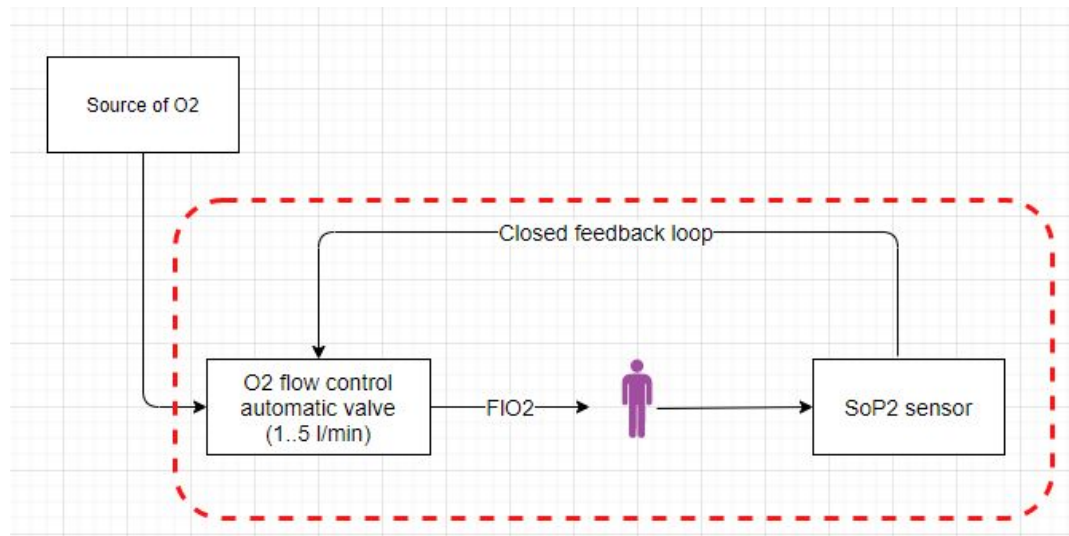


Goal:



ToDo:

- Prototype for Concept Proof Model
 - Flow Control Valve (HW)
 - Restrictor
 - Flow Meter
 - SpO2 Sensor (HW)
 - Integrating Closed loop control of flow (Control SW)
 - Closed loop control of SpO2
- Medical Personnel Enlightenments
 - What's the Standard procedure to define O2 rate (or FIO2) for nasal cannula treatment?
 - Is there a more specific procedure for COVID19 cases?
 - Name the parameters that are taken into account? (Weight, Age, Sex, Condition, etc.)
 - What situations would need to ring a bell to necessarily have human intervention (too much flow? Too low SpO2? Which values?)
 - Fixing a given flow of O2 to a patient, what is an expected period for the resulting levels of SpO2 to reach a steady state? (response time of patient)
- Sourcing
 - Electronic Air flow Regulator
 - SpO2 electronic transducer

Goal:

Intended Use:

- Use in Hospital with a Oxygen Bottle/Oxygen Wall Outlet
- Inlet pressure regulated upstream (outside this equipment)
- Need to keep flow independently of how many devices are connected/disconnected to O2 source (given that source can supply enough O2)
- Could also be used with (potentially shared) O2 concentrators

Specs:

- Automatically regulate the Flow of O2 [1-5]LPM depending on the SpO2 reading from the patient
- Automatically shut of O2 flow if:
 - Power failure
 - Emergency actuation
 - Critical error detected
- System give sound/visual alarm if:
 - SpO2 falls below (?)
 - ...
- Connections
 - Inlet/outlet same as cannula Tubing (8MM pagoda (hose connection)?)
 - Oximeter (TB9?)

Prototype

Oximeter

Hardware options:

- <https://www.digikey.com/product-detail/en/sparkfun-electronics/SEN-15219/1568-SEN-15219-ND/10483252>
-

Software options:

- <https://github.com/GliaX/pulseox>

Valve

- <https://www.clippard.com/products/electronic-valve-proportional>

Sourcing

Electronic Air Flow Regulator

The Goal is to find off the shelf (cheap) air flow regulators that we can integrate in a simple DIY circuit. Specs (TBC):

Flow to be regulated:

Between 1 and 5 Liter per second (follow [link](#) for conversion to other units)

Pressure

<2 bar (need confirmation)

Example:

<https://proportionair.com/mass-flow-controllers/fqpv2-mass-flow-controller/>

<https://www.clippard.com/products/electronic-valve-proportional>

https://www.festo.com/cat/en-gb_gb/data/doc_engb/PDF/EN/VEMD-G_EN.PDF

<https://kellypneumatics.com/product/miniature-proportional-valve/>

<https://www.ebay.com/itm/Carbon-Dioxide-Oxygen-Sensor-Module-9600bps-UART-5V-TTL-3-3V-CMOS-Sensor/153829249212?autorefresh=true> (flow meter)

<https://aquaorinoco.com/equipamento-e-co2/injeccao-de-co2/valvulas-e-derivadores/valvula-de-precisao-co2-rapido-46mm-macho-g-18>

<https://www.olx.pt/anuncio/kit-vmvula-ajuste-fino-para-co2-IDAOzpl.html#573be705ca>

Oximeter

Example:

<https://www.digikey.com/product-detail/en/sparkfun-electronics/SEN-15219/1568-SEN-15219-ND/10483252>

<https://www.ebay.com/itm/Disposable-Adult-Neonate-SpO2-sensor-Probe-for-Nellcor-non-oximax-DB9-7pins-3FT/253779388948>