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CONTACT TRACING OF THE COVID PATIENT TO OVERCOME MANUAL SURVEILLANCE

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Abstract: A newly identified Coronavirus, SARS-CoV-2, is spreading across the globe and emerged as a serious of death. India is in the midst of a deadly wave of the coronavirus pandemic, with more people are getting affecting by this virus. The main Aim of our project is to track the Covid-19 person who are got quarantine/Isolated for 15-20 days and their daily works like body temperature, heartbeat rate, and pulse rate. This device is in the form of band and this band will recognize the face of a particulate Covid-19 patient and also track the location of patient. COVID-19 is the disease caused by SARS-CoV-2. The objective of this article is to review enabling technologies and systems with various application scenarios for handling the COVID-19 crisis. The article will focus specifically on

1) wearable devices suitable for monitoring the populations at risk and those in quarantine, both for evaluating the health status of caregivers and management personnel, and for facilitating triage processes for admission to hospitals.

2) unobtrusive sensing systems for detecting the disease and for monitoring patients with relatively mild symptoms whose clinical situation could suddenly worsen in improvised hospitals.

3) telehealth technologies for the remote monitoring and diagnosis of COVID-19 and related diseases. Finally, further challenges and opportunities for future directions of development are highlighted.

Index Terms **- Blynk, Thingspeak, Telegram bot, Twilio**

I.Introduction

Corona viruses is a large family of viruses which may cause illness in animals and humans. COVID-19 is an infections and kind of virus which spread from person to person. Coronavirus was first found in Wuhan China in December 2019 and know it is growth in larger scale throughout the world. And it has been growing by stage by stage. Corona virus disease 2019 (COVID-19) has emerged as a pandemic with serious clinical manifestations including death. Wearables in attention and medical specialty are physical science, activity, telecommunication and transmission devices capable to find and monitor very important signs like heartrate (HR), vital sign (BT) chemical element saturation (SpO2) Our main aim of the project is to principally management the unfold of the COVID-19. So to form it less we've got designed a model referred to as COVID wearable band. Principally management the unfold of the COVID-19. So to form it less we've got designed a model referred to as COVID wearable band.

II. RELATED WORK

[1] CT (Computed Tomography) scanners and RT-PCR testing are not available in most medical centres and hence in many cases CXR images become the most time/cost effective tool for assisting clinicians in making decisions. Deep learning neural networks have a great potential for building COVID-19 triage systems and detecting. Deep-learning-based computer vision methods have demonstrated great promise for use in medical imaging applications, including X-rays, magnetic resonance imaging, and CT imaging.

[2] we review the use of imaging characteristics and computing models that have been applied for the management of COVID-19. CT, positron emission tomography - CT (PET/CT), lung ultrasound, and magnetic resonance imaging (MRI) have been used for detection, treatment, and follow-up findings indicate that typical imaging characteristics and their changes can play an important role in the detection and management of COVID-19.

[3] The approach is based on complexity of neuromotor coordination across speech subsystems involved in respiration, phonation and articulation, motivated by the distinct nature of COVID-19 involving lower (i.e., bronchial, diaphragm, lower tracheal) versus upper (i.e., laryngeal, pharyngeal, oral and nasal) respiratory tract inflammation, as well as by the growing evidence of the virus' neurological manifestations.

[4] A weakly supervised deep learning framework was developed using 3D CT volumes for COVID-19 classification and lesion Localization the COVID-19 infectious probability and discover lesion regions in chest CT without the need for annotating the lesions for training. The easily-trained and high-performance deep learning algorithm provides a fast way to identify COVID-19 patients, which is beneficial to control the outbreak of SARS-CoV-2. For this study secondary data has been collected. From the website of KSE the monthly stock prices for the sample firms are obtained from Jan 2010 to Dec 2014. And from the website of SBP the data for the macroeconomic variables are collected for the period of five years. The

time series monthly data is collected on stock prices for sample firmsand relative macroeconomic variables for the period of 5 years. The data collection period is ranging from January 2010 to Dec 2014. Monthly prices of KSE -100 Index is taken from yahoo finance.

III. SOFTWARE COMPONENTS

Python: Python is an interpreted high-level general-purpose programming language. Python's design philosophy emphasizes code readability with its notable use of significant indentation. Its language constructs as well as its object-oriented approach aim to help programmers write clear, logical code for small and large-scale projects. Python is dynamically-typed and garbage-collected.

OpenCV: OpenCV is the huge open-source library for the computer vision, machine learning, and image processing and now it plays a major role in real-time operation which is very important in today's systems. By using it, one can process images and videos to identify objects, faces, or even handwriting of a human. When it integrated with various libraries, such as Numpuy, python is capable of processing the OpenCV array structure for analysis. To Identify image pattern and its various features we use vector space and perform mathematical operations on these features.

Raspbian OS: Although the Raspberry Pi's operating system is closer to the Mac than Windows, it's the latter that the desktop most closely resembles It might seem a little alien at first glance, but using Raspbian is hardly any different to using Windows (barring Windows 8 of course). There's a menu bar, a web browser, a file manager and no shortage of desktop shortcuts of pre-installed applications. Raspbian is an unofficial port of Debian Wheezy armhf with compilation settings adjusted to produce optimized "hard float" code that will run on the Raspberry Pi. This provides significantly faster performance for applications that make heavy use of floating-point arithmetic operations.

IV. HARDWARE COMPONENTS

Raspberry Pi 3B+: The Raspberry Pi 3 Model B+ is the latest product in the Raspberry Pi 3 range, boasting a 64-bit quad core processor running at 1.4GHz, dual-band 2.4GHz and 5GHz wireless LAN, Bluetooth 4.2/BLE, faster Ethernet, and PoE capability via a separate PoE HAT the dual-band wireless LAN comes with modular compliance certification, allowing the board to be designed into end products with significantly reduced wireless LAN compliance testing, improving both cost and time to market.

Raspberry Pi Cam: The 5MP Raspberry Pi 3 Model B Camera Module with Cable equips flexible cable for attaching with Raspberry Pi 3 Model B. The 5MP camera module is perfect for small Raspberry Pi projects which have very little space allowance just boot up the latest version of Raspbian. The high-definition 5MP camera delivers outstanding photos but can also shoot video, ideal for drones or a CCTV project. It attaches to Raspberry Pi by way of one of the two small sockets on the board upper surface.

GPS Module: This Raspberry Pi GPS Module is built with CP2102 as USB to UART Bridge chip, which is stable and faster. You can easily apply on your Raspberry Pi model A/A+/Zero/2/3B/3B+. There is also an L80-39 GPS chip inside the chip. The L80-39 is with 66 search channels and 22 simultaneous tracking channels, which can help communicate satellite with UART or USB. As the serial port issue of Raspberry Pi 3 Model B, it may cause unexpected problems.

Temperature Sensor: Using LM35 temperature sensor with Raspberry Pi is a relatively simple task once you have a way to read and convert analogy signals. Fortunately, in my previous project I've shown how to build a basic Raspberry Pi voltmeter with ADS1015 chip. So now we just need to connect the LM35 sensor to one of ADC inputs and adjusts the output format and we have a working thermometer in Celsius.

Heartbeat Sensors: An optical heart rate sensor measures pulse waves, which are changes in the volume of a blood vessel that occur when the heart pumps blood. Pulse waves are detected by measuring the change in volume using an optical sensor and green LED.

SPO2 Sensor: A pulse oximeter noninvasively measures the oxygen saturation of a patient blood. This device consists of a red and an infrared light source, photo detectors, and a probe to transmit light through a translucent, pulsating arterial bed, typically a fingertip or earlobe. The sensor used is MAX30100. It is used to measure oxygen level of the patient. The MAX30100 is an integrated pulse oximetry and heart rate monitor sensor solution. It combines two LEDs, a photodetector, optimized optics, and low-noise analogy signal processing to detect pulse oximetry and heart-rate signals.

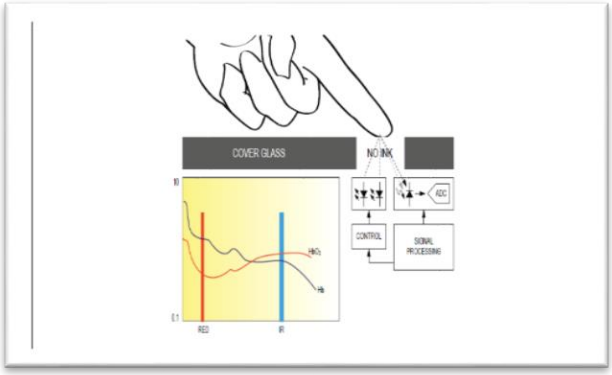

Fig -1: Sensors Working

Push Button: A Pushbutton Switch is a switch designed so that its contacts are opened and closed by depressing and releasing a pushbutton on the Switch in the direction of its axis. Used to arise the emergency condition.

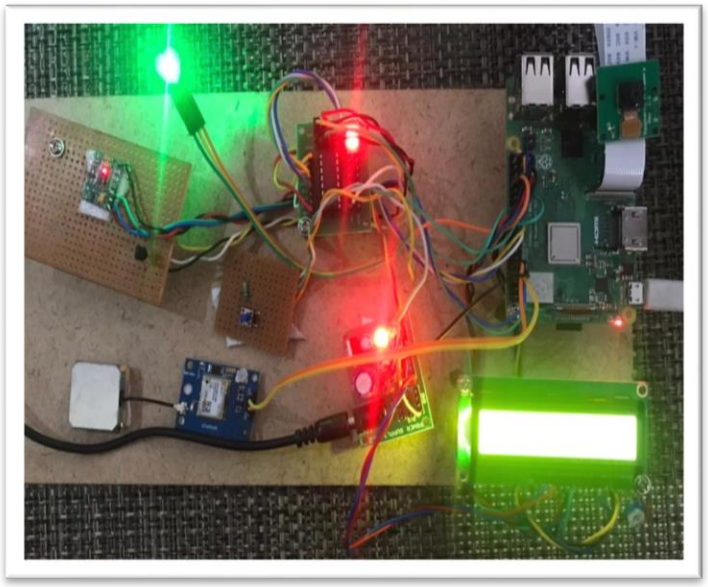

Fig -2: Working

V. INTERFACE

Blynk: Blynk is a hardware-agnostic IoT platform with white-label mobile apps, private clouds, device management, data analytics, and machine learning.

Blynk application:

- This application is developed that can measure heartbeat and Heart-beat variability parameters for patients who should be under constant observation.
- The wearable sensors are used to constantly measure patient's physiological signals.
- These signals are sent to app through Wi-Fi and stored in Blynk cloud.
- A predetermined critical value is set for heartbeat, if measured values exceed the critical value, then, an SMS is sent to the nearby hospital.
- The SMS includes the heart-beat rate and the exact location of the patient tracked through latitude and longitude.

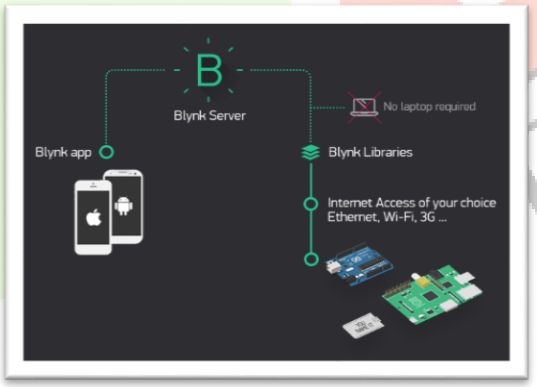

Fig-3: Blynk

Telegram bot: Bots are simply Telegram accounts operated by software - not people - and they'll often have AI features. They can do anything -teach, play, search, broadcast, remind, connect, integrate with other services, or even pass commands to the Internet of Things. In our case we'll pass commands to raspberry pi regarding threshold. We have to create a bot based on Telegram that uses an ESP8266 to control Peripheral.

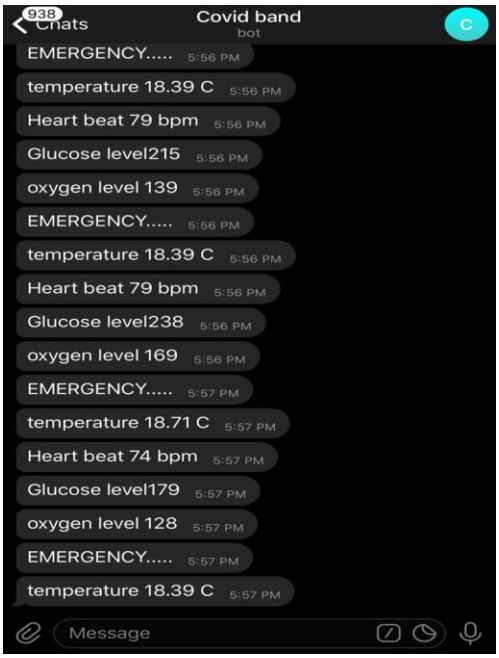

Fig-4: Telegram Bot

Thingspeak*:* Thingspeak is an open-source Internet of Things (IoT) application and API to store and retrieve data from things using the HTTP and MQTT protocol over the Internet or via a Local Area Network. Thingspeak enables the creation of sensor logging applications, location tracking applications, and a social network of things with status updates and quit. It is an IoT analytics platform service that allows you to aggregate, visualize, and analyses live data streams. Thingspeak allows you to connect and save sensor data in the cloud and develop IoT applications. Once you send data to Thingspeak from your devices, you can create instant visualizations of live data without having to write any code.

Twilio*:* Twilio Messaging is an API to send and receive SMS, MMS, OTT messages globally. It uses intelligent sending features to ensure messages reliably reach end users wherever they are. Twilio has SMS-enabled phone numbers available in more than 180 countries.
Twilio receives the message from the carrier over a dedicated connection between Twilio and that carrier. The message then lands in Twilio's messaging processing stack where Twilio has written software to receive and interpret that message.

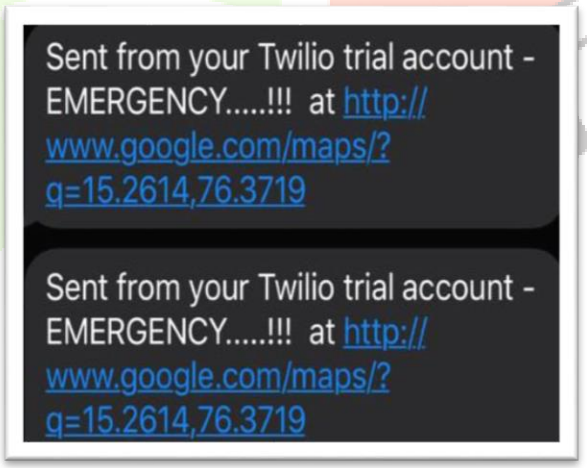

Fig- 5: Twilio

VI. HAAR CASCADING ALGORITHM

It is an Object Detection Algorithm used to identify faces in an image or a real time video. The algorithm is given a lot of positive images consisting
Haar Cascade is a machine learning object detection algorithm used to identify objects in an image or video. It is a machine learning based approach where a cascade function is trained from a lot of positive and negative images. It is then used to detect objects in other images. It is well known for being able to detect faces and body parts in an image, but can be trained to identify almost any object. First step is to collect the Haar Features.
A Haar feature considers adjacent rectangular regions at a specific location in a detection window, sums up the pixel intensities in each region and calculates the difference between these sums, of faces, and a lot of negative images not consisting of any face to train on them. The model created from this training is available at the OpenCV GitHub repository.

Training Data Sets of Face Detection Using HAAR Cascade

Face training is a stage where we recognize faces in images and videos, we first need to quantify the faces in the training set. Face Trainer is where all user data from the dataset and "trainer" the OpenCV Recognizer. This is done directly by a specific OpenCV function. The result will be a .yml file that will be saved on a "trainer/" directory. Face Trainer is where all user data from the dataset and "trainer" the OpenCV Recognizer. This is done directly by a specific OpenCV function. The result will be saved on a "trainer/" directory. Face recognition is a method of identifying or verifying the identity of an individual using their face. There are various algorithms that can do face recognition but their accuracy might vary.

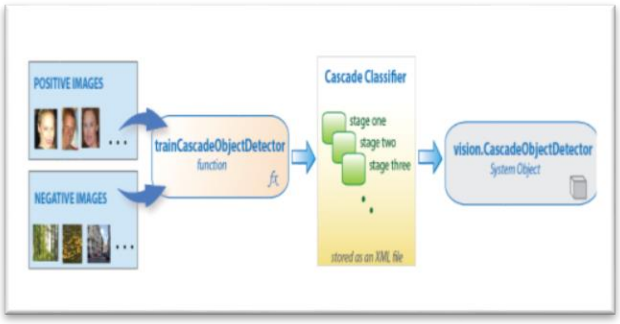

Fig-6: Haar Cascading algorithm

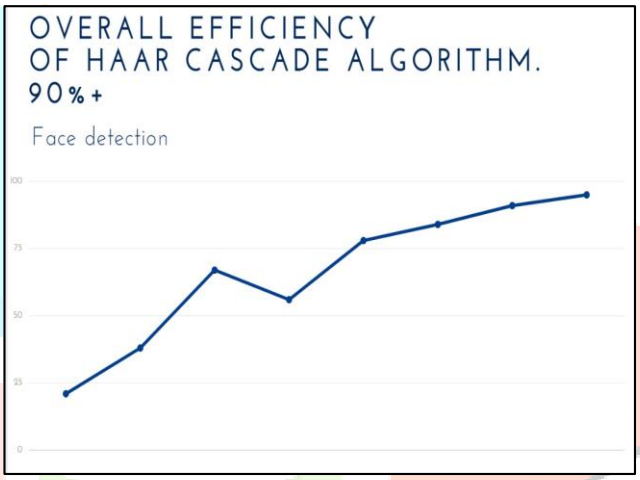

Fig-7: Haar cascade Efficient

VII. EXPERIMENT

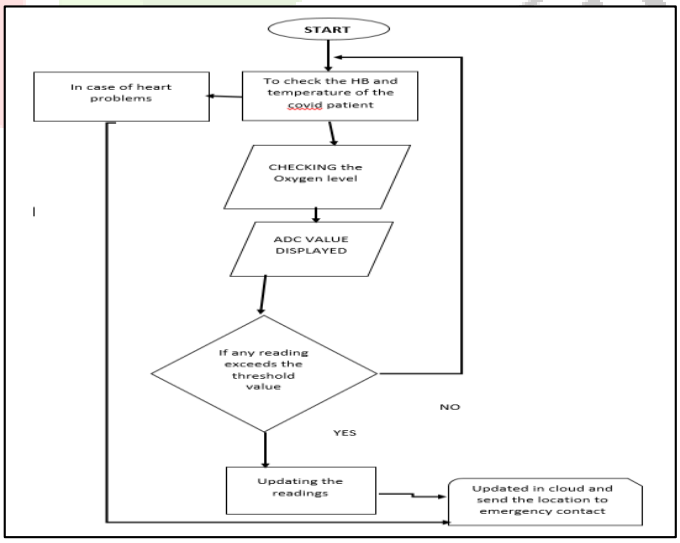

Fig-8: Flow Chart

The COVID-19 patient can monitor his own condition at any time, though this he can save the life. Sensor technology is to be used for monitoring the COVID-19 patient condition easily. Temperature: For the temperature we have 2 domains, the cold air and the hot air. The patients are mostly exposed to cold air after exercising. It is advised to avoid temperatures below 18°C. The temperature of 15°C and below is considered risky. The hot air is by itself dangerous. It also helps contain pollen and air pollution. It is advised to avoid temperatures above 27°C. The temperature of 30°C and above is considered also risky for the COVID-19tic patients.
The system uses Microcontroller. A SPO2 sensor, and Temperature sensor are connected to the Microcontroller. The temperature sensor gives the temperature value in degree Celsius. To measure the heart rate, the heart beat/pulse is detected and the number of pulses for one minute is counted to get the beats per minute. Light (using an LED) is passed from one side of the finger and the

intensity of light received on the other side is measured (using an LDR). The GPS and Nodemcu modules are interfaced with the microcontroller. The GPS module finds out the latitude and longitude of the patient. The temperature and Spo2 values are measured and compared with a configurable threshold to be classified as “low”, “normal” or “high”.

The Nodemcu module is used to send a message to the doctor’s mobile in case of emergencies. The message contains the temperature, Spo2 values and the patient’s latitude and longitude. The doctor can thus take immediate action with the help of this alert system and if in case of changing the position of Covid Patient also detect by using GPS value and send alert to the concern persons.

The measurement results are transmitted via a wireless interface to a PC, tablet or smartphone and are recorded in an electronic diary or, for example, can be used to train a neural network. This will allow for the accumulation of data to adapt the program of processing results for a specific patient and more accurately monitor the change in its health.

When the measurement results exceed the set limits, an alarm is generated, which is displayed as a message on the screen of the mobile device and can be sent to the email address of the medical centre.

The described individual system can be useful for continuous express monitoring of the condition of a person suffering from COVID-19 during the day and warning him about the need to take medicine. In addition, it can be useful in medical institutions for monitoring the condition of a patient in hospital, and monitoring the effects of drugs.

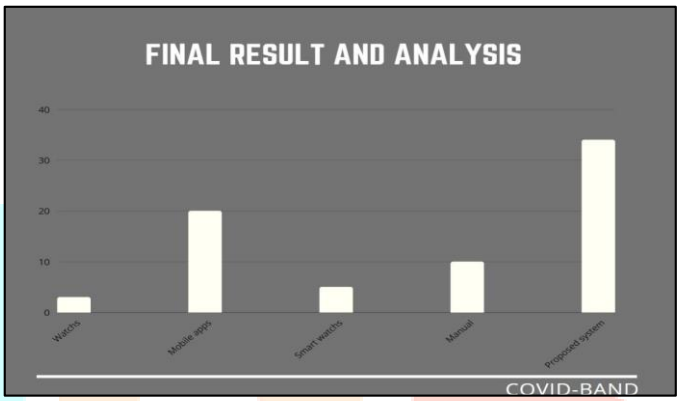

Fig-9: Final Result

VIII. CONCLUSION

The prospects for introducing a portable system for diagnosing COVID-19. A block diagram of the system is presented on the basis of a cheap patient status sensor in combination with a portable computing device - a smartphone, tablet, etc. Such a structure will significantly reduce the cost of the device, which will contribute to its wider distribution. As the main method of state control, it is proposed to use the method of measuring the transmission coefficient of the microwave signal through the patient's chest. In this case, measurements are carried out at a single point, but for a long time, for example, when the device is continuously worn during the day. The advantages of using microwave technologies allow us to apply the proposed structure to monitor the condition of patients of all age groups, including young children. The integration of additional sensors for the patient’s vital activity and the state of the environment, together with the use of modern IT technologies, will enable the creation of a comprehensive system for monitoring the patient’s condition and informing him of the necessary actions in a timely manner.

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