PeerJ Computer Science
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Intrapartum cardiotocograph trace pattern preprocessing, features extraction and fetal health condition diagnoses based on RCOG guideline

GENERAL COMMENTS

CTG automatic segmentation and classification systems are a very interesting and high relevance area. The methodology section is well presented and the results are positive. Nevertheless, despite the CTG interpretation challenges are addressed properly, but the proposed techniques should be validated with other public databases in order to increase the reliability.

The main objective is not properly stated in the Introduction.

A superficial “Literature Review” section is provided. The literature review needs a significant update. The area is a hot topic. So, the authors should carefully update the references and the state of art presentation.

A small dataset is considered in the work. The impact of that must be highlighted in the paper, specially thinking about the generalization of the proposed techniques.

Overall, the English writing of the paper is good. Please carefully proof-read it to eliminate grammatical errors.

SPECIFIC COMMENTS ABOUT THE PAPER SECTIONS:

ABSTRACT

- The abstract is well structured. Although the development environment MATLAB is repeated many times and this is only necessary in the methods section.
- The Results should be presented in Accuracy or any other statistical measure and not intervals of bpm. This is not relevant for any analysis. Why consider this?

INTRODUCTION

- This is probably a PDF generation issue, but I could find several changes in the font size in the Introduction… this makes the document very unpleasant to read.
- The RESEARCH GAP is not clearly stated. This section must bring it very clearly.
- I extremely encourage the authors to improve the provided flowchart of the proposed solution.

- The MAIN OBJECTIVE is not stated nor the LIST OF CONTRIBUTIONS (in bullet points).
- The end of the Introduction must present how the paper is structured.

RELATED WORKS / LITERATURE REVIEW

- This section is superficially addressed. Conciseness is good but in certain terms. The authors should organize it clearly and in different paragraphs.

Relevant references in the area are missing such as (but not all for sure):

J. A. Lobo Marques, P. C. Cortez, J. P. D. V. Madeiro, S. J. Fong, F. S. Schlindwein and V. H. C. D. Albuquerque, "Automatic Cardiotocography Diagnostic System Based on Hilbert Transform and Adaptive Threshold Technique," in *IEEE Access*, vol. 7, pp. 73085-73094, 2019, doi: 10.1109/ACCESS.2018.2877933.

Maria G. Signorini, Nicolò Pini, Alberto Malovini, Riccardo Bellazzi, Giovanni Magenes. Integrating machine learning techniques and physiology based heart rate features for antepartum fetal monitoring, Computer Methods and Programs in Biomedicine, Volume 185, 2020, 105015.

Marques, J.A.L., Cortez, P.C., Madeiro, J.P.V. *et al.* Nonlinear characterization and complexity analysis of cardiotocographic examinations using entropy measures. *J Supercomput* **76,** 1305–1320 (2020). https://doi.org/10.1007/s11227-018-2570-8

MATERIALS AND METHODS

- A paragraph between 3 and 3.1 needs to be provided. What should I expect from this Section? It can't start directly in 3.1
- Section 3.1 "Description of Data Sets" – as far as I understood there is only one dataset. In addition, the first paragraph is an introduction to the problem. Should not be another subsection? It is also essential to provide the RCOG sources where do this come from.

RESULTS

- Figures 22 and 23 are completely blurred. I can't even read the titles.
- The RESULTS section should consider statistical analysis and not graphical visual analysis. Figures 24 to 34 are not valid to provide any conclusion or analysis.
- Tables 3 and 4 should be focused on statistical analysis and not absolute FHR results.
- The graphical analysis can be provided as an additional tool, but I really doubt "line-plots" are the best approach to do so. The authors should find a better representation to that.

- Matlab Fuzzy Toolbox is a blackbox. The impact of fuzzy inference rules is a research area itself and very superficial information is given on that. This should be significantly improved before publication.

- No classification metrics are provided, such as Se, PPV, Acc. The classification can't be evaluated without that.

- Dataset limitations are to be discussed when presenting the dataset and in the conclusion.

CONCLUSIONS

- The conclusion should be more elaborated. The authors need to bring each aspect of the main objective and the contributions proposed in the INTRODUCTION – the main paper contributions.