PROGETTO NON PARAMETRIC STATISTICS – VENTILATOR PRESSURE PREDICTION

WHY?

What do doctors do when a patient has trouble breathing? They use a ventilator to pump oxygen into a sedated patient's lungs via a tube in the windpipe. But mechanical ventilation is a clinician-intensive procedure, a limitation that was prominently on display during the early days of the COVID-19 pandemic. At the same time, developing new methods for controlling mechanical ventilators is prohibitively expensive, even before reaching clinical trials. High-quality simulators could reduce this barrier.

DATA

Dataset prodotto da un ventilatore open source (?) collegato a un polmone di prova a soffietto artificiale tramite un circuito respiratorio

Variabili:

* id - globally-unique time step identifier across an entire file
* breath\_id - globally-unique time step for breaths
* R - lung attribute indicating how restricted the airway is (in cmH2O/L/S). Physically, this is the change in pressure per change in flow (air volume per time). Intuitively, one can imagine blowing up a balloon through a straw. We can change R by changing the diameter of the straw, with higher R being harder to blow.
* C - lung attribute indicating how compliant the lung is (in mL/cmH2O). Physically, this is the change in volume per change in pressure. Intuitively, one can imagine the same balloon example. We can change C by changing the thickness of the balloon’s latex, with higher C having thinner latex and easier to blow.
* time\_step - the actual time stamp.
* u\_in - the control input for the inspiratory solenoid valve. Ranges from 0 to 100.
* u\_out - the control input for the exploratory solenoid valve. Either 0 or 1.
* pressure - the airway pressure measured in the respiratory circuit, measured in cmH2O.