**Dataset Description**

The diagram below illustrates the setup, with the two control inputs highlighted in green and the state variable (airway pressure) to predict in blue. The first control input is a continuous variable from 0 to 100 representing the percentage the inspiratory solenoid valve is open to let air into the lung (i.e., 0 is completely closed and no air is let in and 100 is completely open). The second control input is a binary variable representing whether the exploratory valve is open (1) or closed (0) to let air out.

A diagram of a ventilator

Description automatically generated with low confidence

Each time series represents an approximately 3-second breath. The files are organized such that each row is a time step in a breath and gives the two control signals, the resulting airway pressure, and relevant attributes of the lung, described below.

**Files**

* **train.csv** - the training set
* **test.csv** - the test set
* **sample\_submission.csv** - a sample submission file in the correct format

**Columns**

* 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.