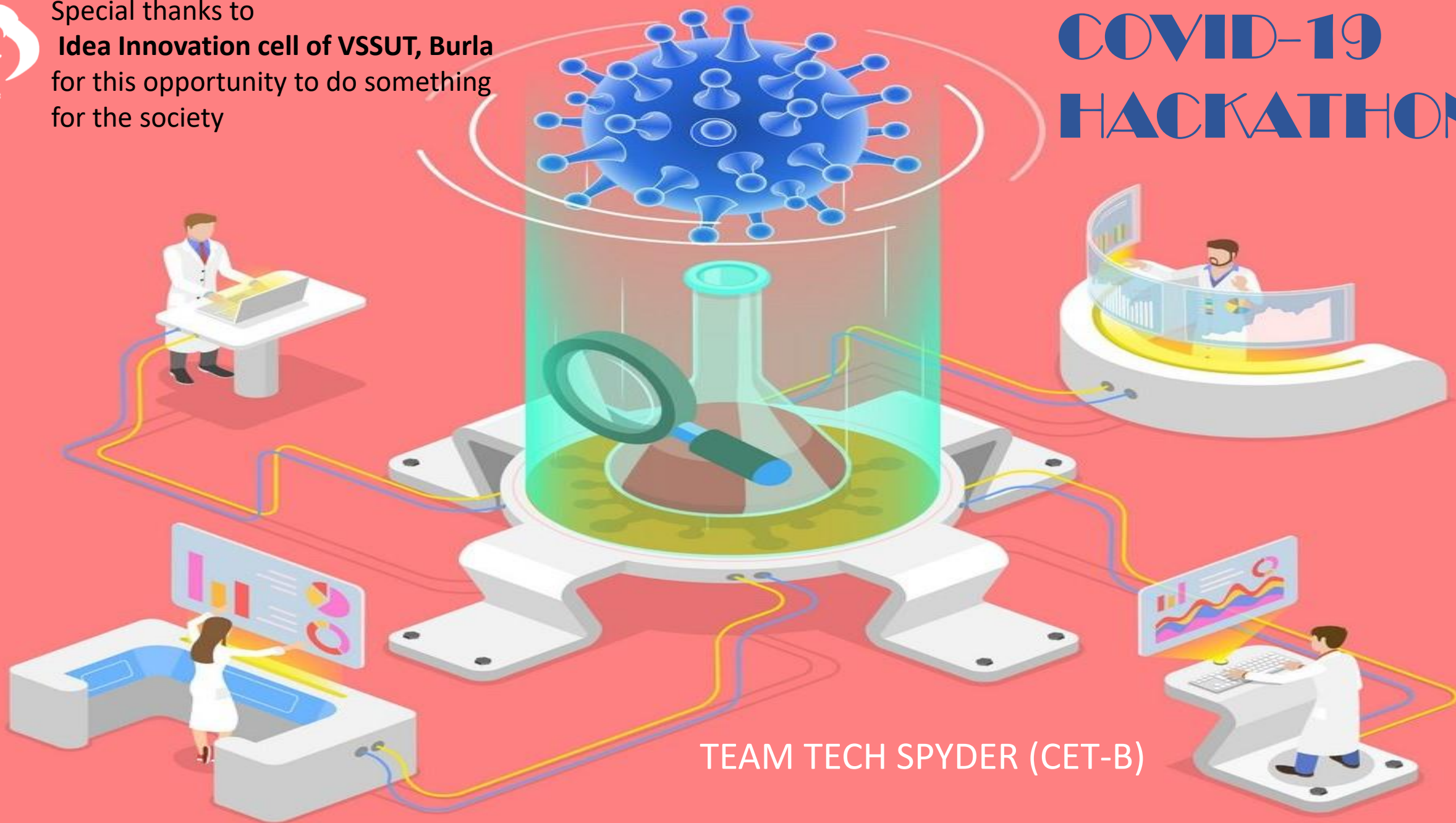




Special thanks to
Idea Innovation cell of VSSUT, Burla
for this opportunity to do something
for the society

COVID-19 HACKATHON



TEAM TECH SPYDER (CET-B)



TEAM TECH SPYDERS

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The **2019–20 coronavirus pandemic** is an ongoing pandemic of coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).

The outbreak was first identified in Wuhan, Hubei Province, China, in December 2019. The World Health Organization (WHO) declared the outbreak to be a Public Health Emergency of International Concern on 30 January 2020 and recognized it as a pandemic on 11 March 2020.



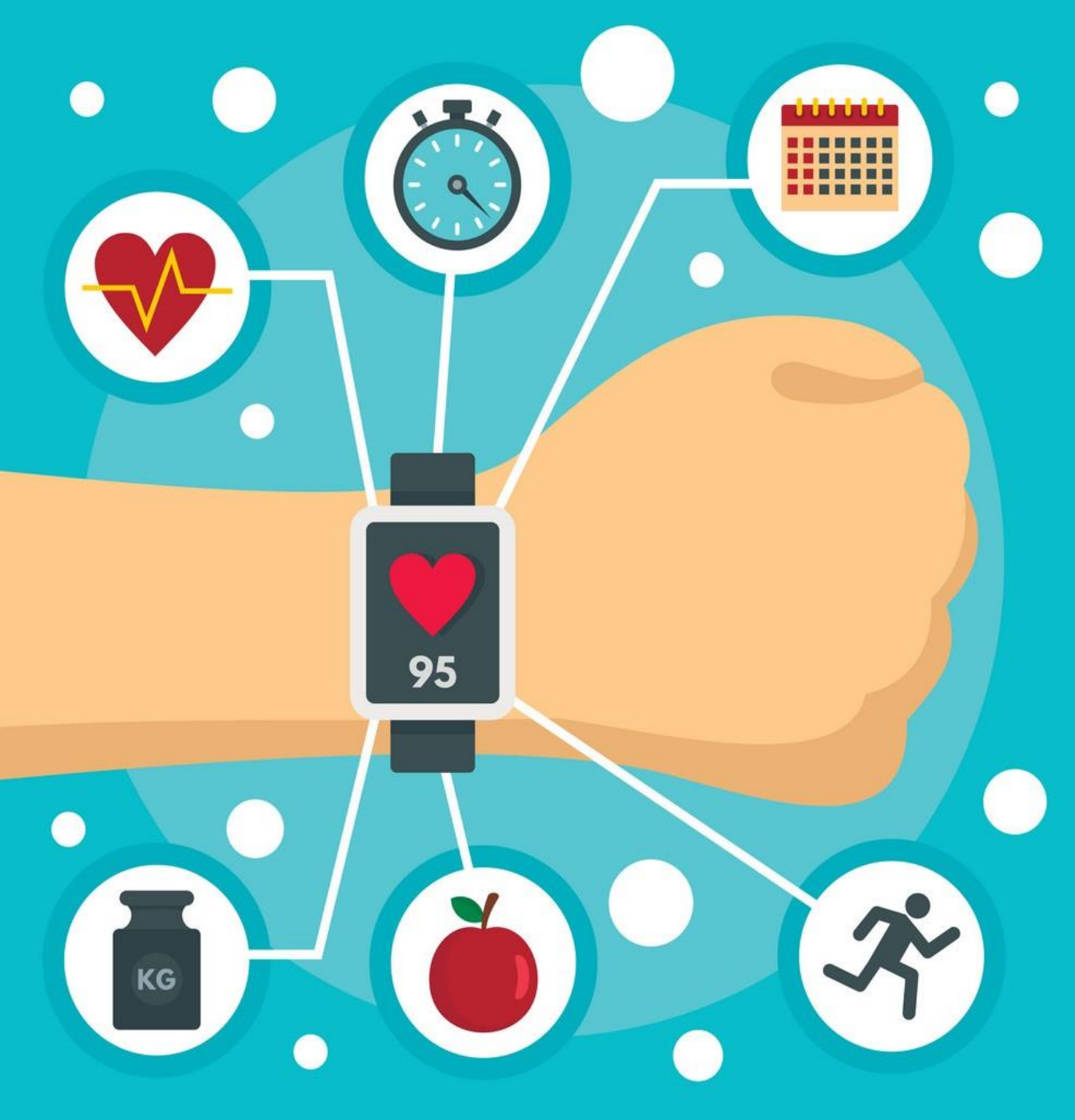
The virus is mainly spread during close contact and by small droplets produced when people cough or sneeze. Respiratory droplets may be produced during breathing but the virus is not generally airborne. People may also catch COVID-19 by touching a contaminated surface and then their face. It is most contagious when people are symptomatic, although spread may be possible before symptoms appear. The time between exposure and symptom onset is typically around five days, but may range from 2 to 14 days. Common symptoms include fever, cough, and shortness of breath. Complications may include pneumonia and acute respiratory distress syndrome. There is no known vaccine or specific antiviral treatment. Primary treatment is symptomatic and supportive therapy.

PROBLEM STATEMENT :

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.



What do we have to offer ?

Our solution is of using bands that we use along with an app that stores the data given by that band this will help in monitoring anyone easily. The band consists of sensors for different functionality. The band consists of only sensors, so is easy to use. All the info is displayed on the app.

Why this solution ?

In this age of technology as we know everyone uses a smartphone. The band will be an add up. So using the functionality of these two is the best thing that can be done. Moreover it won't cost anything more just using the sensors and an app that actually accumulates the information and displays it to the user. This makes it cost effective and efficient and also can be implemented very soon.

Installation

The installation requires the following:

1.A fitness band:

The fitness band is used to basically record stuff like heart rate, sleep monitor , temperature and the use of motion sensors that actually checks for the hand movements.

Sensors required:

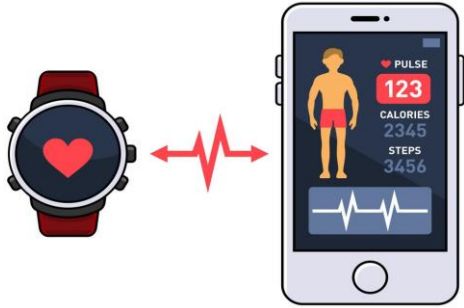
- 1.MAX30102 –Pulse Oximeter and heart-rate sensor.
- 2.GPS Module NEO6MV2
- 3.TMP36- Temperature Sensor
- 4.HC-05 – Bluetooth sensor
- 5.Myoware – EMG sensor

2.A smart device :

A smart device like a smart phone is required.

The device is used to install the app that is required to connect the device to the fitness band and helps to monitor the data recorded and in case of any malicious data it informs the user to be safe.





Heart rate monitor

The band uses photoplethysmography or PPG technology to measure heart rate. It tests how much red or green light it can see when looking at the skin of user's wrist. Blood is red because it reflects red light and absorbs green light. So when user's heart beats, there's more blood flow in their wrist and thus more green light absorption but between heart beats, there's less absorption of green light.

So by flashing its LED lights hundreds of times per second, band can calculate the number of times the heart beats each minute which will be the heart rate of the user.

The sensor can compensate for low signal levels by increasing both LED brightness and sampling rate.

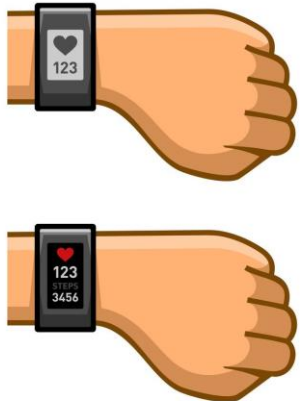
This data is recorded over time and if any anomaly is there it informs the person.

Using maps to avoid going to pandemic prone areas

Google maps is installed in each of the smart devices. According to this we can use to track the location of the person and alert him not to go to the places prone to the pandemic. This can be done by alarming the person with a vibration signal through the phone and also the person can be asked to tell about the destination to provide a safer pathway.

Social distancing

The band maintains a Bluetooth connection continuously with phone. So, the app can track the location of all bands of its type and recognize the distance between one band to other a shorter range like 2-3 m. It pushes a signal to the smart phone to alarm when it finds two bands in closer vicinity i.e. when distance is less than 1 m (3 feet). It is also supported by Bluetooth beacons which generates radio, ultrasonic, optical, laser signals that indicate the proximity or location of a device. It helps to synchronize, coordinate and manage electronic resources using minuscule bandwidth.





Temperature monitor-

The temperature is measured and obtained by the temperature sensor. The temperature sensor used is TMP36 temperature sensor that is much accurate.

The temp can be tested and saved at integral points making it upto 24 times a day.

This can be used to know the person's health status and might be helpful if he/she gets treated with the disease. It will also aware the other person's data and tell them to maintain distance if the person is not safe.

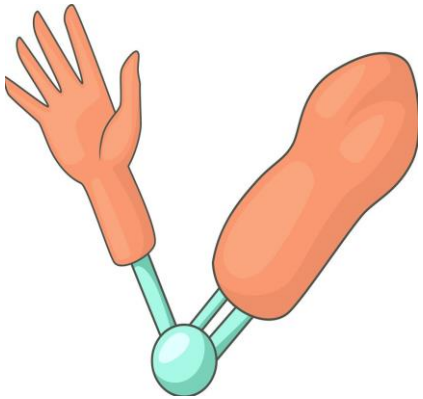
Face touch detection-

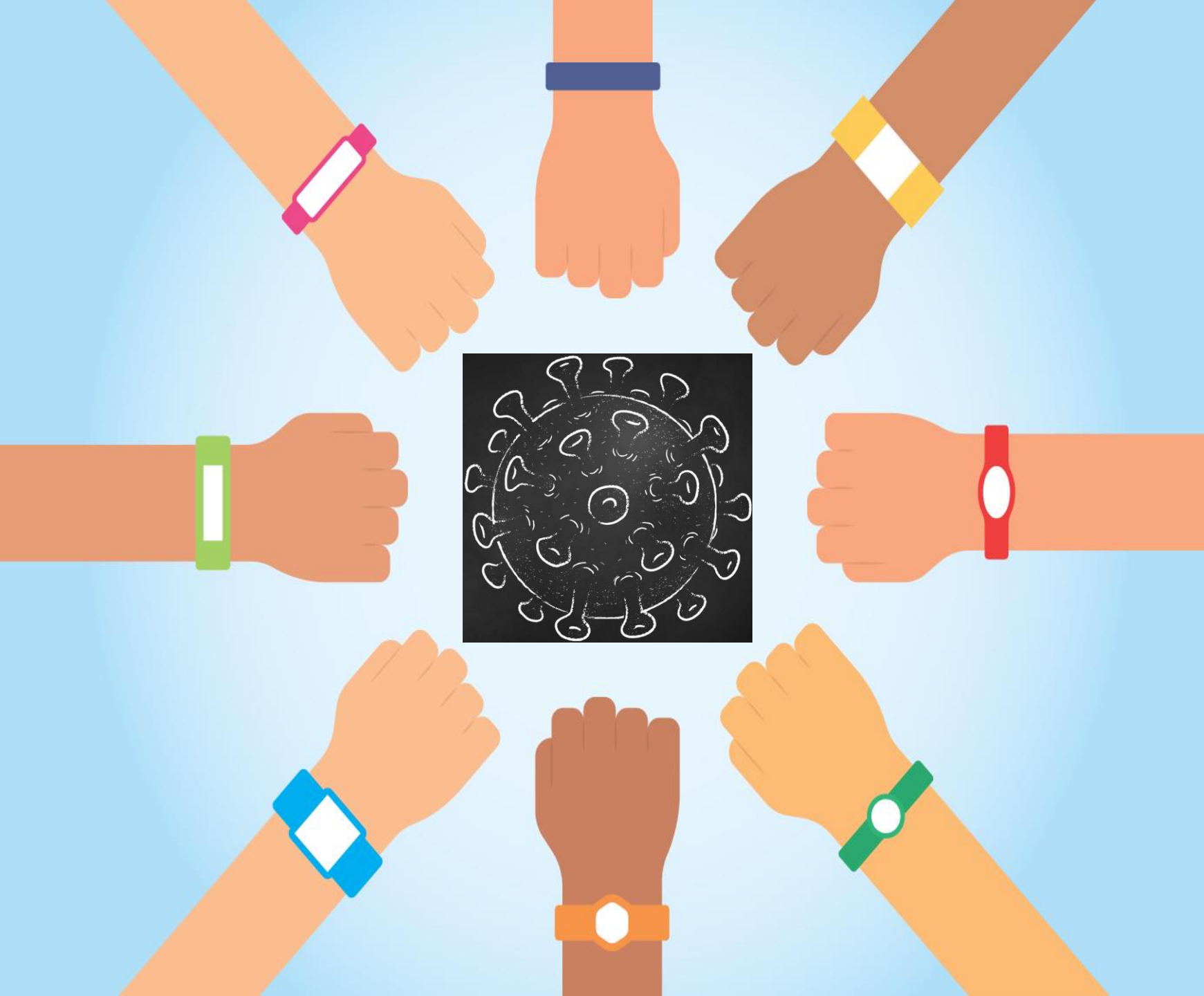
The band needs to be provided with electromyographic electrodes, inertial measurement unit and a transmission module. Using proprietary EMG sensors, it measures in real-time the electrical activity from user's muscles to detect gestures made by their hands (muscles activation and movements in the three-dimensional space) and sends these data to the connected device. It sends the data via Bluetooth Low Energy technology. The main parts of this band are (i)the electronic control board embedded into the main element (ii)the micro-USB connector (iii)MCU ARM Cortex M4 (iv)BLE chip (v)the vibration motor (vi)the antenna (vii)the Lithium battery.

Initially the user is asked to touch eyes, nose and mouth, while they do so, the band will recognize the biopotential changes of the myoelectric signal generated during the movement of the muscle tissue of the hand. So from now anytime the user is about to touch their face, the band will integrate its data and vibrate just before their hands reaches too close to their face. It will train the user with aversive conditioning to ignore the desire to touch their face repeatedly.

Remainder to wash hands-

The user will be reminded to wash their hands after specific intervals of time like after every 2 hours(excluding sleep hours), which is very important because it will help them to wipe viruses off their hands if any present thus increasing protection level. They will be reminded by an alarm which will stop only when the user takes off their band in order to wash their hands. The band will recognize that the user has removed the band when it stops sensing the heart rate and body temp.





Conclusion

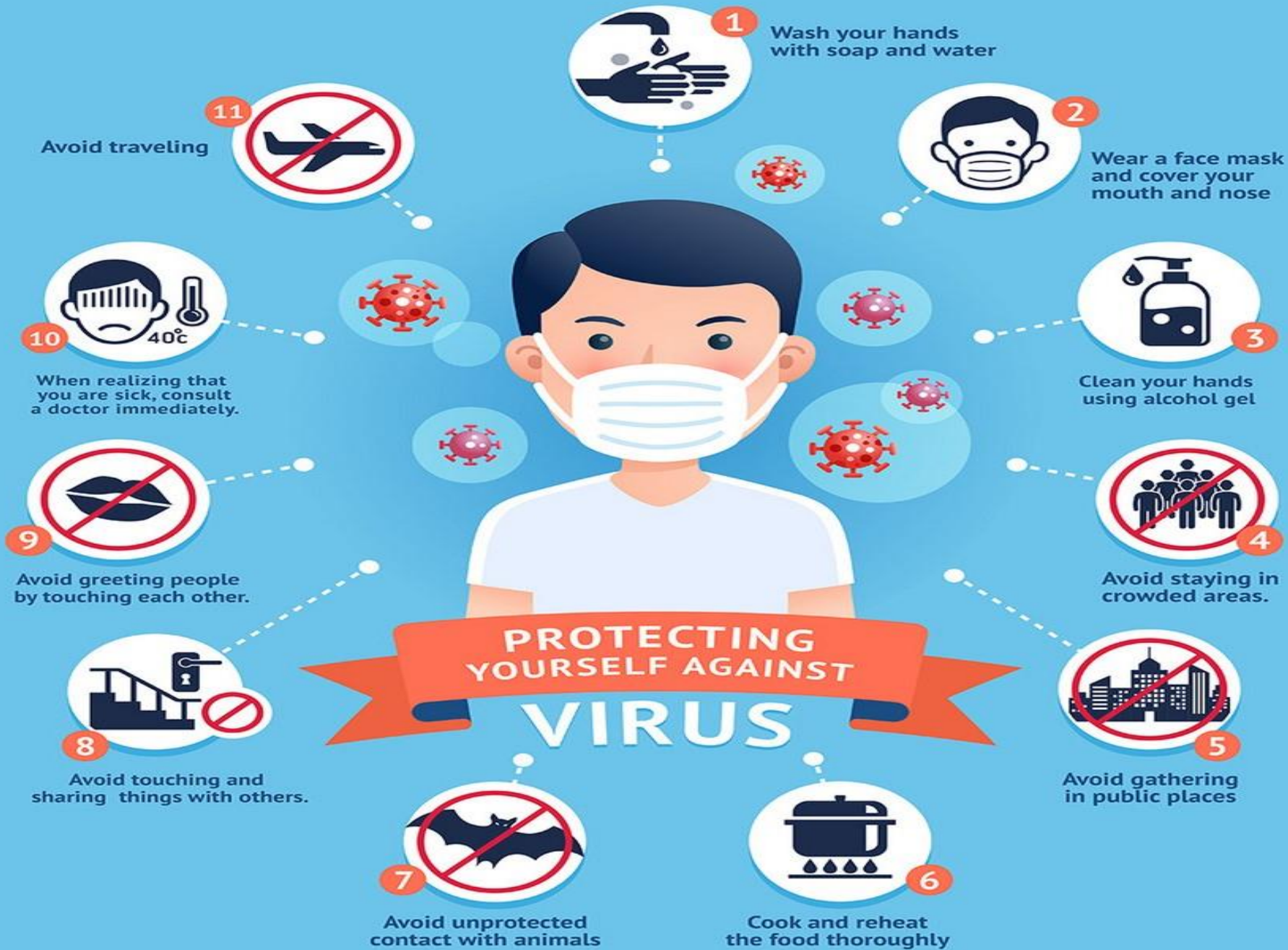
While concluding its important to note that we can easily beat the corona virus with our sincere efforts.

Technology will always play a vital role whether its protecting us through our fitness band idea or by making out a vaccine.

Until these things are at place the most important thing is self awareness and being a bit selfish yet selfless.

I personally believe that our idea can protect lives and can be helpful to the human race. Hope that we all get over this pandemic safely.

Do consider to have a look at the last slide it tells us how to protect ourselves from this virus



#stay home

#stay safe

#fight-covid