VIT – EXTERNSHIP IOT

IOT ANALYTICS IN

HEALTH MONITORING SYSTEM

GUIDED BY: SMART BRIDE IN ASSOCIATION WITH IBM

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Introduction:

Health monitoring is the major problem in today's world. Due to lack of proper health monitoring, patients suffer from serious health issues. There are lots of IoT devices nowadays to monitor the health of patients over the internet. Health experts are also taking advantage of these smart devices to keep an eye on their patients. With tons of new healthcare technology start-ups, IoT is rapidly revolutionizing the healthcare industry.

Here in this project, we will make an IoT based Health Monitoring System which records the patient temperature rate, BP rate and pulse rate and also send an email/SMS alert whenever those readings go beyond critical values.so that patient health can be monitored from anywhere in the world over the internet. This is for specially monitoring patients and informing doctors, loved ones.

Literature survey:

In this project, we present our key results based on data collected through patients. Our main objective is to monitor health through IOT and sending alert messages to people when values of parameters are increased.

Therefore, we are going to focus on how data is monitored, connection to IOT and sending alert messages.In order to address the purposes outlined by the team, the information from previous research is needed to provide direction for

the concepts, data and methods to be included in the study.so we reviewed related researches and articles from different websites

Theoretical analysis:

The main aim of this project is to keep everyone stay healthy and fit.There are so many lives who can't know about his physical conditions and there are conditions like there might not be any initial changes in the body but his health condition is going to be critical in few days like raise in BP and sudden change in Pulse which lead to heart stroke,hypertension etc.,
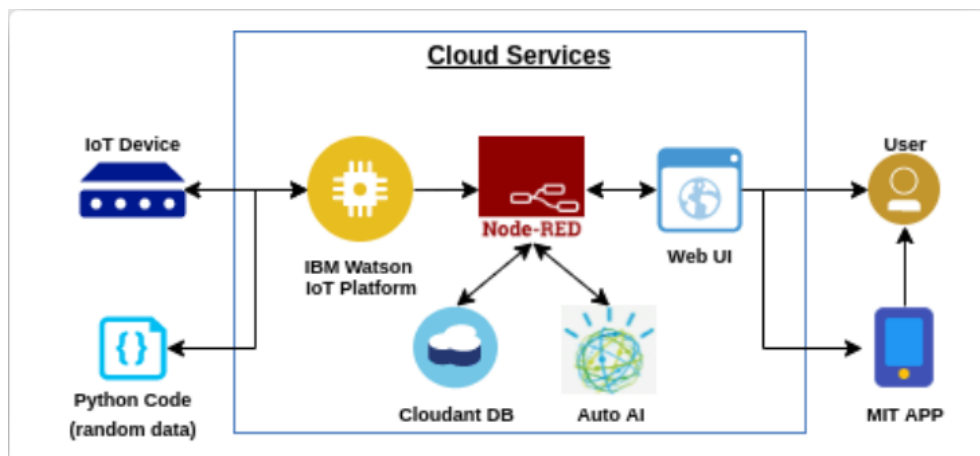
In this project we have to do a integration to the wearable device using python,but due to some conditions we have done this project with only software part we just integrated the watson sensors with python.In this project we have just sent a random values to the node red flow application but in real time we will read the values using sensors from a wearable device.And display the data in the mobile using mobile application through MIT app inventor.and we stored the values in the cloud server(cloudant DB).and we sent SMS to the user mobile using way to sms service.

The main task here is we have to an Auto AI to our device Where in Auto AI we have to Train the network with the dataset,where the data set contain All the values of Temperature with many conditions,Since we have to predict the

patient condition.So,There are different ranges for each Variable,It leads to Several Combinations,To enter all those combinations to the data set is the worst case.To avoid this we need to train the System so that if the values of the patient is not in the dataset The trained block will predict the output based on the conditions in the dataset

Experimental investigation:

To complete or main aim and targets we investigated on the diseases that occur due to changes in pulse,BP and temperature values some of them are Hypertension, prehypertension, critical, Hypothermia, fever, high grade fever, tachycardia, bradicardia, like this there are several stages that are linked to pulse,bp and temperature values of the body.

Conditions:

Hypertension   ⇒ High BP

Prehypertension ⇒ you may get high blood pressure in the future.

Hypothermia   ⇒ when your body temperature falls below 95 F (35 C).

Tachycardia   ⇒ when heart beats faster than 100

Bardicardia   ⇒ when your heart rate is slow

Above mentioned are the main conditions that are linked with the temperature,Bp and Pulse values.

And we investigated on the several python codes of importing message services by command of **import requests** The requests module allows you to send HTTP requests using Python. The HTTP request returns a Response Object with all the response data (content, encoding, status, etc)

We have done AI Implementation with machine learning to train the block

using watson studio service in IBM cloud using the dataset that was provided in Student dashboard

Flow chart:

To monitor the health condition we should do a source code using python where the code should be able to take all the inputs required from user like temperature blood presurre and pulse etc.. here we will give some conditions to know the health is critical or not if the health is critical we can get a message alert.

We need to Implement the Auto AI modelling in the Node red flow to implement We need to train the device using Auto AI concept.as discussed above where it can predict the output based on values in the dataset.
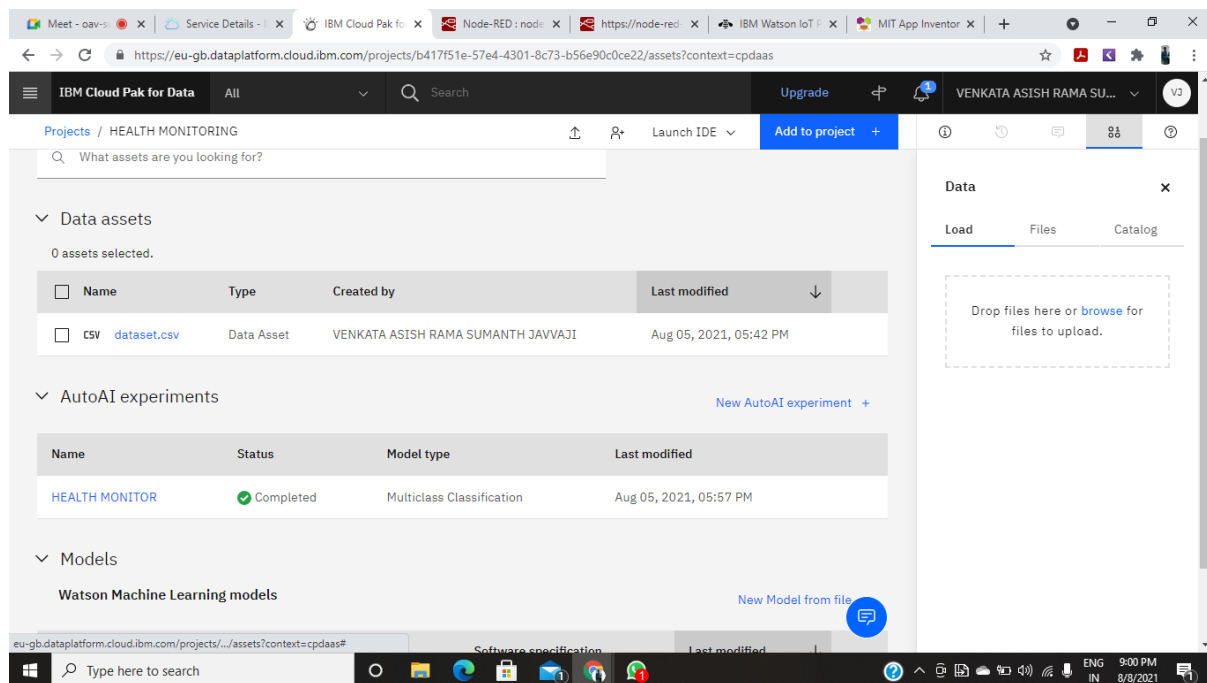
We need to send some random data to the flow using device simulation function in the services through following code.

So to create the flow first we should take the input node where we should initailise the python code to input node using device id, device type, authentication toen etc.. and next we will create functions for each item to be monitored and we should connect all the information to the message payload to get the required information and we will analyse all the values using charts, graphs etc.. and to store the values in the database we should gather all the

information in a single function using global.get and store all the data in cloudant which is a database and all the data is saving in cloudant using JSON format.
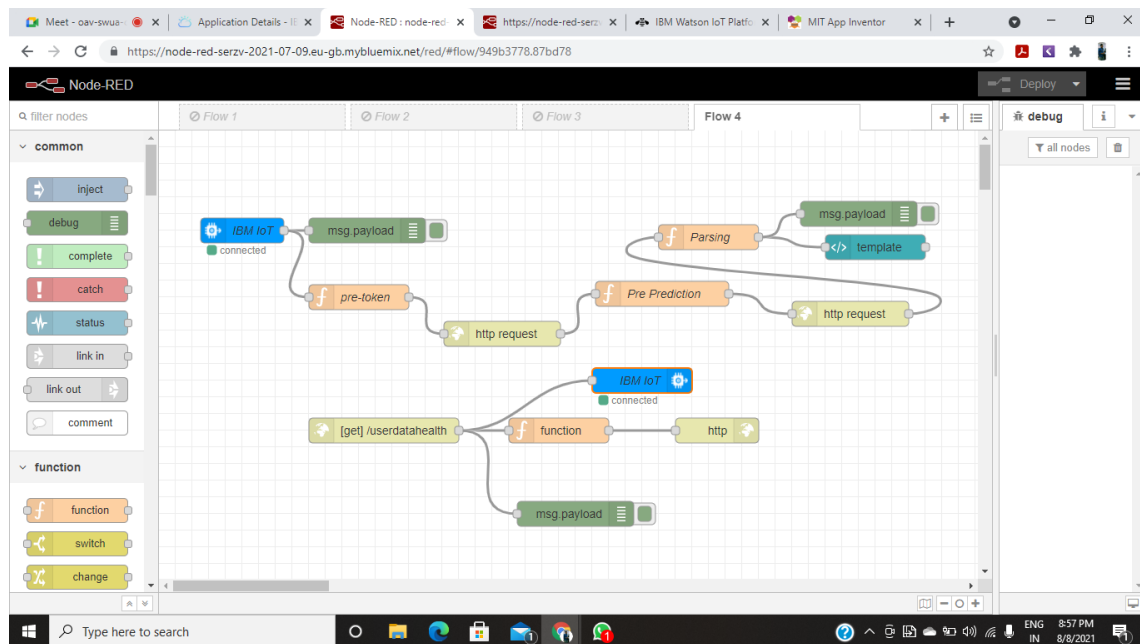
And now we should connect http in and request these helps to send the data to mobile app. The mobile app we used is MIT app inventor in http in we are taking user data and connecting it to python code to read the information and http out is created which produces the output in the mobile app. And in the mit app first we have to create a new project and then we have to build the screen which should be displayed on mobile app so we should create empty textboxes and lables and connect the mobile to web application and then assign a clock to it. The clock is helped to update the values.
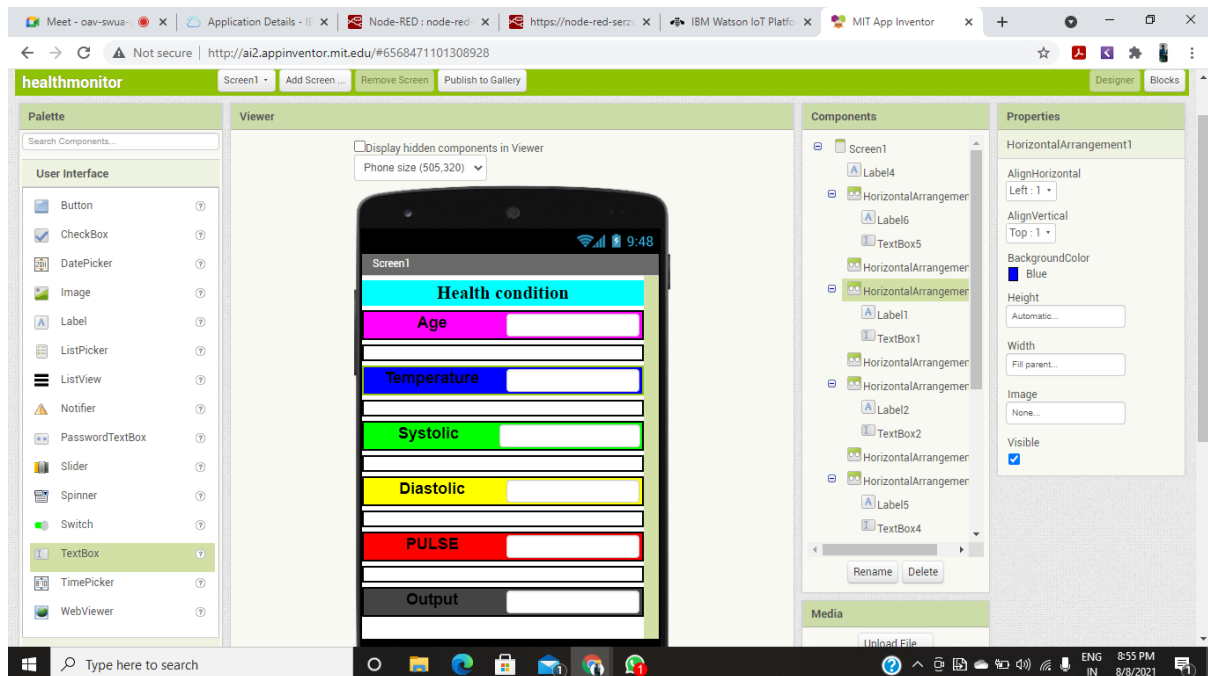
In the app block diagram first we should call the node red application and we should then create a blocks to read temperature, pulse, pulse etc.. and we store all the values in the empty textboxes.
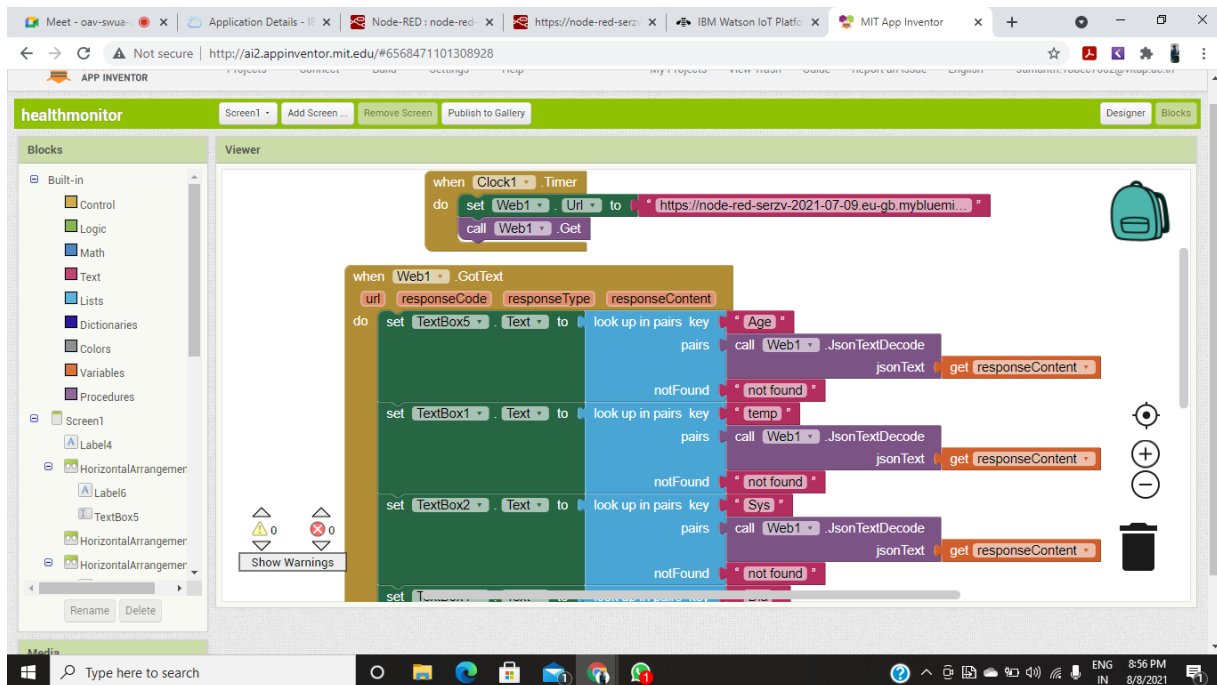
Result:

In the node red dash board we see the all the input data updating for every 10 seconds by these we can get the status of the patient health condition. This is just the sample output at selected time it will keep updating minute to minute
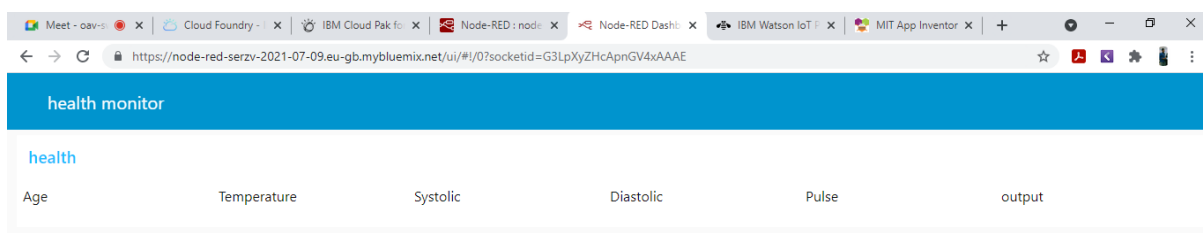
This the date being published to node red and MIT app and if the values does not

match the required criteria the information is sent immediately to mobile with alert message
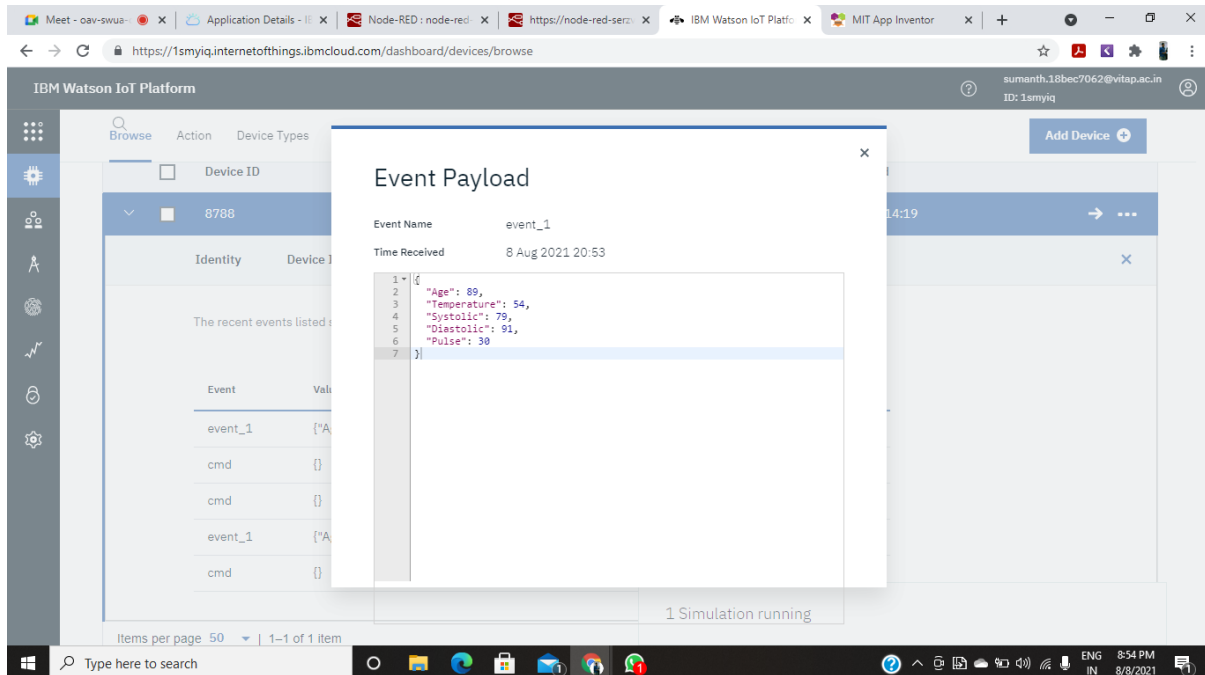
In cloudant database the title with name Health monitor is the database and all the information is stored in cloudant and the database is in the json format.

Name	Size	# of Docs	Partitioned	Actions
assignment5	81 bytes	1	No	
health-monitor	0.6 KB	4	No	
noderedserzv20210709	34.0 KB	4	No	
pump-control	80 bytes	1	No	

Advantages & disadvantages:

Advantages:

1.   Accurate collection of data

2.   Decreased cost based on real time

3.   Improved disease management

4.   Better patient experience

5.   Home care

6.   Medical data accessibility

7.   Prevention of health condition

Disadvantages:

1.   Security and privacy

2.   Risk of failure

3.   Lack of memory

4.   Global healthcare regulations

5.   Emergency accidents

6.   People in remote villages who have less technology

Applications:

We can build many applications using IOT and these applications can be used to collect patient's information, diagnose diseases, monitor the health of the patients, and generate alerts in case of a medical emergency . In the following section, some of the most recent commercially available devices have been discussed.

1.   Wheel chair management

2.   Medication management

3.   Glucose level monitoring

4.   Oxygen level testing etc..

Conclusion:

The Internet of Things is considered now as one of the most easy solution for any data tracking especially in the field of health monitoring.we can also do a thing like from the hospital as a end user as it need to collect the data of the patients who stays in hospital, and their health can be monitored and disease diagnosed by any doctor at any distance. In this paper, an IoT based health monitoring system was developed. The system monitored body temperature, pulse rate and BP which are also displayed on a monitor. These sensor values are then sent to a medical server using http communication. These data are then received in an authorized personals smart phone with IoT platform. With the values received the doctor then diagnose the disease and the state of health of the patient.

Future scope:

1. We can add more parameters like SpO2 for better health monitoring.
2. We can store patient data on the server and use it for future health purposes.
3. We can make individual health monitor systems to patients , So that it monitors according to particular condition of patients
4. We can develop this project so that it sends health updates to all the family members.

Bibliography:

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- https://partheniumprojects.com/smart-health-monitoring-using-ibm-watson-project/

Appendix:

The below pictures are the source codes and outputs of the UI which is the information we are getting on our mobile.

```python
import wiotp.sdk.device
import time
import random
import requests
myConfig = {
    "identity": {
        "orgId": "1smyiq",
        "typeId": "Asish",
        "deviceId":"8788"
    },
    "auth": {
        "token": "Ashish@123"
    }
}

def myCommandCallback(cmd):
    print("Message received from IBM IoT Platform: %s" % cmd.data['command'])
    m=cmd.data['command']

client = wiotp.sdk.device.DeviceClient(config=myConfig, logHandlers=None)
client.connect()

while True:
    temp=random.randint(-20,125)
    pul=random.randint(50,120)
    bp=random.randint(50,200)
    myData={'temperature':temp, 'pulse':pul, 'BP':bp}
    client.publishEvent(eventId="status", msgFormat="json", data=myData, qos=0,
    print("Published data Successfully: %s", myData)

    if(pul>100 or pul<60):
        print("successfully information sent")
        r=requests.get('https://www.fast2sms.com/dev/bulkV2?authorization=tzlaoN
        print(r.status_code)



    client.commandCallback = myCommandCallback
    time.sleep(2)
client.disconnect()
```

Health condition

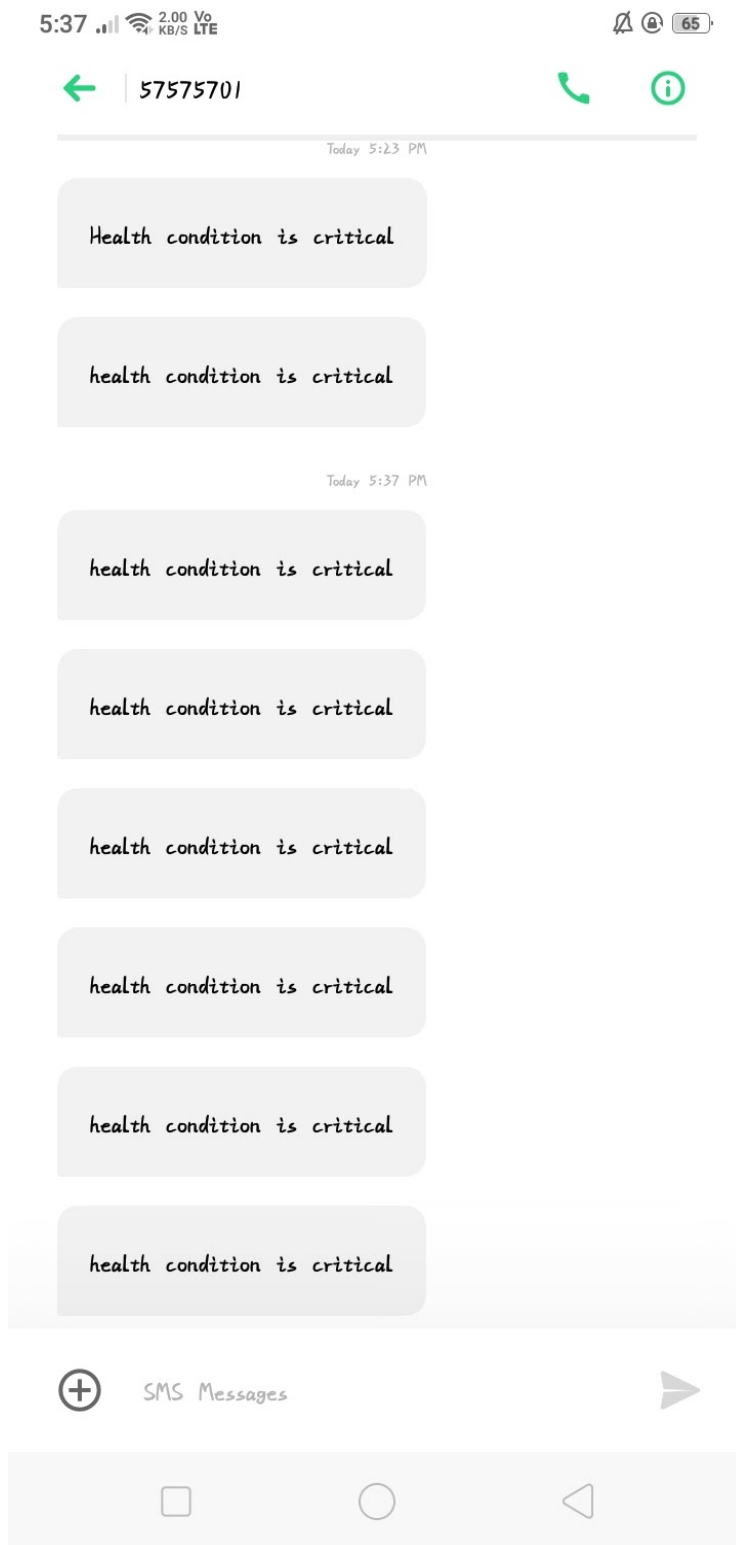|	
Age	89
Temperature	54
Systolic	79
Diastolic	91
PULSE	30
Output	Hypotension

Presentation Link:

https://drive.google.com/file/d/1pXjB2K-XlRWfHSgLEE4issoJA1sGBy_v/view?us