. |
| Write up and visualize findings | Any plots showing an interesting result will be saved from the previous step, and physiological interpretations of these plots will be written up. |

## This project does not include:

*Specify the things that this project isn’t responsible for doing (out of scope). For instance, “this project does not involve a summation of 2019 data analysis”*

* Machine learning algorithms. So far, we are only looking at the basic statistics, and we are not using any advanced machine learning techniques to predict sepsis onset.
* Clinical recommendations.

## Deliverables:

*A specific list of things that your project will deliver.*

| Deliverable | Description/ Details |
| --- | --- |
| Code for the pipeline | See the pipeline above |
| Code for the statistics | See the description of statistics above |
| Report and visualizations | See above. |
| Reflection paper | A 2-3 page reflection paper about the research conducted for this project. Part of the course through which this project has been organized. |

## Schedule Overview / Major Milestones:

*The expected schedule for the project. This can be defined by milestones (e.g. “all data is cleaned and processed”), periods of time (“Week 1 / Week 2”), or other ways based on the needs of the project.*

| Milestone | Expected Completion Date | Description/Details |
| --- | --- | --- |
| *Complete pipeline* | *11/22/2022* | *This has been a long time coming, and is already nearly complete* |
| *Complete statistics code* | *11/25/2022* | *Prototype code has already been written; only a few tweaks are necessary, so my hope is that this will not take long* |
| *Report and visualizations* | *11/29/2022* | *This is likely to be my next meeting with Joshua* |
| *Reflection paper* | *12/1/2022* | *The deadline for the class; would be wise to complete ahead of time* |

## \*Estimated date for completion: 12/2/2022

*This is my “if all goes well and I have everything I need, this is when I’ll be done” date.*