PROPOSED MODUS OPERANDI :

(FYI: The personal pronoun 'he' is used for simplification only.)

1. A person entering the shop is met by a sight of a device in the size of a ATM.
2. He can see the QR displayed on the screen/on a printed paper.

(Screen is a add-on for adverts, or awareness messages.)

3. Once he scans the QR code with his phone, he is directed to the app.
4. If he is visiting for the first time, the app gives a box for entering his phone number and in the next page, he is asked about how many members, names of each member and details for each.

For subsequent visits, details are loaded automatically and he has to just select them. The date and time of the entry is fetched and recorded.

5. A message is displayed on the phone to sanitise, automatic sanitiser detects motion and sanitise safely.
6. Then the message for temperature sensing is done. He has to show the wrist and temp. is loaded to the database.
7. If it's of permissible limit, he is allowed to enter and his data :
    - **Name**
    - **Phone number.**
    - **Temperature**
    - **Date and time of entry, is stored.**
8. Time of exit is also stored at the final billing time.

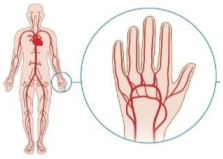
KEY HARDWARE TECHNOLOGY PROPOSALS:

1. Fist temperature scanner.

Temperature scanner is one of the most important device in the UNCOVTRACKER, due to the fact that it is the primary setup by which person is considered whether fit to be allowed inside the shop/market.Temperature scanner are varied in shapes/forms and mobility in market, but the most deemed technology we have decided is Fist temperature scanner (FTS).

For a non-contact thermal scanner, this is better than camera thermal scanner and also

forehead/face thermal scanner.



Science Behind FTS

Thermal scanners work best used in high blood flow areas. These areas typically include the forehead, upper and lower arm, back of hand, chest, stomach, thigh, anterior calf, posterior calf, and the foot instep.

Infact thermal scans can be taken in many places on the human body, especially those regions where arterial blood flow is present. Still, some areas, including the fist, are best to correlate with mean body temperature (MBT), which is used to measure fever.

Why FTS Over Other Alternatives??

Many people are familiar with infrared (IR) skin temperature devices being used to monitor forehead skin temperature. But due to

- ***different heights,***
- ***heavy perspiration of the forehead area,***

- ***hair***
- ***makeup***
- ***and other facial coverings, the readings can be compromised and often require secondary scans***.

Another reason the fist/wrist area was selected as an optimal temperature scanning is because **people can easily manipulate their arm/hand and scan themselves**. In contrast, people of different heights would require multiple scanners to achieve the same results with a forehead scanner.

Camera thermal scanning systems are also available on the market. **But**
• they are **expensive**, and
•a **high resolution camera is necessary** to direct the image to the correct facial areas.
• **infrared cameras cannot be used** outdoors due to the **interference of the sunlight's infrared rays which, will impact the results**.

2. Automatic Sanitiser Spray.

Automatic hand sanitiser spray or AHS make use of automatic sensing of motion of hands/body of the person and give sufficient sanitizer according to the safety standards.
It predominantly makes use of :

- **PIR SENSOR/Ultra sonic range finder.**
- **Spray pump**
- **Arduino microcontroller to synchronise all the above.**

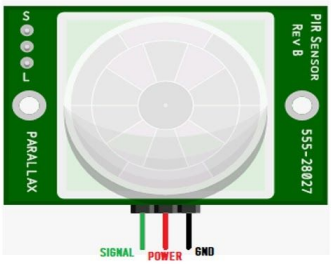
Hand detection can be done primarily by either or both of the two available technologies, those are :

A) PIR Sensor :

Passive Infrared Sensors are used to sense motion and it almost detects human motion. The sensor is built using a pyroelectric sensor ,it detects infrared signals , as every living body emits some level of radiation. The sensor divides the sensed signal into 2 halves, which is wired up, to cancel out each other and as one part senses the signal more or less, the output swings high or low.Figure below shows a PIR sensor.

B) Ultrasonic Range Finder :

The sensor has a range of 3cm - 400 cm. The sensor operates by transmitting an ultrasound and receiving the echo as it bounces back against an obstacle after a certain time and calculates the distance of the object accordingly. The sensors sends the ultrasound and senses the echo with the same pin SIG. Figure below shows an ultrasonic range finder.



PROCEDURE :

The ultrasonic sensor and PIR sensor is attached to the Arduino for detection of human/object ranging and motion respectively.

PIR sensor has a range of around 5m – 12m and any detection in the specified range will activate the sanitizer and it will sanitize the surroundings with activation of spray pump 1 accompanied with a blower so that the sanitizer reaches the surrounding .

The ultrasonic sensor on the other side has been specified with a range of less than 30cm, any movement especially hand near(<30cm) the device will activate the spray pump 2 and the sanitizer reaches the hand through a small pipe. The sanitization is done simultaneously with the activation of the sensors , keeping the particular region sanitize and free from virus or bacteria or any infectious agents.

CHANGES IN PROTOTYPE PHASE SO FAR :

1. Fist thermal scanner is preffered over temperature scanner due to ease of operation, quantity, and for more accurate measurements.
2. Camera for facial recognition is removed for reasons of high cost of procurement and data safety concerns.

3. The mic is also changed, the person can enter his required details through the web page after scanning the QR code.
4. The speaker has been also removed making use of the phone itself to read out messages and instructions.
5. Sanitizer spray now works on arduino circuits.