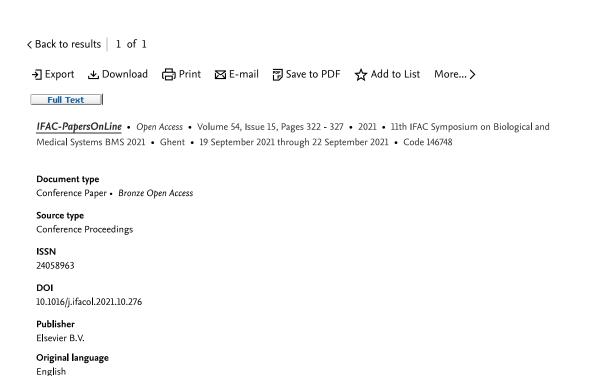


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# Classification patient-ventilator asynchrony with dual-input convolutional neural network

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### **Abstract**

Mechanical ventilated respiratory failure patients may experience asynchronous breathing (AB). Frequent occurrence of AB may impose detrimental effect towards patient 's condition, however, there is lack of autonomous AB detection approach impedes the explication of aetiology of AB causing underestimation of the impact of AB. This research presents a machine learning approach, a dual

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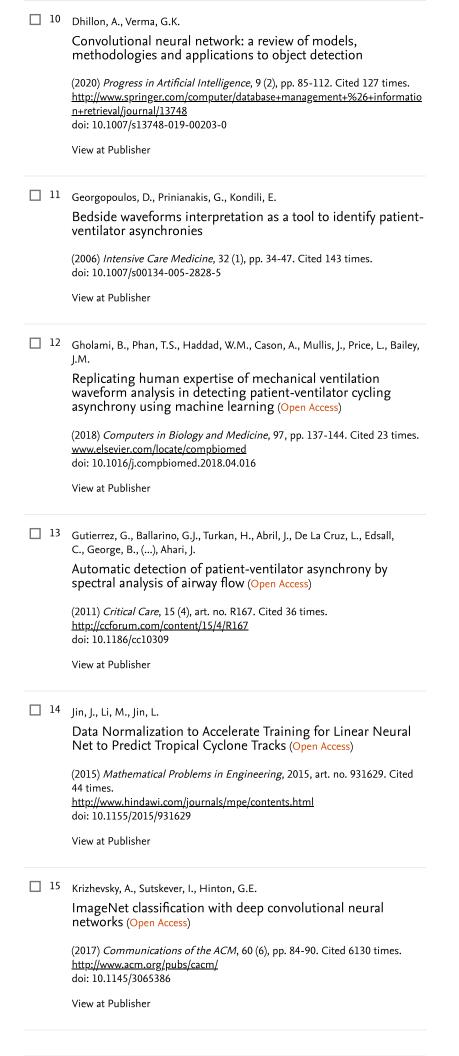
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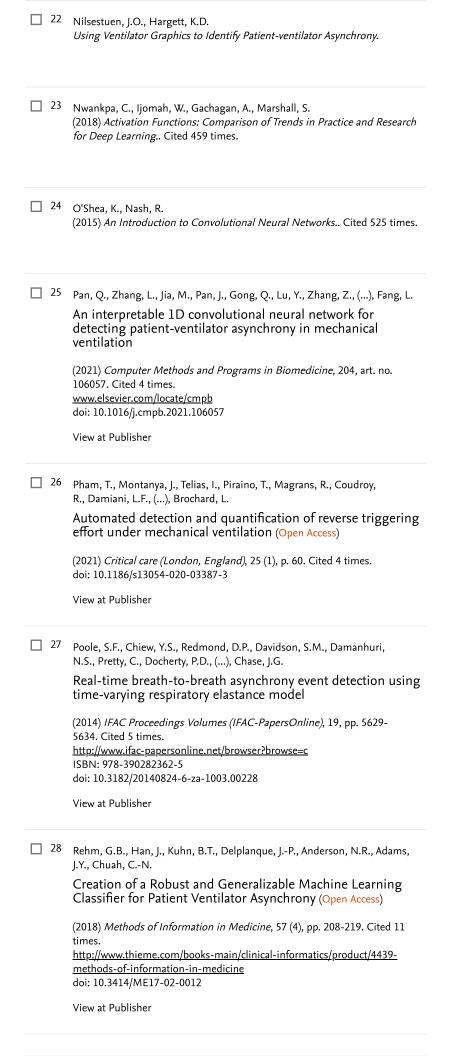
input convolutional neural network (CNN) to identify 5 types of AB and normal breathing by accepting both airway pressure and flow waveform profiles concurrently. The model was trained with 6,000 breathing cycles and validated with 1,800 isolated data collected from clinical trials. Results show that the trained model achieved a median accuracy of 98.6% in the 5-fold cross-validation scheme. When validated with unseen patient 's data the trained model achieved an accuracy median of 96.2%. However, the model was found to misidentify premature cycling with reverse triggering. The results suggest that it may be difficult to clearly distinguish ABs with similar features and should be trained with more data. Nonetheless, this research demonstrated that a dual input CNN model able to accurately categorise AB which can potentially aid clinicians to better understand a patient 's

condition during treatment. © 2021 The Authors.		
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□ 1	Akoumianaki, E., Maggiore, S.M., Valenza, F., Bellani, G., Jubran, A., Loring, S.H., Pelosi, P., (), Brochard, L.  The application of esophageal pressure measurement in patients with respiratory failure  (2014) American Journal of Respiratory and Critical Care Medicine, 189 (5), pp. 520-531. Cited 290 times. http://www.atsjournals.org/doi/pdf/10.1164/rccm.201312-2193Cldoi: 10.1164/rccm.201312-2193Cl	
_ 2	Kassis, E.B., Su, H.K., Graham, A.R., Novack, V., Loring, S.H., Talmor, D.S. Reverse Trigger Phenotypes in Acute Respiratory Distress Syndrome (Open Access)  (2021) American Journal of Respiratory and Critical Care Medicine, 203 (1), pp. 67-77. Cited 8 times. <a href="https://www.atsjournals.org/doi/pdf/10.1164/rccm.201907-1427OC">https://www.atsjournals.org/doi/pdf/10.1164/rccm.201907-1427OC</a> View at Publisher	
□ 3	Blanch, L., Sales, B., Montanya, J., Lucangelo, U., Oscar, GE., Villagra, A., Chacon, E., (), Murias, G.  Validation of the Better Care® system to detect ineffective efforts during expiration in mechanically ventilated patients: A pilot study  (2012) Intensive Care Medicine, 38 (5), pp. 772-780. Cited 79 times.  link.springer.de/link/service/journals/00134/index.htm doi: 10.1007/s00134-012-2493-4	
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□ 29	Sassoon, C.S.H., Foster, G.T. Patient-ventilator asynchrony  (2001) Current Opinion in Critical Care, 7 (1), pp. 28-33. Cited 82 times. doi: 10.1097/00075198-200102000-00005  View at Publisher
30	Sinderby, C., Liu, S., Colombo, D., Camarotta, G., Slutsky, A.S., Navalesi, P., Beck, J.  An automated and standardized neural index to quantify patient-ventilator interaction (Open Access)  (2013) Critical Care, 17 (5), art. no. R239. Cited 69 times. <a href="http://ccforum.com/content/17/5/R239">http://ccforum.com/content/17/5/R239</a> doi: 10.1186/cc13063  View at Publisher
31	Srivastava, N., Hinton, G., Krizhevsky, A., Sutskever, I., Salakhutdinov, R. (2014) <i>Dropout: A Simple Way to Prevent Neural Networks from Overfitting.</i> . Cited 101 times.
32	Szlavecz, A., Chiew, Y.S., Redmond, D., Beatson, A., Glassenbury, D., Corbett, S., Major, V., (), Chase, J.G.  The Clinical Utilisation of Respiratory Elastance Software (CURE Soft): A bedside software for real-time respiratory mechanics monitoring and mechanical ventilation management (Open Access)  (2014) BioMedical Engineering Online, 13 (1), art. no. 140. Cited 56 times. http://www.biomedical-engineering-online.com/content/13/1/140 doi: 10.1186/1475-925X-13-140
33	Zhang, L., Mao, K., Duan, K., Fang, S., Lu, Y., Gong, Q., Lu, F., (), Pan, Q. Detection of patient-ventilator asynchrony from mechanical ventilation waveforms using a two-layer long short-term memory neural network  (2020) Computers in Biology and Medicine, 120, art. no. 103721. Cited 15 times.  www.elsevier.com/locate/compbiomed doi: 10.1016/j.compbiomed.2020.103721

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