Acceleration vs fetal health

Prolong deceleration vs fetal health

Categorizing heart rate (normal-1, 2-suspect, abnormal-3)

Presentation structure

Motivation:

* What is the problem?
  + Child mortality under 5 years of age
* Why is it important (either business, public good, or research perspective)?
  + The UN expects that by 2030, countries end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce under‑5 mortality to at least as low as 25 per 1,000 live births.
  + Parallel to notion of child mortality is of course maternal mortality, which accounts for 295 000 deaths during and following pregnancy and childbirth (as of 2017). The vast majority of these deaths (94%) occurred in low-resource settings, and most could have been prevented.

Task:

* Problem from a technical perspective.
  + What features are the most significant in determining the fetus health status, based on being normal, suspect and pathological
* Description of the dataset, features and targets, data exploration
  + baseline value - Baseline Fetal Heart Rate (FHR)
  + accelerations- Number of accelerations per second
  + fetal\_movement- Number of fetal movements per second
  + uterine\_contractions - Number of uterine contractions per second
  + light\_decelerations- Number of LDs per second
  + severe\_decelerations- Number of SDs per second
  + prolongued\_decelerations- Number of PDs per second
  + abnormal\_short\_term\_variability- Percentage of time with abnormal short term variability
  + mean\_value\_of\_short\_term\_variability- Mean value of short term variability
  + percentage\_of\_time\_with\_abnormal\_long\_term\_variability- Percentage of time with abnormal long term variability
  + mean\_value\_of\_long\_term\_variability- Mean value of long term variability
  + histogram\_width- Width of the histogram made using all values from a record
  + histogram\_min- Histogram minimum value
  + histogram\_max- Histogram maximum value
  + histogram\_number\_of\_peaks- Number of peaks in the exam histogram
  + histogram\_number\_of\_zeroea- Number of zeroes in the exam histogram
  + histogram\_mode- Hist mode
  + histogram\_mean- Hist mean
  + histogram\_median- Hist Median
  + histogram\_variance- Hist variance
  + histogram\_tendency- Histogram trend
  + fetal\_health- Fetal health: 1 - Normal 2 - Suspect 3 – Pathological ( target)

Modeling:

* Important aspects of your approach.
  + Created linear regression model and identified significant features based on p-value
  + Identified the relationships between each significant feature and the condition
* How did you process the data or engineer features?
* What model did you use? Use schematics!

A diagram of a data flow

Description automatically generated

Results:

* Visuals! Show metrics and experiments. Demo (if any)

Conclusions:

* What worked? What didn’t (and why)?
* How are we better off?
* Where could the project go next?

Model classification evaluation result:

Precision:

-The precision for class 1 is 0.95, which means that 95% of the instances predicted as normal were correctly classified.

-The precision for class 2 is 0.89, suggesting that 89% of the instances predicted as suspected were correctly classified.

-The precision for class 3 is 0.87, indicating that 87% of the instances predicted as class pathological were correctly classified.

Recall:

Class 1 is 0.98, suggesting that the model identified 98% of the true instances of class normal

And Class 2 and 3 at 0.75 and 0.93, indicating that 75% and 93% of the true instances of class Suspected and pathological.

F1-score:

Class 1 is 0.96, which is the harmonic mean of precision and recall for this class.

Class 2 is 0.81, representing the balance between precision and recall for this class.

Class 3.0 is 0.90, indicating the balance between precision and recall for this class.

Accuracy:

The overall accuracy is 0.94, suggesting that the model correctly classified 94% of the instances.

Overall, the classification report indicates that the model has good performance across most classes, with high precision, recall, and F1-scores. However, the lower recall for class 2 suggests that the model may struggle to correctly identify instances of class 2