



## **PROBLEM STATEMENTS**

### **1. Alternative for ventilators:**

COVID-19, the disease caused by the corona virus is known to directly affect a person's lungs. Patients severely affected by the disease suffer from acute respiratory disorders and are in need of ventilator support for stabilising their breathing. However, the number of hospitalized patients in need of breathing assistance has exploded since the pandemic began. India has an estimated 40,000 working ventilators, a number experts said will be inadequate in case there is a surge in Covid-19 infections that, in approximately 5% of the cases, sends patients to intensive care units (ICU) with acute breathing problems. On average, a ventilator costs ₹8-10 lakh. Around 8,510 ventilators valued at ₹444.74 crore were bought by public and private hospitals in 2019, with imported equipment accounting for 64% by numbers and 75% by value of units, according to industry estimates.

Training medical staff to use ventilators and ensuring there are enough skilled operators to run them 24x7 is a bigger challenge than procuring machines.

Alternative ventilation methods like mechanical ventilators are very expensive and need to be approved for usage through medical tests. Some of these may be invasive which cannot be used by individuals under self-isolation. Alternate solutions that could be cost-effective and need no healthcare professional besides being effective in treating patients at home with chronic breathing difficulties is the need of the hour.

### **2. Scanning to identify the spread of infections on goods/commodities:**

Coronaviruses are well known to be particularly resilient in terms of where they can survive. Goods and commodities come in direct contact of numerous hands of stakeholders in the supply chain i.e. production, packaging, shipment, and delivery. An individual infected with coronavirus working in the supply chain has an incredibly high probability of passing it on to others given the capacity of the virus to be alive on the surface of an object for a period ranging from a few hours to a few days. This makes goods and commodities a transient yet potential carrier for the COVID-19 virus, posing a threat of infecting people involved. A system is needed, to scan the goods and commodities for potential infection at every stage of the supply chain and to minimize the spread.

### **3. Solutions to lessen the mental impact of social isolation**

Quarantine is known to be linked with post-traumatic stress disorder (PTSD) symptoms, confusion and anger with some research suggesting these effects are long-lasting. Given that the corona virus crisis is likely to be with us for some time, the mental health implications can't be dismissed. Whether in quarantine or not, anxieties are only worsened by confusion and social judgment. Being quarantined gives one a sense of being at the mercy of other people and other uncontrollable forces such as an epidemic. This leads to a feeling of helplessness and uncertainty about the future that can be very unsettling.

### **4. Crowd management and resource management system.**

As the major cities of India go under lockdown, businesses are shutting down, and employees are being asked to practice social distancing and work from home, whenever possible. In the middle of India's effort to contain the spread of the coronavirus pandemic, there's a mad rush in the country to stock up of

groceries and vegetables. The fear of a lockdown is driving people to throng supermarkets and stores to buy essential items in bulk. This is a hindrance to every measure put forth by the government to prevent the outbreak. A system to showcase stock of supplies and indicate crowd at local stores in prior would help reduce unnecessary crowding at the stores and be helpful in managing resources efficiently and effectively.

### **5. Alternative learning environment for students :**

Classrooms will be empty from coast to coast in the coming weeks as the novel corona virus spreads and officials say indefinite closures are a real possibility.

If schools were to shut down long term, one of the greatest challenges for teachers, officials and school administrators would come down to ensuring all students have equal education opportunities and that their food and housing security is not put in jeopardy. The only possible solution to minimize the impact on students' education would be the implementation of alternative and effective learning facilities for the students.

### **6. An alert mechanism to stop touching our face**

Since face-touching can be a relational tool, humans start touching their own faces from a young age and it becomes a habit, making it even harder to stop, even if a person's health is at stake. In order to avoid this, an alert mechanism using wearable tech can be designed in such a way that it alerts whenever a person brings his hands close to his/her face, and also remind people at regular intervals to wash their hands. This could inculcate hygienic practices and control the spread of COVID-19.

### **7. Symptom detection and early warning and precaution system:**

The individuals who spread COVID-19 are not the ones with severe symptoms, rather it's the asymptomatic - people with no symptoms but could spread the virus when they come in contact with others. It is estimated that the symptoms may occur anywhere between 2 to 14 days after getting infected, till then the individual may not even be aware that they already carry COVID-19.

Asymptomatic individuals are now what is called 'super-spreaders' of COVID-19, i.e. the ones who are more likely to infect others compared to those with severe symptoms. In order to control the spread, it is crucial to identify the asymptomatic as early as possible. A system that could detect and notify potential asymptomatic individuals at an early stage can help contain the spread of COVID-19. Also, Faster and hassle-free test kits at people's homes could test and provide results that would not only help identify patients & contain the outbreak faster but also reduce the dependency on hospitals to conduct individual tests.

### **8. Open category**

Participants can submit their ideas regarding any other problem they find to be critical in regard to the challenges related to COVID-19.

They are requested to make sure to explicitly mention their problem statement before they proceed with their solution in all the rounds.