

# Accepted Manuscript

Replicating human expertise of mechanical ventilation waveform analysis in detecting patient-ventilator cycling asynchrony using machine learning

Behnood Gholami, Timothy S. Phan, Wassim M. Haddad, Andrew Cason, Jerry Mullis, Levi Price, James M. Bailey



PII: S0010-4825(18)30097-0

DOI: [10.1016/j.combiomed.2018.04.016](https://doi.org/10.1016/j.combiomed.2018.04.016)

Reference: CBM 2941

To appear in: *Computers in Biology and Medicine*

Received Date: 26 January 2018

Revised Date: 2 April 2018

Accepted Date: 21 April 2018

Please cite this article as: B. Gholami, T.S. Phan, W.M. Haddad, A. Cason, J. Mullis, L. Price, J.M. Bailey, Replicating human expertise of mechanical ventilation waveform analysis in detecting patient-ventilator cycling asynchrony using machine learning, *Computers in Biology and Medicine* (2018), doi: 10.1016/j.combiomed.2018.04.016.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

# Replicating Human Expertise of Mechanical Ventilation Waveform Analysis in Detecting Patient-Ventilator Cycling Asynchrony Using Machine Learning

Behnood Gholami, PhD,<sup>1</sup> Timothy S. Phan, MS,<sup>1</sup> Wassim M. Haddad, PhD,<sup>2</sup> Andrew Cason, RRT,<sup>3</sup>  
Jerry Mullis, RRT,<sup>3</sup> Levi Price, RRT,<sup>3</sup> James M. Bailey, MD, PhD<sup>3</sup>

<sup>1</sup> Autonomous Healthcare Inc., Hoboken, NJ

<sup>2</sup> School of Aerospace Engineering, Georgia Institute of Technology, Atlanta, GA

<sup>3</sup> Northeast Georgia Medical Center, Gainesville, GA

## Abstract

**Background—** Acute respiratory failure is one of the most common problems encountered in intensive care units (ICU) and mechanical ventilation is the mainstay of supportive therapy for such patients. A mismatch between ventilator delivery and patient demand is referred to as patient-ventilator asynchrony (PVA). An important hurdle in addressing PVA is the lack of a reliable framework for continuously and automatically monitoring the patient and detecting various types of PVA.

**Methods—** The problem of replicating human expertise of waveform analysis for detecting cycling asynchrony (i.e., delayed termination, premature termination, or none) was investigated in a pilot study involving 11 patients in the ICU under invasive mechanical ventilation. A machine learning framework is used to detect cycling asynchrony based on waveform analysis.

Download English Version:

<https://daneshyari.com/en/article/6920535>

Download Persian Version:

<https://daneshyari.com/article/6920535>

[Daneshyari.com](https://daneshyari.com)