Evaluation of Fetal Distress Diagnosis during Delivery Stages based on Linear and Nonlinear Features of Fetal Heart Rate for Neural Network Community

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Abstract

Cardiotocography (CTG) is a fetal monitoring technique used to determine the distress level of the fetus during pregnancy and delivery. CTG consists of two different signals including fetal heart rate (FHR) and uterine contraction (UC) activities. The linear features of FHR are the most powerful prognostic indices to ascertain whether the fetus is in distress. In addition, it is observed that nonlinear features have produced very great results on the time series analysis in recently. In this context, the classification success of the neural network community designed based on the linear and nonlinear features of FHR is analyzed for the delivery process evaluated in three stages. The experimental results have shown that the system designed to distinguish normal and pathological instances is achieved the best classification accuracy at the first stage of the analysis. Also, the greatest contribution of nonlinear features to the classification accuracy is observed at the second stage of the delivery. Consequently, 92.40%, 83.29%, and 79.22% of accuracy obtained for the three stage of the analysis, respectively.

References


Index Terms

Computer Science

Networks

Keywords
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Cardiotocography, fetal heart rate, artificial neural network, linear and nonlinear features, classification