Improvements on Detecting Abnormal Deliveries

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Cardiotocography

- Measures fetal heart rate and uterine contractions
- Insight into fetal neural condition, oxygenation, and acidemia

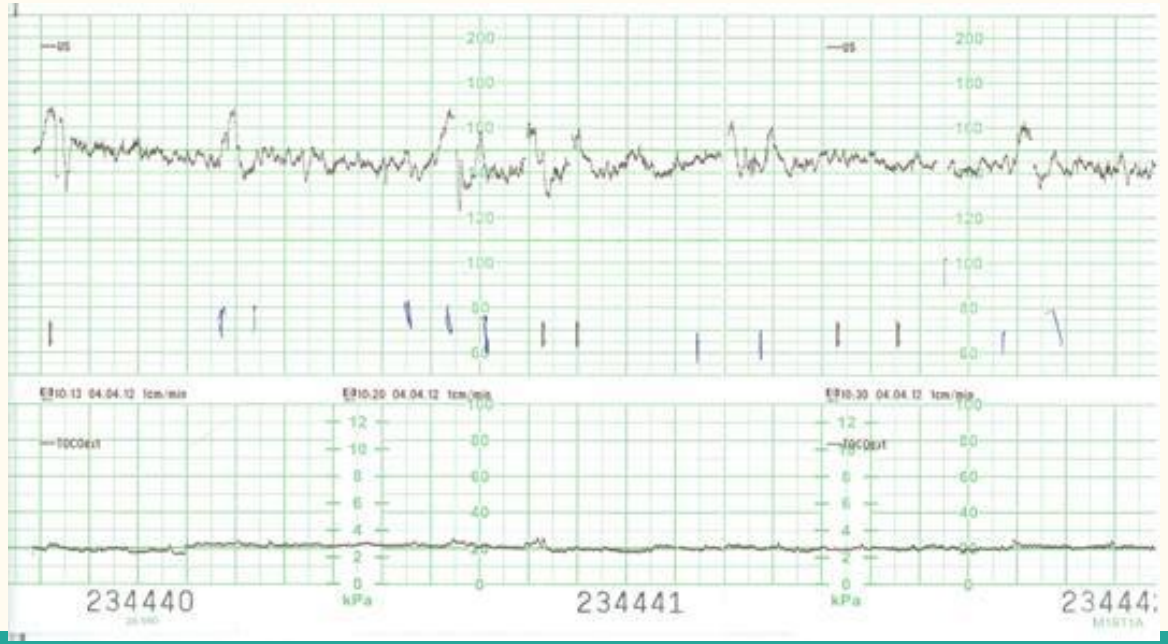


Image Source:
V. Gintautas, G. Ramonienė, D. Simanavičiūtė

Four Main Indicators

- Baseline (110 - 160 bpm)
  - Bradycardia
  - Tachycardia
- Variability
  - Fluctuations of the baseline
- Accelerations
  - Abrupt increase in heart rate
- Decelerations
  - Decreases in heart rate

Image Source: FamilyDoctor.org

Fetal Distress Classifications

- Usually classified by an expert
- Normal
  - Continue general procedures and monitoring
- Suspect
  - Close monitoring and consider pathological steps
- Pathological
  - Change delivery techniques
- Can we do anything to allow experts/doctors to focus on Suspect and Pathological cases?

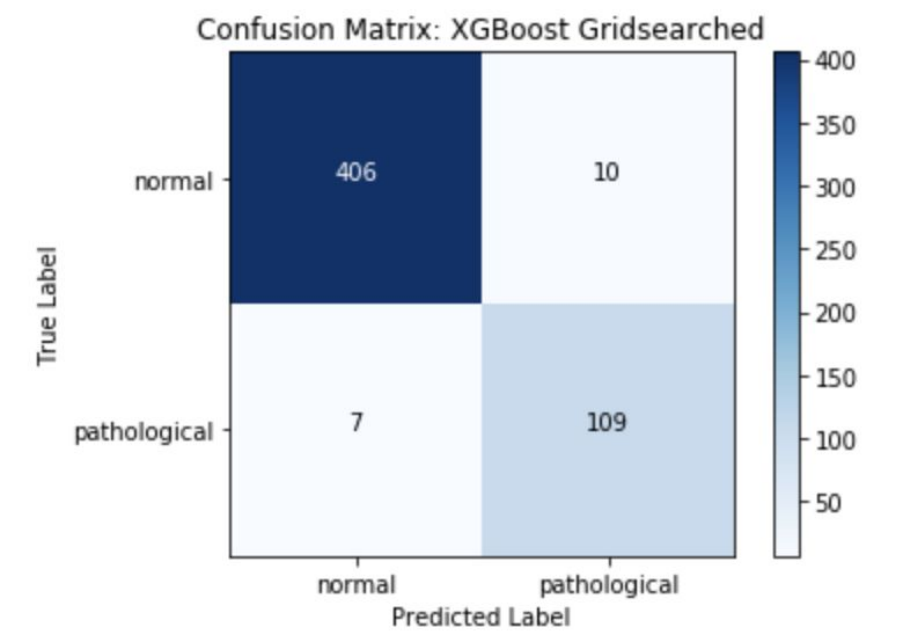
Our Dataset

- 23 predictive features from CTGs
- Consensus classification of three expert opinions
- 2126 CTGs

Image Source: Alivia Swiss Healthcare

Findings

- Used an XGBoost classifier
- Recall of 94%
- 3.2% of all predictions were incorrectly classified



Suggestions

- Keep using CTG expert opinions.

- 6% of actual Suspect/Pathological cases were classified as normal
- More data to further improve the model
- Each delivery is different
  - CTGs have shown to be not very effective for pre-term/post-term deliveries, multiple births, or for mother's that had a previous C-section

Questions?