Author's Accepted Manuscript

www.elsevier.com/locate/cbm

Automated Detection of Premature Delivery Using Empirical Mode and Wavelet Packet Decomposition Techniques with Uterine Electromyogram Signals

U Rajendra Acharya, Vidya K Sudarshan, Soon Qing Rong, Zechariah Tan, Lim Choo Min, Joel EW Koh, Sujatha Nayak, Sulatha V Bhandary

PII: S0010-4825(17)30099-9
DOI: http://dx.doi.org/10.1016/j.compbiomed.2017.04.013
Reference: CBM2649

To appear in: *Computers in Biology and Medicine*

Received date: 14 December 2016
Revised date: 16 April 2017
Accepted date: 16 April 2017

Cite this article as: U Rajendra Acharya, Vidya K Sudarshan, Soon Qing Rong Zechariah Tan, Lim Choo Min, Joel EW Koh, Sujatha Nayak and Sulatha V Bhandary, Automated Detection of Premature Delivery Using Empirical Mode and Wavelet Packet Decomposition Techniques with Uterine Electromyogram Signals, *Computers in Biology and Medicine* http://dx.doi.org/10.1016/j.compbiomed.2017.04.013

Automated Detection of Premature Delivery Using Empirical Mode and Wavelet Packet Decomposition Techniques with Uterine Electromyogram Signals

U Rajendra Acharya[1,2,3], Vidya K Sudarshan[1*1], Soon Qing Rong[4], Zechariah Tan[4], Lim Choo Min[1], Joel EW Koh[1], Sujatha Nayak[5], Sulatha V Bhandary[6]

[1]Department of Electronics and Computer Engineering, Ngee Ann Polytechnic, Singapore.

[2]Department of Biomedical Engineering, School of Science and Technology, SIM University, Singapore.

[3]Department of Biomedical Engineering, Faculty of Engineering, University of Malaya, Malaysia

[4]Department of Engineering Science, Ngee Ann Polytechnic, Singapore.

[5]Department of Gynecology, Dr TMA Pai Memorial Rotary Hospital, Karkala, India

[6]Department of Ophthalmology, Kasturba Medical College, Manipal, 576104, India

*Corresponding author. Tel.: +(65) 91761371. vidya.2kus@gmail.com

ABSTRACT

An accurate detection of preterm labor and the risk of preterm delivery before 37 weeks of gestational age is crucial to increase the chance of survival rate for both mother and the infant. Thus, the uterine contractions measured using uterine electromyogram (EMG) or electro hysterogram (EHG) need to have high sensitivity in the detection of true preterm labor signs. However, visual observation and manual interpretation of EHG signals at the time of emergency situation may lead to errors. Therefore, the employment of computer-based approaches can assist in fast and accurate detection during the emergency situation. This work proposes a novel algorithm using empirical mode decomposition (EMD) combined with wavelet packet decomposition (WPD), for automated prediction of pregnant women going to have premature delivery by using

[1] Postal Address: Department of Electronics and Computer Engineering, Ngee Ann Polytechnic, Singapore 599489