Sharing, Collaboration and Free Designs/Software Versus Pandemic

By Roy Schestowitz

Desperate times call for desperate measures, and while making your own medical equipment isn't normally advisable, Johnny Lee’s project explores how to turn a CPAP machine into a ventilaor.

The idea is that since these machines are basically just blowers controlled by a brushless DC motor, an Arduino Nano equipped with an electronic speed controller could allow it to act as one.

The extreme and necessary measures taken to restrict the spread of COVID-19 (Coronavirus) have impacted the day-to-day lives of everyone around the globe. From schools and jobs to sports and entertainment such as restaurants, bars and movie theaters - all been closed or impacted. The federal government has not been spared as the Office of Personnel Management (OPM) has directed agencies to utilize telework to the maximum extent possible.
As more and more people are hospitalized due to the COVID-19 coronavirus, there may not be enough ventilators to sustain critical patients who need breathing assistance. That has prompted various individuals and groups, for better or worse, to look at MacGyvering their own airway support equipment.

The Society of Critical Care Medicine last week published a paper noting that the American Hospital Association has estimated that 4.8 million patients in the US alone will be hospitalized due to COVID-19, with 1.9 million admitted to Intensive Care Units (ICU) and 960,000 requiring breathing support on a ventilator.

The problem with that scenario is that, according to a 2009 survey of hospitals by the association, there were only 62,000 full-featured mechanical ventilators available at the time. That was also roughly the number cited in a 2013 study.

• How open source might prove helpful during the coronavirus pandemic [6]

Over the last few weeks, there's been plenty of bad news. The way things are looking with the coronavirus pandemic, we're in for even more bad news over the coming weeks and, likely, months. In a time when people's health is at risk, money doesn't matter much. Even so, economists are starting to utter the "R" word, as consumers and businesses delay spending amidst novel coronavirus uncertainty, which will, in turn, create even more hardship.

• People Are Trying to Make DIY Ventilators to Meet Coronavirus Demand[7]

As countries affected by the coronavirus pandemic expect to run out of ventilators and other equipment, makers are desperately trying to fill the gap with proposals for open-source, do-it-yourself devices.

Most cases of COVID-19—the disease caused by the novel coronavirus—do not require hospitalization. But for people hospitalized with severe infections, coronavirus damages their lungs and makes it hard to breathe in and circulate the amount of oxygen that their bodies need. Ventilators, machines that provide the lungs with oxygen, are proving to be key to treating these people, who seem to comprise around 10 percent of cases.

• ViacomCBS and the Ad Council are tackling coronavirus with open-source PSAs and Pauly D[8]

One of the US’s biggest media companies is using its vast array of talent to help get the word out about staying safe during the coronavirus pandemic.

ViacomCBS has teamed up with the Ad Council for the #AloneTogether campaign on
social, digital, streaming and live television to help raise awareness, especially among younger viewers.

ViacomCBS’ Entertainment & Youth Brands, led by MTV, Comedy Central, Paramount Network, CMT and VH1, today launched #AloneTogether, a national social and talent led campaign that educates audiences on the importance of social distancing and drives unity through entertainment.

DIY Ventilators Might Ease Supply Shortage Amid Coronavirus Pandemic[9]

Most CoViD-19 cases – the disease that comes from contracting the coronavirus infection – don’t require hospitalization. But those who are hospitalized with severe cases of coronavirus infection suffer damaged lungs that make it hard to breathe in and circulate oxygen within the body. Machines that provide human lungs with oxygen called ventilators have proven to be crucial in treating people suffering from severe cases of CoViD-19, who represent 10 percent of all cases, according to VICE.

Governments around the world are already readying themselves for a shortage of ventilators, and the effects this will have on their health care systems.

U.S. President Donald Trump called U.S. governors on Monday to tell states not to completely rely on the federal government for equipment. "Respirators, ventilators, all of the equipment? try getting it yourselves," said the president, according to the New York Times. "We will be backing you, but try getting it yourselves. Point of sales, much better, much more direct if you can get it for yourself."

An open source respirator could help fight coronavirus[10]

Hackaday has issued a call to arms in the ?ultimate medical hackathon? to help design an open source version of a respirator that could be widely produced and deployed with the aim of aiding those suffering at the hands of coronavirus.

As we?ve already seen in Italy, hospitals face issues around the numbers (and maintenance) of medical equipment designed to provide respiratory aid. 3D-printed valves have already come to the rescue of a hospital in Brescia which needed replacement valves for so-called ?reanimation? machines (because the normal supplier couldn?t provide them due to disruption caused by coronavirus).

There?s A Shortage Of Ventilators For Coronavirus Patients, So This International Group Invented An Open Source Alternative That?s Being Tested Next Week [11]
Topline: A group of 300-plus engineers, designers, tech founders and others galvanized on Facebook with a goal of building a ventilator using readily available materials, 3D printing and open-source hardware resources. In just seven days, they built a prototype that will be validated as a solution to the global ventilator shortage by Irish authorities as early as next week.

- **Super-rich people are panicking over the coronavirus ventilator shortage**

  At least 950,000 coronavirus patients in the US could need ventilators, according to the Society of Critical Care Medicine, but hospitals here have just 160,000. Between five to 10 companies in the world supply most of the planet's breathing machines and they weren't ready for this.

- **Coronavirus medical supplies are dwindling. New open-source designs for 'makers' may be the answer.**

  When the number of cases in San Francisco spiked last week, entrepreneur and engineer Gui Cavalcanti decided he had to do something. At the time, there were widespread reports of a shortage of ventilators - machines that deliver air to the lungs of patients who can't breathe. So, he started a Facebook group to bring together engineers and create an open-source design that any manufacturer could use to start producing these devices.

  But after a conversation with a senior health care practitioner who had just been trained on the response to COVID-19, the disease caused by the novel coronavirus, he discovered that a much more pressing concern was the rapidly dwindling stocks of basic medical supplies, especially those required to protect health workers from infection like masks, gloves and face shields.

- **Copper3D creates open source mask to fight coronavirus**

  Contxtto? We've heard of biotechs' approaches to coronavirus. However, here's another take: 3D printing. In light of high demand for N95 masks, entrepreneurs from Chilean Copper3D created and launched a downloadable design of an antiviral mask for 3D printing yesterday.

  Known as ?NanoHack,? the startup boasts that it's reusable, recyclable, and antiviral. And its STL files for creating it on a 3D printer are free for downloading here.

  Although it's worth pointing out that to make it, the Copper3D says you'll require PLACTIVE, a unique plastic that makes the mask antiviral and antibacterial in the first place.
Not to mention some assembly is required.

- **Shortage Of Ventilators Leads To The Creation Of An Open-Source Alternative** [15]

  As hospitals in certain parts of the world are being overwhelmed due to the influx of patients with the coronavirus, they are starting to run out of medical supplies and equipment, such as ventilators, which are crucial in helping patients who are affected more severely to breathe.

- **Biohackers team up online to help develop coronavirus solutions** [16]

  Scientific questions and crippling logistical challenges surrounding the global response to the fast-moving coronavirus pandemic have led many to help look for solutions, stoking a burgeoning DIY biology movement.

- **ClosedLoop.ai Announces Release of Free Open Source AI-based Tool to Identify Individuals Vulnerable to Severe Complications of COVID-19** [17]

  ClosedLoop.ai, Healthcare’s Data Science Platform, announced the release of the COVID-19 Vulnerability Index (CV19 Index) — a free, open-source tool designed to help healthcare organizations identify and protect individuals that are most vulnerable to COVID-19. By releasing the CV19 Index as free and open-source, ClosedLoop aims to distribute this tool as widely and quickly as possible while leveraging the collective knowledge and experience of the open source community to quickly improve the Index.

- **Penn Medicine released a digital tool to help hospitals with COVID-19 capacity planning** [18]

  The Predictive Healthcare team at Penn Medicine has developed and released an open-source tool to help hospitals plan for patient increases and intake during the COVID-19 spread in the Philly area.

  The tool, called CHIME, or COVID-19 Hospital Impact Model for Epidemics, uses SIR modeling, which computes the theoretical number of people infected with a contagious illness in a closed population over time to predict outcomes.

  It’s currently set up to help Penn’s operational leaders with up-to-date projections of what additional resources will be required, and estimate of how many patients will need hospitalization, ICU beds and mechanical ventilation.
**Open ventilator project ? 3d printed emergency ventilator for covid-19** [19]

The aim to have something that can be made simply in many places around the world to be used only when not enough proper medical ventilators are available.

There are actually a lot of similar ideas on the web, some of them of dubious quality, but this one seems to be the real deal being designed by engineers and medical folk, and built around an existing hand-operated medical ventilator.

**The Futuristic Solutions The Internet Is Crowdsourcing to Cure Coronavirus** [20]

A Facebook group called Open Source COVID19 Medical Supplies, which consists of over 13,000 members, is trying to find solutions to the pandemic by creating open-source ventilators, as well as medicine and supply guides. The group was created on March 10 by MegaBots founder Gui Cavalcanti released the first version of its open-source medical supply guide on March 18. The group's significant growth has spread worldwide, with a strong focus on Ireland and Portugal. Some leaders in the group are beginning to focus more on the Middle East.

**Open source project breathes life into Covid-19 health emergency** [21]

It's difficult, and feels slightly irrelevant, to write a story this week that doesn't contain the words covid-19. More difficult still to tackle a virus-related story that doesn't add yet more doom to an already gloom-laden media frenzy, but there is one.

The open source ventilator is not only a thing, but it’s being tackled at lightning speed by at least one group aiming to have a low-cost, easy-to-assemble ventilator design finished, validated and up and in production at lightning speed to meet the pressing ventilator problem worldwide. If - or more likely, when - the open source project comes up with the goods it will be a timely validation of the open source approach (that much of the telecoms industry is now adopting to propel its next generation of services) and a proof-point for the value of collaborative working across the internet.

**Irish health officials to review 3D-printed ventilator** [22]

Health officials in Ireland are set to review a prototype 3D-printed ventilator next week created by an open-source hardware project started to address shortages driven by the spread of coronavirus.
We have six prototypes that are ready to be manufactured and tested with validation by the Health Service Executive likely from next week,” Colin Keogh, a 3D printing expert at University College Dublin and an early member of the Open Source COVID19 Medical Supplies project, told The Irish Times.

While Ireland is not currently facing a shortage of the ventilators, which are often needed to treat COVID-19 cases, getting approval from the country's regulatory body could lead to deployment elsewhere down the road.

- *Irish project for easy-to-assemble Covid-19 ventilators bears fruit* [23]

  Open Source 3D-printer ventilator project has prototypes ready to be validated by HSE

- *Irish project tackles global ventilator shortage* [24]

  An Irish team is leading an international community of engineers, designers and medical professionals who are trying to develop a low-cost, easy-to-assemble ventilator to use in the battle against coronavirus.

- *LOOK: UP community, others pitch in to create open-source design for COVID-19 sanitation tents* [25]

  It started with an open call in a Facebook group last Monday.

  ?I called for Chemistry scientists in the Overheard FB group and announced: ?I said it's time to give back?? narrated August Patacsil, project head and lead industrial designer of SaniTents PH.

  Patacsil at that time was concerned that COVID-19 was going to affect the elderly when many Filipinos ?have no clue as to what the lockdown is for.? He wanted to create a prototype for a decontamination tent.