



Qorona

We've all heard about it; we've all been affected by it; COVID-19 has been on a rampage since its outbreak in late 2019.

Starting in Wuhan, china and wasting no time getting to the rest of the world, it's been one of the deadliest viruses we've ever faced mostly due to its longevity.

To say the least, it has affected us in one way or the other disrupting our routine lives to give us a different perspective of life.

It's been more than a year since its first outbreak, and we have learnt of ways to keep the virus to as low of an infected rate as possible.

Masks, social distancing, and limiting the amount of people in smaller areas have all helped us stay safe as well as keep the community safe.

A brief backstory

Despite the hundreds of positive cases Qatar registers daily, it's performance in keeping the virus at bay has been great when compared to the rest of the world.

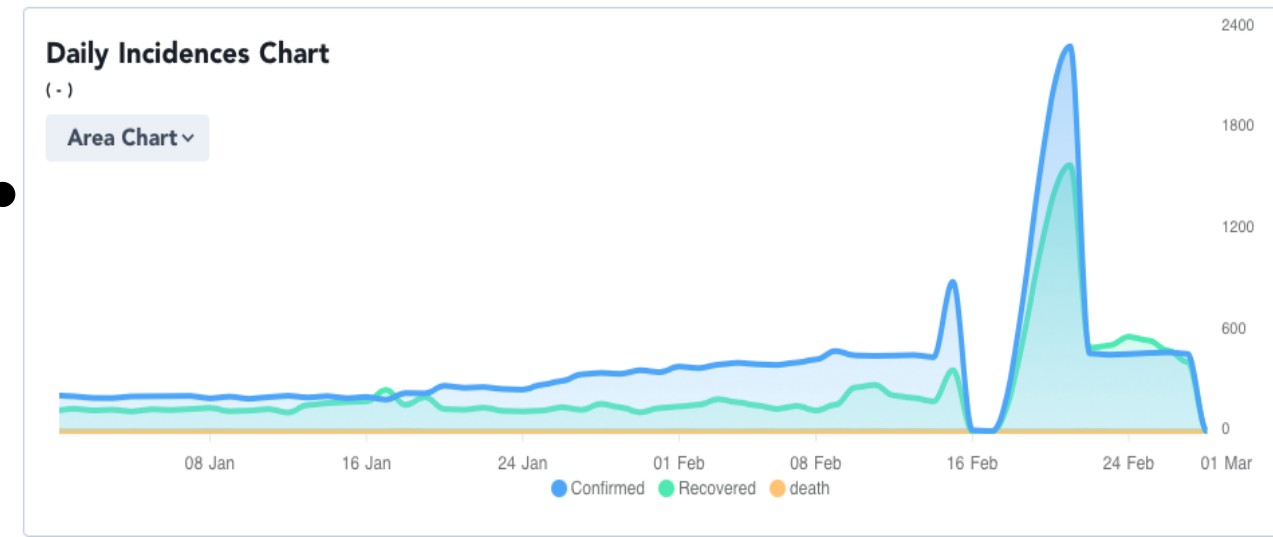
However, there's always room for improvement. The Qorona team won't rest until we live to see the day where COVID-19 is no more.

And so, with the announcement of the competition, we knew exactly where to start.

Graph demonstrating
the rise of COVID-19
in recent times



The conception of the Qorona project



- 1.LOGIN
- 2.QUESTIONNAIRE
- 3.MAP
- 4.WHERE THE AI COMES IN
- 5.CAPSULE CLINICS
- 6.DRONE DELIVERY
- 7.REQUEST A TEST
- 8.LANDMARK CONTROL
- 9.QR CODES??
- 10.RECORDS
- 11.GET VACCINATED
- 12.DATABASE HOTLINE
- 13.FUTURE PLANS

Intro / Our goal

Through the hardship that is the coronavirus, we've all wondered what's next, when will it end?

Our goal at Qorona is to help us, the citizens of Qatar, lead a safe and healthy way back to our normal life by getting rid of the virus and preventing further spreading of the virus.

The Qorona project has grown from a simple idea to becoming a part of our lives. Its impact on our lives cannot be described with words. Despite all the challenges we faced we persevered and were able to produce our first prototype of the website in the matter of a few months.

Let us show you our journey outlining the creation of **Qorona**.

The Login Page

QID – The citizens' Qatar ID contains a lot of information about them like their date of birth. It is also used as a way to identify users and using it is the best way to be able to update the QR code color.

Phone number – The phone number can be used to contact the user in case of any information that the user might need to know. It can also be used for two-factor authentication.

Password – A password protects all the data the user enters into Qorona in case of any attempted brute force attacks. Strong password policies are forced on any registering users.

Questionnaire

The questionnaire is one of our most well designed features and an important aspect of the Qorona website. By making use of artificial intelligence, our program and algorithms, are able to calculate the chances of the user containing the coronavirus.

Going through many articles about the pandemic (sources in the references section) , while also wanting to keep the questions short and simple, we've concluded that 5 sections of questions would be sufficient to determine how high or low of a chance the user has of having the virus.

From simple questions like the user's age, weight, height and area of residence; to more eye-opening questions like whether they've been to highly concentrated areas in the past two weeks, to COVID symptoms you might be experiencing and sicknesses that run in the user's family; We have tried to keep the questions as simple as possible while also getting the information we need to determine the chances of the user having the virus.

Upon submission of the results, the site will calculate the chances of you having the virus. If the results show 60% or higher, the user will get an option to request a test.

With a simple and self-explanatory user interface, combined with the sophisticated and modern algorithms used, the questionnaire is able to aid the citizens of Qatar with detecting the virus, and being able to prevent further panic.

Where the AI comes in

The two main features that use artificial intelligence in the Qorona website are:

1. Population density predictions:

One of Qorona's most innovative ideas is "**map statistics**". By recording and analyzing data from previous days and weeks, the program is able to accurately provide predictions of the population density for a certain area, at a certain time of the week.

This section can be divided into three portions:

First it collects data from previous days in addition to the current day. Data is collected from popular landmarks, via the use of QR Codes. When a citizen wants to visit an area, they are required to scan their QR Code, which would then modify the statistics ever so slightly.

It would then store the data in a database, which is later used in the second stage. In the second stage, data is carefully analysed and with the usage of neural networks, the raw data is processed to provide predictions for the future.

The last and final stage is to collect the predictions and to display the required information to the user's interface.

Users of Qorona are therefore able to view the map and make informed decisions on whether a certain location is suitable to visit.

Note: At the moment, the data is randomly generated everytime the page is loaded. In the future, we hope to , with the support of the Qatar government be able to use real time, accurate data, for our programs.

Where the AI comes in

2. Questionnaire:

Following the map, the next key area of artificial intelligence used in Qorona, is the questionnaire. As mentioned in slide 7, the questionnaire follows a complex algorithm , with each input tweaking the current overall percentage. It starts off by asking general questions then moving onto more specific questions , for example COVID-19 symptoms. Each input has a certain value hard coded into the program. As the questionnaire is used more, it is able to tweak its weightage on certain values to be able to provide a more correct detection of the virus.

QR codes and scanners

Each user will have a unique QR code assigned to them.

The QR code will be colour coded in green, yellow, grey or red dependant on whether the user is “healthy”, “quarantined”, “suspected” , or “tested positive” respectively.

The colour of the QR code will be carefully decided by considering the places you have ve been to in the last 2 weeks and if any confirmed cases were found in those areas. How would we know where you’ve been? Check the next slide on landmark control.

This system will be vital for us to determine the approximate population density of areas of Qatar; and over time, based on an increase of Qorona users and data fed to Qorona by the government, these population density approximations will be more and more accurate through the use of artificial intelligence.

This data would be very useful for our stats map where the capacity of a certain landmark would be displayed along with the recommended maximum capacity for the area.

Landmark control

The QR code will not only be used to display your status but also be used to scan upon entry to a landmark. The goal is to have the QR code scanners at all possible landmarks; scanning your QR code upon entry will show the system that one more person has entered the building and scanning it again whilst exiting will indicate that a person has left the building.

As our QR codes gather numbers to find the population density of an area; our stats map gets updated in real time showing the population data of any area you click on. This data includes the coordinates of that place, the current population per square meter, how much of a risk that area is based on how packed that certain area is.

This feature aims to help the user make the decision whether going out to a certain location would be too much of a risk or not. It would also be useful in the fields crowd control and traffic.

Map information

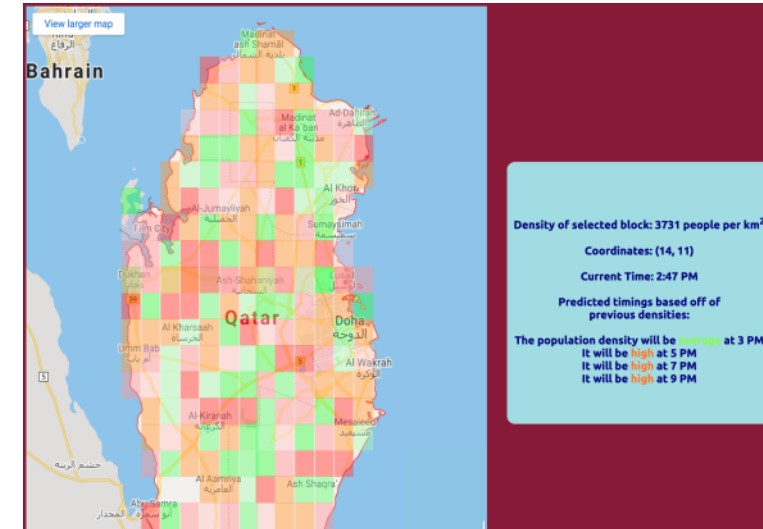
Our stats map page shows a map of Qatar where every area is colour coded in different shades of red, orange, yellow or green; showing whether the area has a high, medium or low concentration of people.

Clicking on a certain area (ex: Mushaireb)) will show a popup showing the statistics in that certain area like the population density and predicted population for certain times.

We've added a total of 9 color codes which indicate a range from very risky to very safe; four colors ranging from Dark red to orange (very risky to risky), 1 shades of orange showing a moderate area and four more colors ranging from light green to dark green (safe to very safe).

The color code of the area will be determined by the number of people in that area.

Similarly, depending on the user they could opt to look for the future predictions (through the use of artificial intelligence) of the population density, for a certain area. Each predicted timing would be colour coded to be able to visually represent our data.



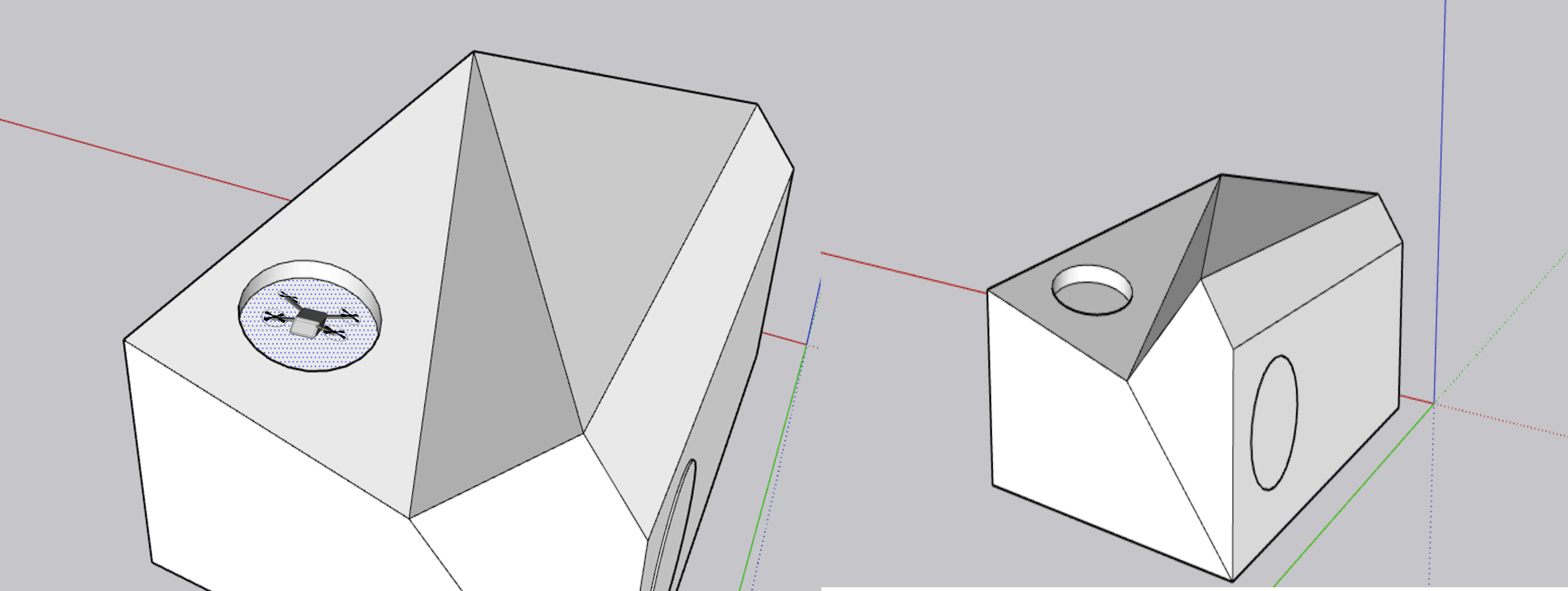
Capsule Clinics

Our most ambitious idea yet involves the manufacturing of around 25-50 clinics around the country. These clinics will act as storage centers.

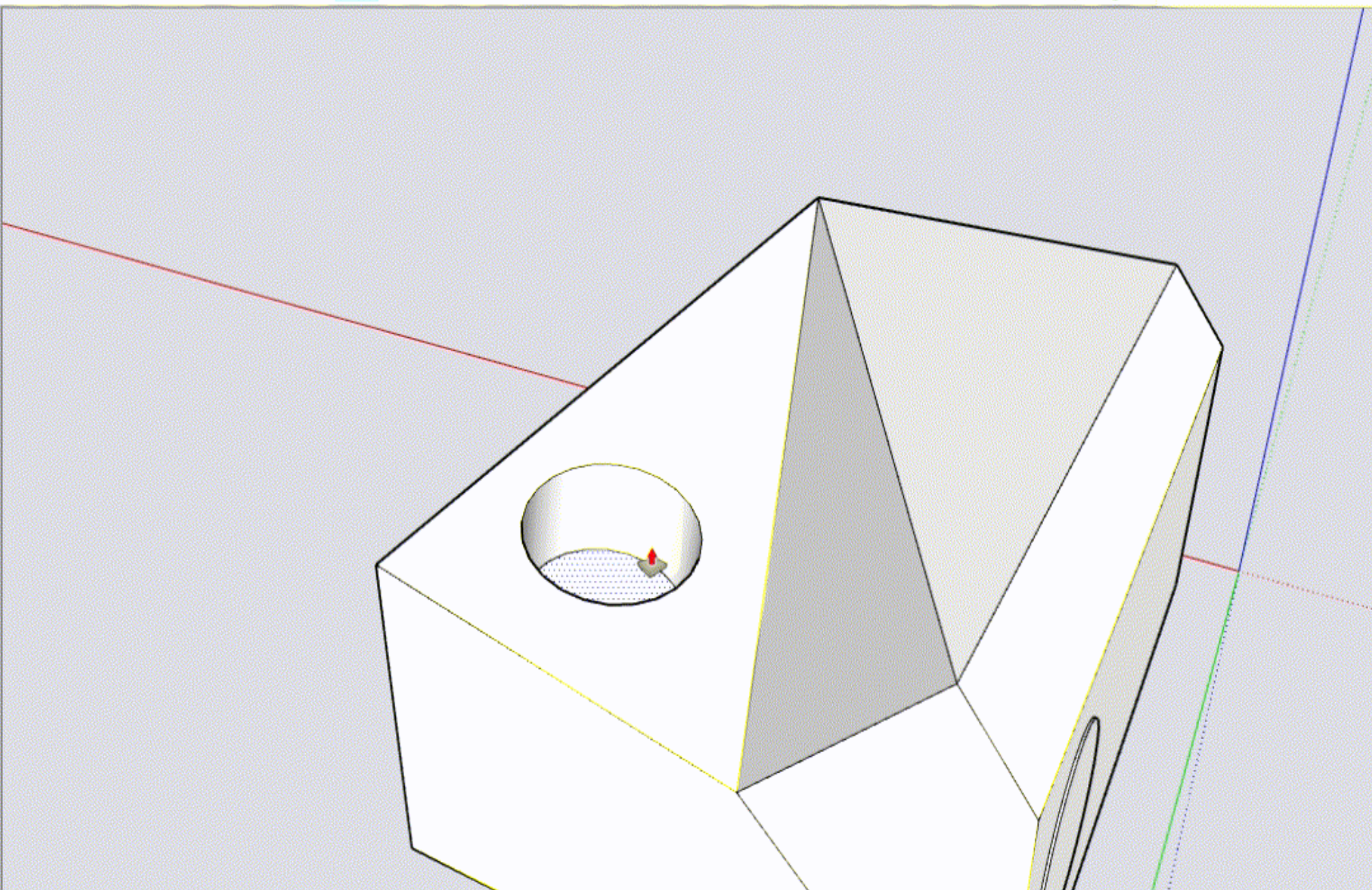
What will the clinics store? Three main things:

- Medical capsules - these contain COVID home testing kits which are becoming more popular and are already rolling out in Qatar, in addition to first aid kits.
- Delivery drones - these drones will be stored and used to deliver the medical capsules mentioned above. When users of Qorona request a test, Qorona will automatically send a notification to the nearest clinic. Trained employees could fly the drone to the required location (one day, they may drive themselves!).
- PCR machines located at each clinic to allow for rapid and efficient testing. This reduces the load on hospitals and reduces COVID-19 spread as people do not have to go to the hospital themselves,

Let's look at some designs of the clinics that we have made using Computer Aided Design (CAD) software!



Drones are released from a circular, moving compartment (check the clip on the next slide). The drone will leave the compartment upon leaving and collected on a component on the side of the clinic.



▼ Entity Info

Tag: Untagged

Area: 77.32 ft²

Toggles:



► **Materials**

► Components

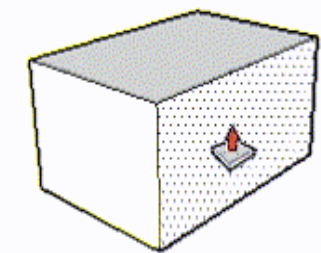
► **Styles**

► **Tags**

► **Shadows**

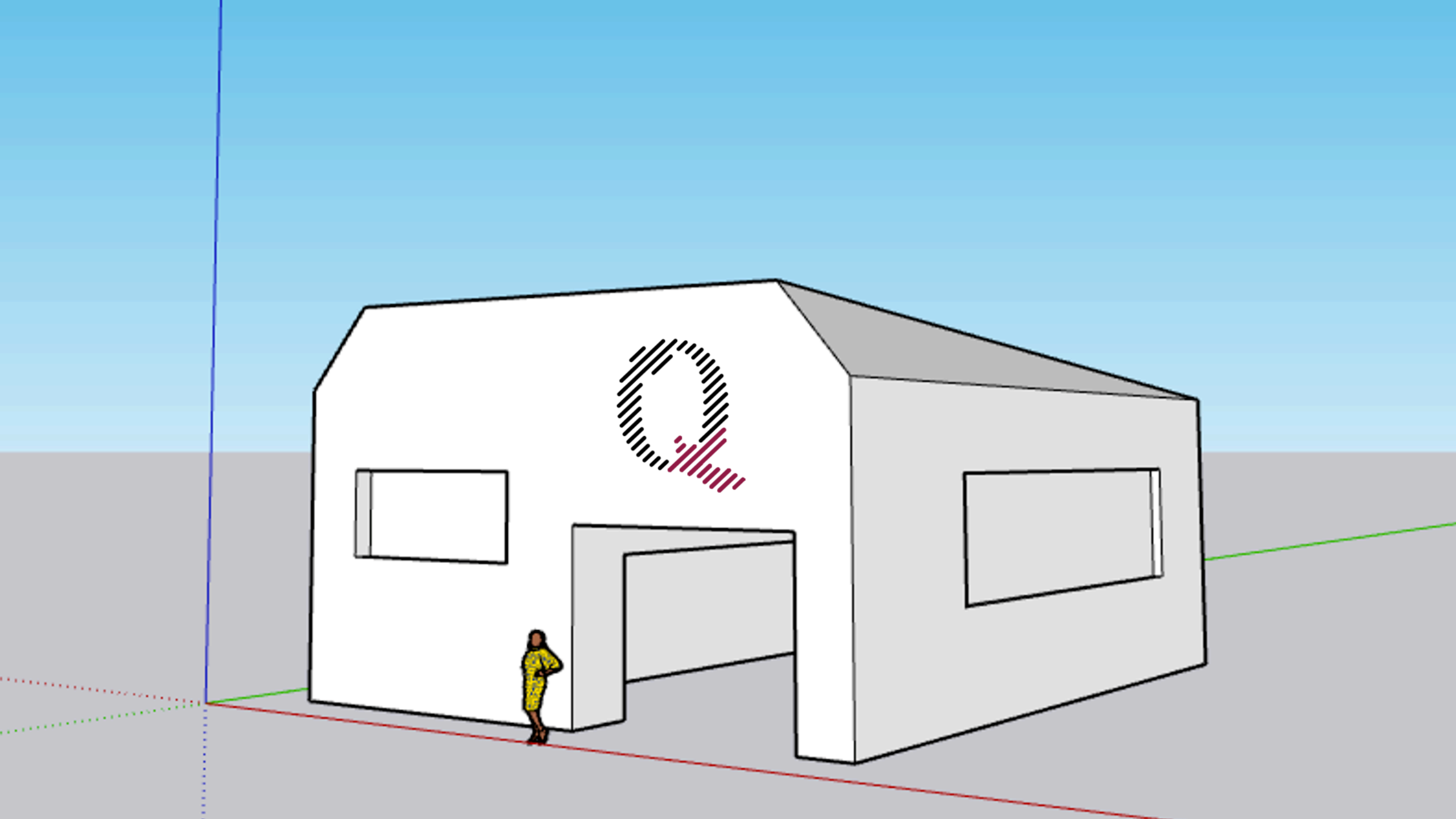
► Scenes

▼ Instructor



Push/Pull Tool

Push and pull Face entities to add or subtract volume from your



Request a test

On the profile on Qorona, the request a test option enables the user to request a PCR test. A home testing kit will be sent to your home address via drone

The requested test will cost nothing for users with a “quarantined” or “suspected” QR code status; which won’t be the case for users with either a “healthy” or “tested positive” status

Covid Test

Current Status: Healthy

Ship Test Kit to:

☐ Ship to Home Address

Calculated Price:

Proceed

Cancel

Drone Delivery Services

Over the years, it's safe to say drone technology has gotten increasingly popular. In 2021, it is still growing and improving. The Qorona project aims to take advantage of the rising industry and implement drones to deliver medical supplies to clients who might find it difficult or risky to head out.

The drones, stored in the capsule clinics, will be utilised to deliver the home testing kits to the clients.

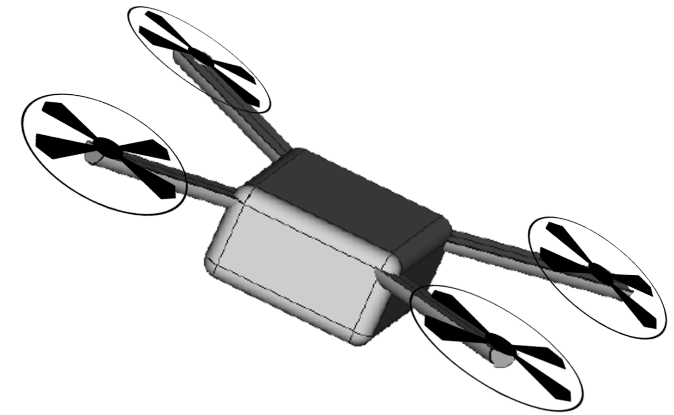
The testing kits include usual coronavirus testing tools:

- 2 nasal cotton swabs

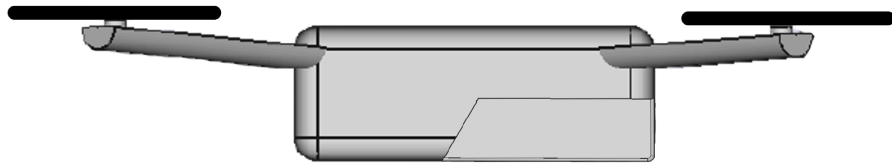
- A digital thermometer

- A urine sample tube

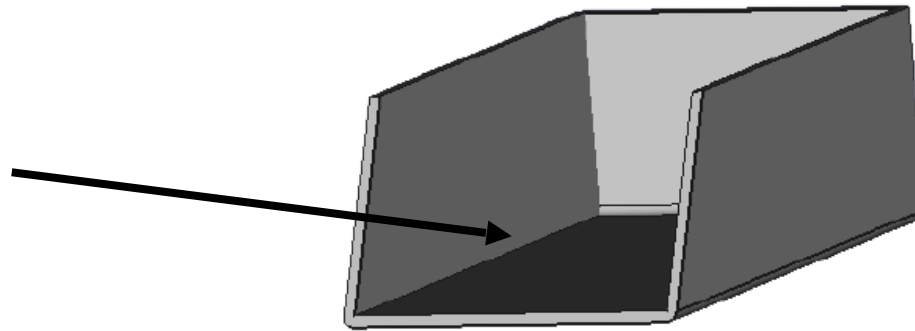
- A secure bag to store the samples in when sending back the drone



How the drone carries the supplies



Medical supplies
stored here



Detachable storage
compartment

Get vaccinated

With the rise of new coronavirus vaccines (like “Pfizer” and “Moderna”) - it is more important now than ever that we focus on delivering vaccines to the nation in an efficient and reliable manner.

On the Qorona website, logged-in users have the option to “**get vaccinated**”. This option allows them to view the nearest vaccination centers and book a date and time to get the vaccine. This will automatically send a notification to the nearest center informing them of the booking.

We believe this is an efficient, reliable way for vaccinations to be booked with ease. The ease of use is undoubtedly going to encourage a greater amount of people to use the vaccine.

FAQ page

Spreading awareness about the coronavirus and good prevention methods of getting the virus is Qatar's, as well as our top priority. Therefore, we have designed a website made specifically for frequently asked questions about the website and COVID-19 in general.

Let's see what it looks like!

Future Plans

- For starters, we could benefit by implementing the website as a mobile application to make the idea more user friendly
- Speaking of user-friendliness, a customizable UI for further personalization of Qorona can make the site look like the users own
- Most of the information that the Qorona site gets is from the Qatar ID. Incase of a user not having the Qatar ID yet, or if they are simply visiting the country; their passport information can be used
- To further inform our users about the virus there would be a daily coronavirus prevention message will be sent to the user. This feature will be optional since some users may be annoyed with daily informatives.
- People you know (Family and friends) would be connected through the website. People connected to your account would be able to see your QR code status.
- To help improve the reliability of the Qorona website we could hope to have a collaboration with the Qatar government and Qatari hospitals to provide even more accurate data to help users.
- We hope to create real neural networks which can process real data provided to us by the MOPH, and result in many amazing discoveries that can help us predict and prevent coronavirus from ever inhabiting our bodies using the questionnaire.

Final Statement

Despite the outcome of the competition we will continue to work on and refine this project; and hopefully in the future, we wish to see a nation-wide use of our website

Qorona - coming soon to Qatar.