
JOONGHEUM PARK

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Required Skills:

Students are expected to know the clinical workflow of weaning from mechanical ventilation (=breathing machine) The mentor also provides articles of machine-learning based approaches for ventilation weaning (there are not many). How to integrate of ML-models into FHIR apps.

Preferred Team Communications:

TBD

Data Sources:

Clinical text will be provided by the mentor.

Other Items:

Project has timezone flexibility. Mentors and students will determine a good time for virtual meeting

There are not many researchers who tried ML approaches for mechanical ventilation, so this might lead to serious publication if successful.

MACHINE-LEARNING BASED PREDICTION FOR SUCCESSFUL EXTUBATION

Extubation refers to the removal of the endotracheal tube (ETT = Breathing machine) in the ICU. It is the final step in liberating a patient from mechanical ventilation. It is tough decision to identify patients who are ready to wean from mechanical ventilation. Physicians typically use physiological tests to predict whether a patient is likely to tolerate weaning, which includes formulae such as the rapid shallow breathing index (RSBI, f/VT) or compliance ($VT / (\text{plateau pressure} - \text{PEEP})$) with limited accuracy.

PROJECT OBJECTIVES

Development of ML-based prediction tool which identifies patients who are ready to wean from mechanical ventilation.

SUCCESSFUL PROJECT

Most of the current prediction methods use variables obtainable from the MIMIC3 dataset, which our mock FHIR server is based upon. The variables include respiratory rate (RR), tidal volume (V_t), oxygenation (PaO_2/FiO_2), peak pressure, plateau pressure, PEEP and oxygen saturation. Some experts suggest that clinician should also consider clinical features such hemoglobin levels, temperature, blood pressure or arterial pH. Output variable would be a true/false variable of whether the patient survived without reintubation for > 24 hours.

Intellectual Property: The mentor will own fifty percent of IP developed as a result of this project, and the students will split the other fifty..