

Identifying the health of fetal using Cardiotocography (CTG) data

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Deadline for Case Study Submission: 14-April-2022 11:59:59

1 Description

Reduction of child mortality is reflected in several of the United Nations' Sustainable Development Goals (SGD) and is a key indicator of human progress. 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 295000 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. In light of what was mentioned above, Cardiotocograms (CTGs) are a simple and cost accessible option to assess fetal health, allowing healthcare professionals to take action in order to prevent child and maternal mortality. The equipment itself works by sending ultrasound pulses and reading its response, thus shedding light on fetal heart rate (FHR), fetal movements, uterine contractions and more [1].



Figure 1: Cardiotocography (CTG) is a continuous recording of the fetal heart rate obtained via an ultrasound transducer placed on the mother's abdomen.

Attribute Information:

This dataset contains 2126 records of features extracted from Cardiotocogram exams, which were then classified by three expert obstetricians into 3 classes:

1. Normal
2. Suspect
3. Pathological

2 Material

Your dataset is available to be downloaded [Click me](#). Your dataset has 2126 rows and 22 columns. The size of this dataset is 229 KB and the format is csv.

3 Aim

Your job is to create a multiclass model to classify CTG features into the three fetal health states (i.e. Normal, Suspect, and Pathological) [2].

4 Help

- Try different classification algorithms such as SVM, Random Forest, KNN, and more [3].
- Split for data into training, validation, and test set to evaluate your model.
- Feel free to take your project in any direction. However, make sure you can justify that the approach is leading to better age prediction.
- Exploratory data analysis is quite important and please use pandas.
- Discuss with CE880 academic staff (Dr Haider Raza).

References

- [1] D. Ayres-de Campos, J. Bernardes, A. Garrido, J. Marques-de Sa, and L. Pereira-Leite, “Sisporto 2.0: a program for automated analysis of cardiotocograms,” *Journal of Maternal-Fetal Medicine*, vol. 9, no. 5, pp. 311–318, 2000.
- [2] A. Akbulut, E. Ertugrul, and V. Topcu, “Fetal health status prediction based on maternal clinical history using machine learning techniques,” *Computer methods and programs in biomedicine*, vol. 163, pp. 87–100, 2018.
- [3] Z. Hoodbhoy, M. Noman, A. Shafique, A. Nasim, D. Chowdhury, and B. Hasan, “Use of machine learning algorithms for prediction of fetal risk using cardiotocographic data,” *International Journal of Applied and Basic Medical Research*, vol. 9, no. 4, p. 226, 2019.