

# Deep Learning Based Fetal Distress Detection from Time Frequency Representation of Cardiotocogram Signal Using Morse Wavelet

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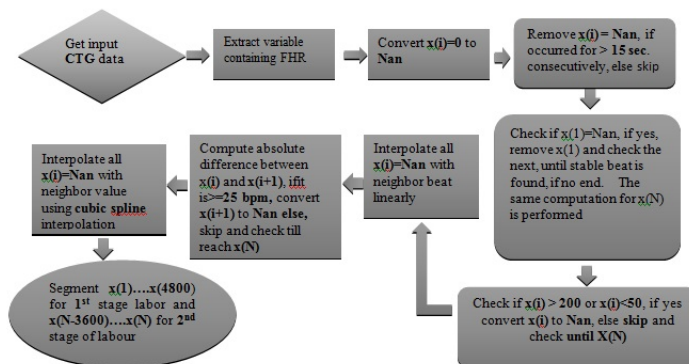
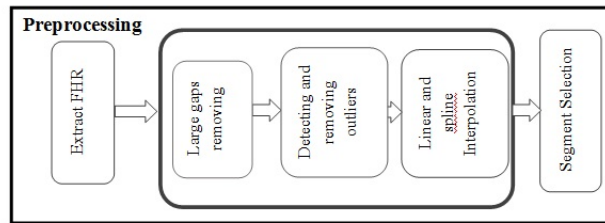
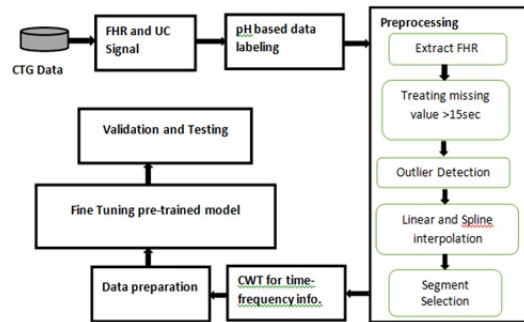
April 12, 2022

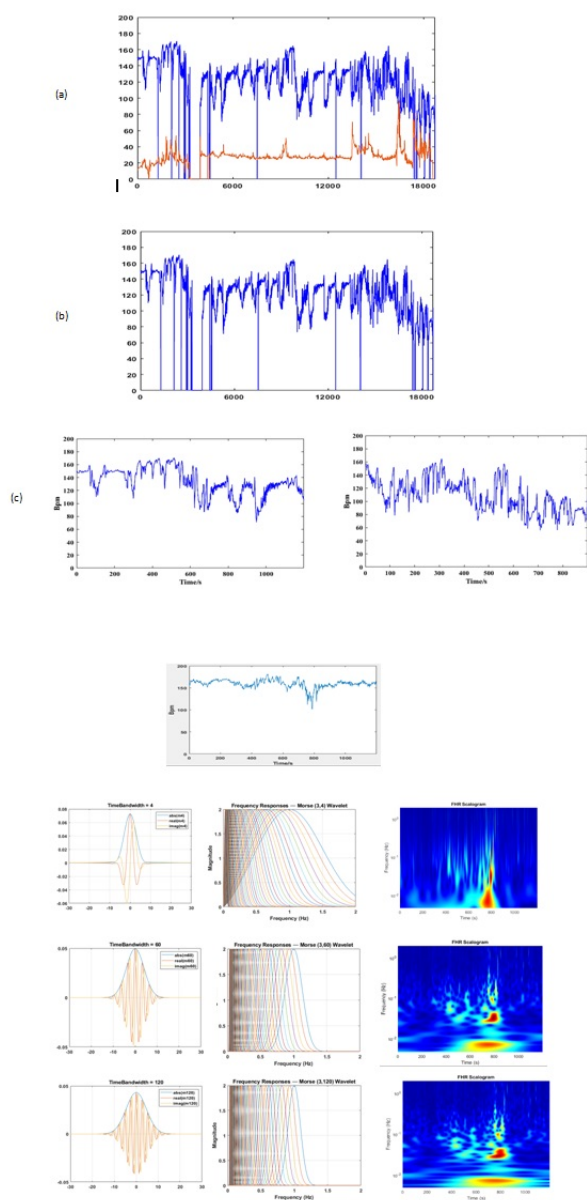
## Abstract

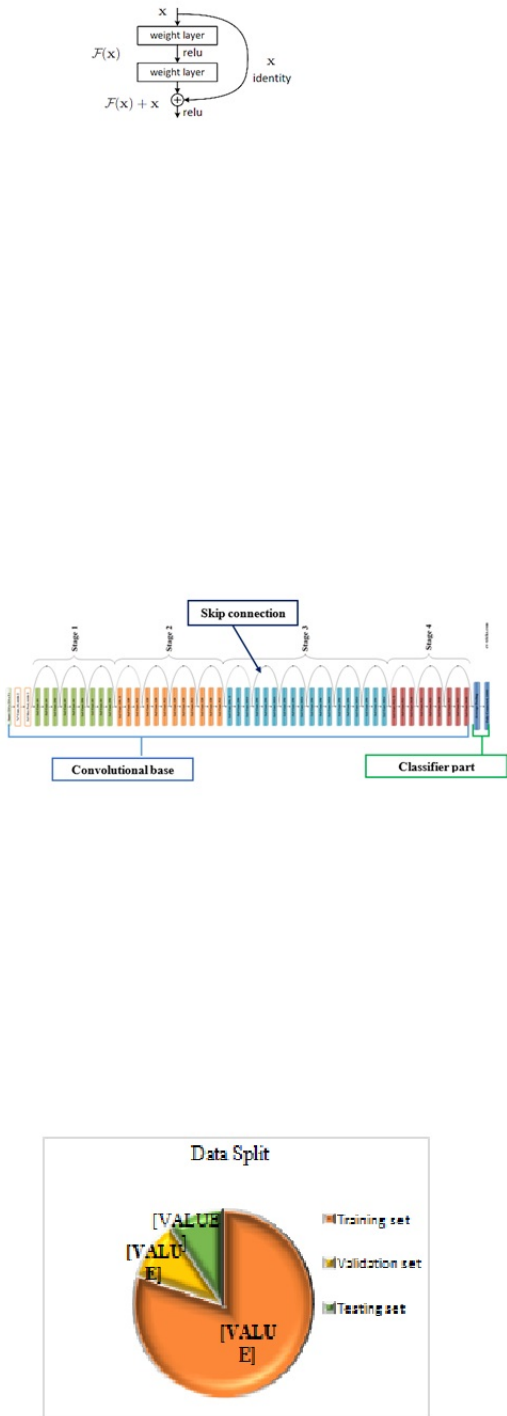
**Abstract Background:** Clinically Cardiotocography is a technique which is used to monitor and evaluate the level of fetal distress. Even though, CTG is the most widely used device to monitor determine the fetus health, existence of high false positive result from the visual interpretation has a significant contribution to unnecessary surgical delivery or delayed intervention. **Objective:** In the current study an innovative computer aided fetal distress diagnosing model is developed by using time frequency representation of FHR signal using generalized Morse wavelet and the concept of transfer learning of pre-trained ResNet 50 deep neural network model. **Method:** The CTG data is obtained from the only open access CTU-UHB data base of Cardiotocogram, and then FHR signal is extracted and preprocessed to remove noises and spikes. After preprocessing the time frequency information of FHR signal is extracted by using generalized Morse wavelet and fed to a pre-trained ResNet 50 model which is fine tuned and configured according to our dataset. **Result:** After successfully training the model, a comprehensive experimentation of testing is conducted for FHR data for which a recording is made during early stage of labor and last stage of labor. Thus, a promising classification accuracy result of 98.7% and 96.1 are achieved for FHR data's of 1st and 2nd stage of labor respectively. **Conclusion:** A graphical user interface is developed for the model using Matlab app designer for ease of implementation, and can be used as a decision-making aid system for obstetrician and gynecologist.

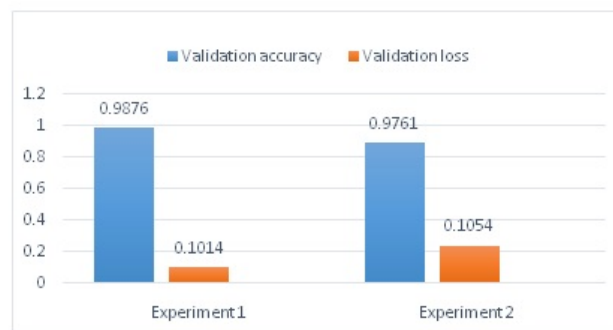
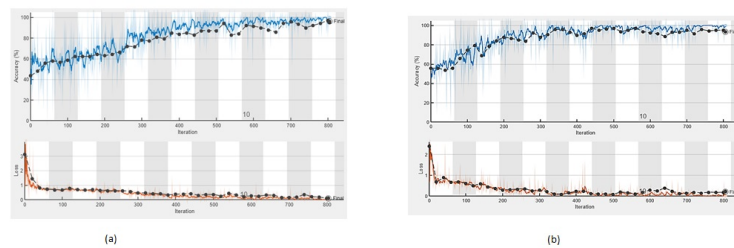
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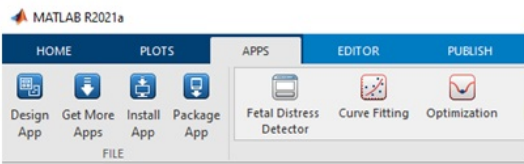
Main Document of Deep Learning Based Fetal Distress Detection.docx available at <https://authorea.com/users/475783/articles/564977-deep-learning-based-fetal-distress-detection-from-time-frequency-representation-of-cardiotocogram-signal-using-morse-wavelet>



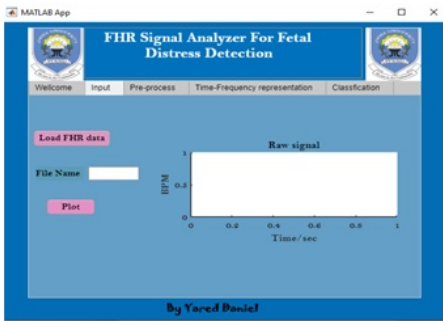




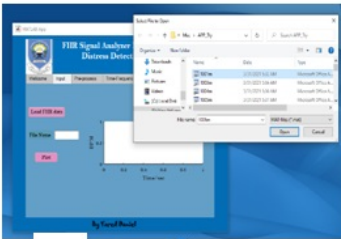




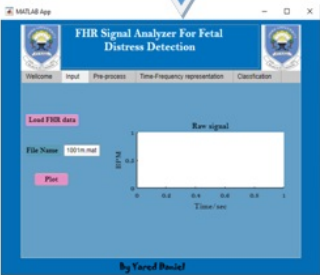
(a)



(b)



(a)



(c)

