UNIVERSITY OF MORATUWA

DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING

EN2560 – INTERNET OF THINGS DESIGN AND COMPETITION

PROJECT REPORT

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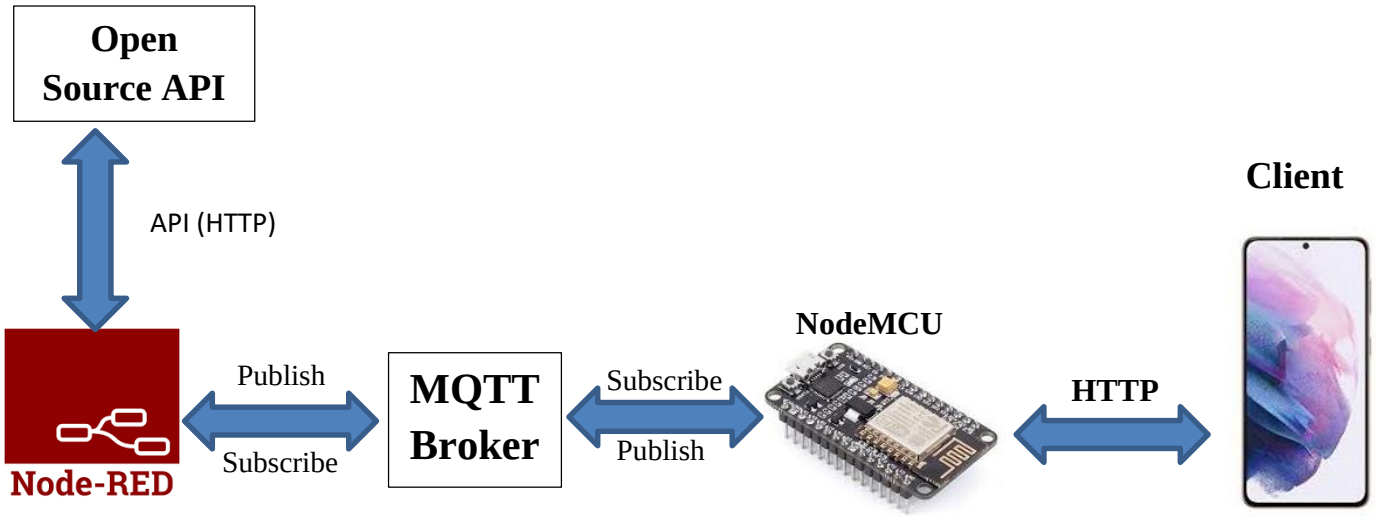
Introduction

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus. Whole world is suffering from this viral disease. Getting accurate and timely statistics about the disease is a main challenge. The pandemic has reminded us of the important role that statistics play in our lives. COVID-19 has put an intense spotlight on statistics. IoT-enabled/linked devices/applications are utilized to lower the possible spread of COVID-19 to others by early diagnosis, monitoring patients, and practicing defined protocols after patient recovery.

So through our project we aimed on getting the statistics (Daily and total number of new cases, number of deaths, number of recovered patients) all over the world in 3 categories and display in a server webpage.

- Updated Covid-19 statistics in Sri Lanka
- Updated Covid-19 statistics in the world
- Covid-19 statistics in any country.

Overview



Operation

- Here Node MCU acts as a Wi-Fi station, as an access point, or both.

  ESP8266 as a Wi-Fi station
  Here by connecting node MCU to a wireless router it can access through the local network.
  In this situation, the router acts as an access point and Node MCU is set as a station. Here the client should connect to the local network (wireless router) by the IP Address of the Wi-Fi webserver.
  ESP8266 as an access point
  When ESP8266 is set as an access point, any device (client) with Wi-Fi capabilities can be connected to the Node MCU. Here Node MCU creates its own Wi-Fi network and clients can connect to it by giving the following credentials.
  SSID – "NodeMCU"
  Password – 123456789

  This is set as an access point using the softAP() method.

```
287 void setup_AP() {
288   Serial.println();
289   Serial.print("Configuring access point...");
290   WiFi.mode(WIFI_AP_STA);
291   WiFi.softAP(APssid, APpassword);
292   Serial.print("IP address of the AP: ");
```

Here we have used the mode ESP8266 as an AP and STA. Then the Node MCU can connect to an external WiFi router and simultaneously set up an Access Point for other devices to connect to it.

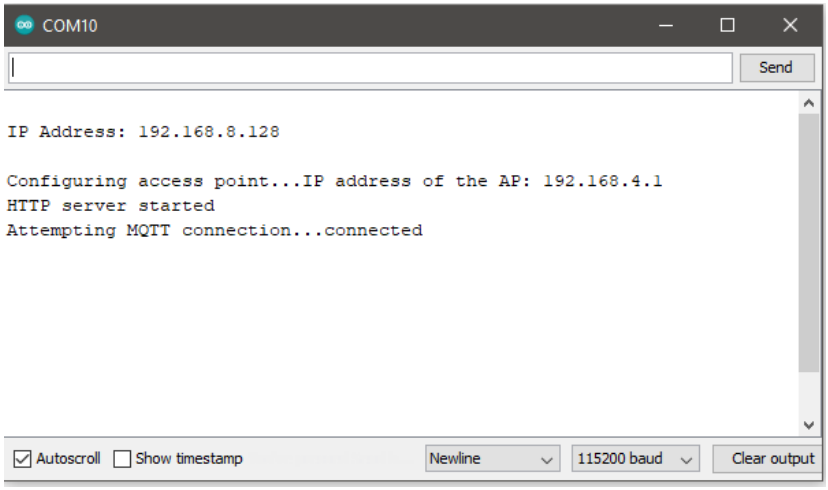


Figure: Screenshot of the serial monitor

- Once a client is connected to the access point, the latest Covid19 details of Local and Global are filled automatically.
- To get the statistics of a specific country in the world, the name of the country should be submitted. Then the data is filled. This data is updated in each 2 seconds.
- If a country which the API doesn't include statistics is submitted, the table is filled as "Invalid".

MQTT

The MQTT broker we used is test.mosquitto.org PORT -1883

The PubSubClient library provides a client for doing simple publish/subscribe messaging with a server that supports MQTT.

Here the MQTT broker acts two roles.

1. When we collect data from the webserver (Client),

First to get the local and global statistics, the message "hello" is sent. And when getting the statistics of a specific country, the message is the country name. This string is transmitted to node red from node MCU under the topic "Refresh".

2. When data is given to the webserver,

Statistics collected from the API's are converted to the format by the node red flow and transferred to the Node MCU via MQTT under the topic "Covid19" and is displayed in the webpage.

Format of the output data from Node Red

Eg:- 869,266499,28321,3268,32,28321,234942,4132872,2021-07-05 22:40:28,869,15780,332497,183687689,6789,3977637,304689,120975907,869,266499,28321,3268

Data Sources

1) Coronavirus COVID19 API (getpostman.com)

This API gives the current real time situation of the COVID-19 patients reported globally and in separate countries throughout the world.

URL to get the global statistics: https://api.covid19api.com/summary

URL to get the details of a specific country (payload): https://api.covid19api.com/live/country/{{payload}}

2) https://www.hpb.health.gov.lk

These are the details given by the Health Promotion Bureau in Sri Lanka.

It provides the current real time situation of the COVID-19 patients reported in Sri Lanka.

Dashboard

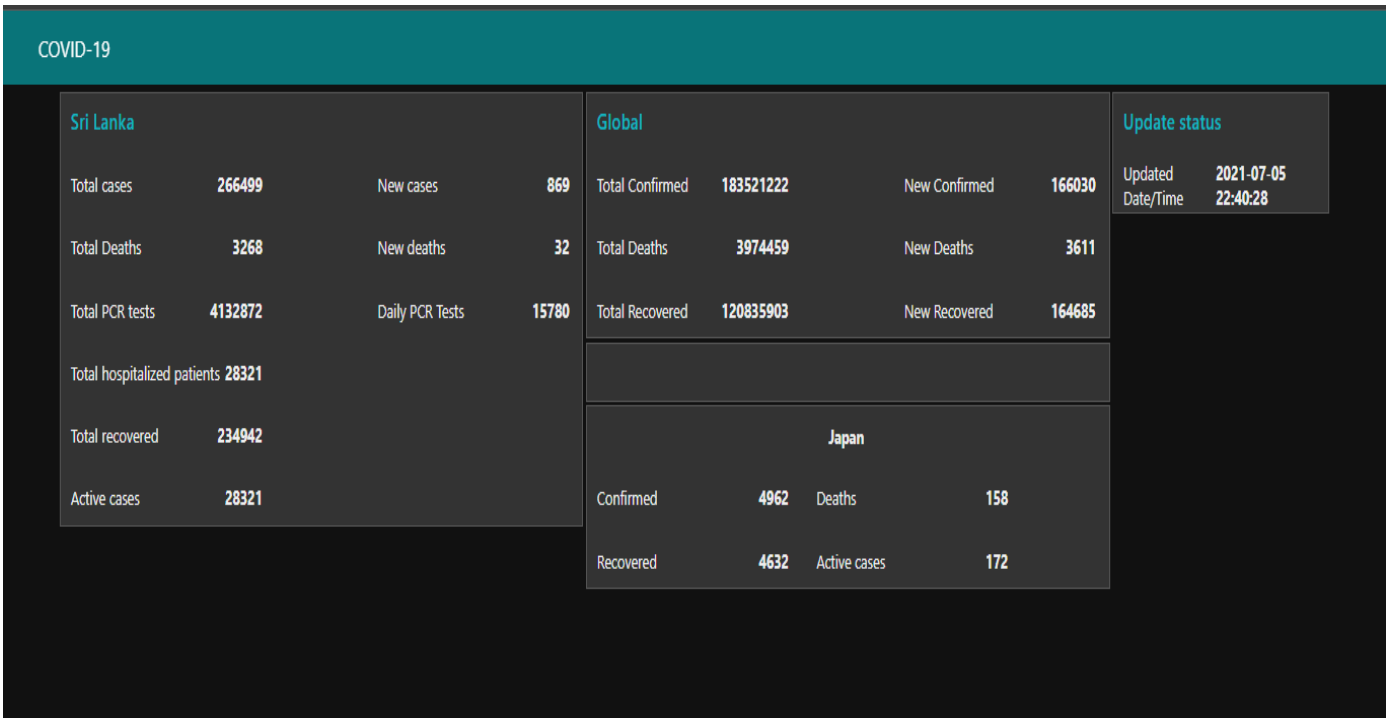


Figure: Screenshot of the NODERED Dashboard

Webpage

Webserver is built through a HTML code

To build the webserver, the ESPAsyncWebServer library is used which has a straightforward way to build an asynchronous web server

Local and Global Statistics

Local Covid 19 Status

Topic	Count
New cases	869
Total cases	266499
In hospitals	28321
Total deaths	3268
New deaths	32
Total recovered	234942
Active cases	28321
Total PCR tests	4132872
Daily PCR Tests	15780

Gobal Covid 19 Status

Topic	Count
New cases	166030
Total cases	183521222
New deaths	3611
Total deaths	3974459
New recovered	164685
Total Recovered	120835903

Statistics of a specific country

Country: Submit

Japan Covid 19 Status

Topic	Count
Total cases	4962
Total deaths	158
Total Recovered	4632
Active cases	172

References

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3. https://theiotprojects.com/esp8266-dht11-dht22-temperature-humidity-with-local-web-server/
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