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A Novel for Analysing Corona Virus using Smart Band

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***Abstract* – In pandemic situation, due to infection causing virus like COVID-19, etc. It is mandatory to find out the people who affected by that virus and continuously track them and separate them at proper time and get them to the physical observations and provide the treatment. Above this is the real time practice and those who have affected with virus, will have the symptoms only after a couple of days and can have the possibility of spread around them. And requires a lots of service staffs to monitor them and manually get the readings from them like body temperature, oxygen level in blood , heart rate, etc. Which is more expensive and time-consuming process. We introduce a technology that eliminates the human service requirements and provides the necessary readings from the persons and get interaction with the virus-affected persons.**

Keywords- Indian Council of Medical Research (ICMR), Deep Learning (DL), Computed tomography (CT), Support Vector Machine (SVM), Convolutional Neural Network (CNN) , Inertial Measurement Unit (IMU), Robust Activity (RA), Deep Neural Network (DNN).

I. INTRODUCTION

We live within the 21st century where the world is subsiding on the harmful novel coronavirus over nine crore people have been affected by covid-19 and 20 lakh people lost their lives due to this virus. Current proof conveys that transference of COVID-19 occurs generally between person by having a in person interactions else on interactions with an affected person in the way of respiratory organs or saliva and through droplets while coughing, where these are evicted from infected one sternutation, sings else speaks. Commonest symptoms like dry cough, tiredness, and fever [1-8]. Persons aged sixty and more than, or those with medical problems like high-pressure level, heart and lung problems, diabetes, obesity, or cancer, are at higher risk of arising a severe illness. On average when an individual was affected with the coronavirus it takes a minimum of five to six days for symptoms to point out, however it can maximize to fourteen days. It is most significant to seek out people affected by this virus. In basic, we have to monitor those who have symptoms, if the symptoms matched with this virus then need to isolate the individual within the correct time and provide the treatment for them. It is real-time practice happening now. In India, Twenty crore people are tested and a survey says on average one person is suffering from the virus by every 19 tested persons. In the year 2020, more than 60% of individuals who tested on the virus are suffering from it. Bharat Biotech in alliance with the (ICMR) - National Institute of Virology (NIV) succeed corona vaccine COVAXINTM that was accomplished in India on January 13. By integrating the concepts, GSM or WIFI to beat this sort of infection occurrence proposed IOT BASED CORONA ANALYSER BAND using ESP32, which provides an effective solution for the security of affected people, surroundings, and medical staffs and eliminates workers in this crucial situation [9-15].

II. LITERATURE SURVEY

A survey on corona virus from World Health Organization reported that over 110 million cases where found. 62.1 million People were recovered and 2.44 million deaths were recorded. In this lot of people spread corona virus without their own knowledge and lack of awareness. In [14] uses the radiology, where x-ray on chest helps in detection with thermal samples and generate a dataset from various investigation. In [1] admits that with 3-dimensional Deep learning system can automatically scan people for detection corona virus with 3-Dimensinal volumetric and Computed Tomography image data. Have the extensions of C3D, LRCN, I3D, 3D DenseNets, and D ResNets. In [15] admits that lungs organ gets affected with corona virus, so in the this model they use PET, MRI and lung ultrasound. In addition, with the help of AI undergoes imaging data by quantitative analysis. In [5] uses the x-ray of chest image, which provides quick information about the respiratory systems. This system helps in detecting corona virus with neural network has ability to provide a great sensitivity of 96% with the help of SVM quadratic and cubic and ensuring to reduce the false detection. In [6] this model has the Alexnet network in DL, which will check CT image of lungs where it is infected with corona virus. The model is built up with eight-layered Alexnet network with hyper parameters. In addition, it consist of optimizer, which are on the basis of Pytorch DL

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frameworks. In [10] this model has Convolutional Neural Networks will get x-ray images of 20,000 with 224 width x 224 height. Analysis all images with CNN, then with the help of trained model this predict the person who has infected with the corona virus. In [8] this is a sensor based detection system with RA in addition with the observation system of slow fall is used. This uses smart and compact implantable device and sensors integrated with IMU and DNN is integrated for classifying and fusing data from the sensors. This system has the ability to provide an accuracy of 90%. This corona virus can take lots of life away, so survivors from this will have pleasant life.

III. Proposed Working

When the dangerous corona virus enters any human body, first it affects the living cells in order to reproduce and multiply into number of viruses. A human body has alveoli inside the lungs, which helps in inhale and exhale. The Alveoli become inflamed. The inflammation will fill the alveoli with fluid. This may reducing the oxygen content level in blood .This can cause a lobar pneumonia or bronchopneumonia. Pneumonia causes breathing difficulties, coughing, chest pain, fever and leads to serious complications. Finally can lead to failure of respiratory organs. At that situations ventilator helps to breathe. In your model, numerous sensors were embedded to monitor the human body.

A. Sensor Implementations

- MAX30100 Pulse Oximeter
- DS18B20 sensor
- DHT11 Sensor

The MAX30100 Pulse Oximeter sensor unit have ability to collect the saturation percentage of blood and oxygen and provide the beat rate of the heart. The DS18B20 sensor unit have ability to measure the human body temperature. The DTH11 sensor will measure the person surrounding parameters like temperature and humidity that helps in calculating the body temperature with high accuracy. Therefore, all the sensors were connected with microcontroller what as ESP32. The microcontroller is connected with a cloud database with the help of Wi-Fi or GSM module along with the microcontroller. The Database will keep on collecting the real time readings from the human body where a number of analyser bands can be connected with it. A software system will continuously evaluating the readings from the individual controller. Identify the device by its unique IP of the controller. A person details who are wearing the bands are initially fed into the database for identification process. When the software evaluate readings from a person and if the readings met with those below conditions, the software system will give an alert notification.

IV. Evaluation Software Functionality

- Heart beat rate per minute < 60 per minute
- Fever > 98.6 degree Fahrenheit
- Blood oxygen saturation < 95%

V. Diagram

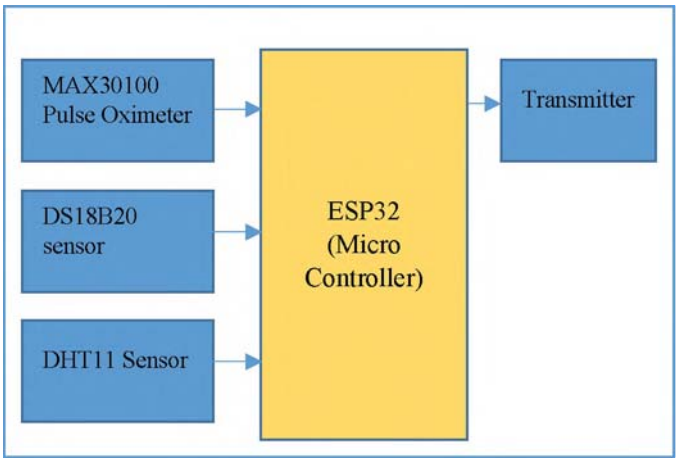

Fig.1. BAND

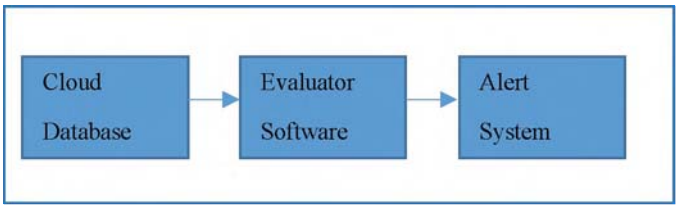

Fig.2. CLOUD DATABASE

VI. Work Flow

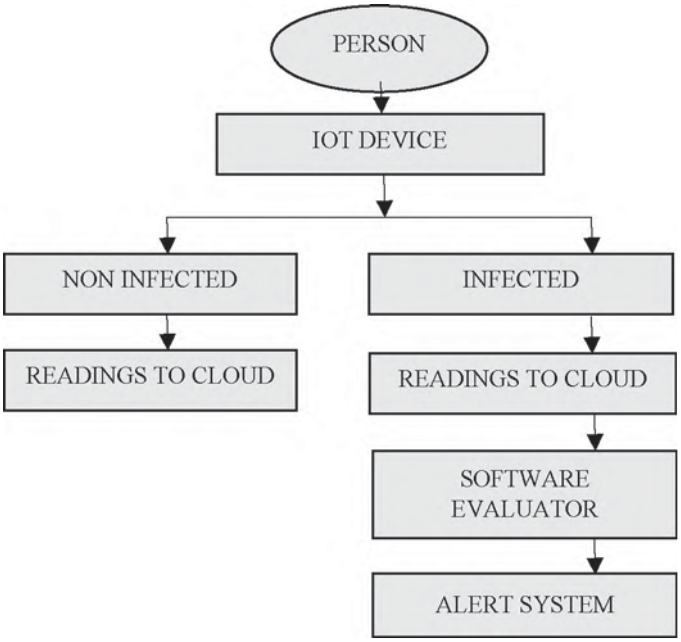

Fig.3. FLOW CHART

Fig.3 is the flow chart, all the suspected persons are connected with their bands and the required readings are taken from them. Either the person in infected or non-infected and those readings are send across to database after the evaluation, alert system creates an alert notification based on the readings.

VII. Result and Discussion

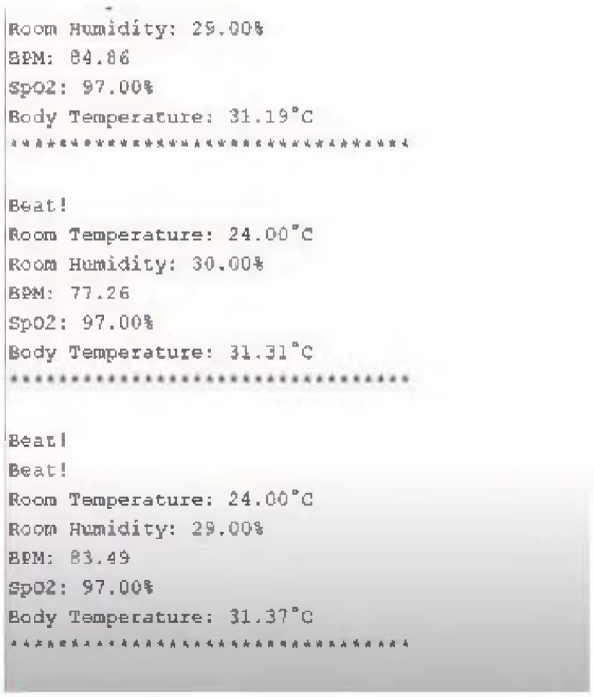

Fig.4. SIMULATION

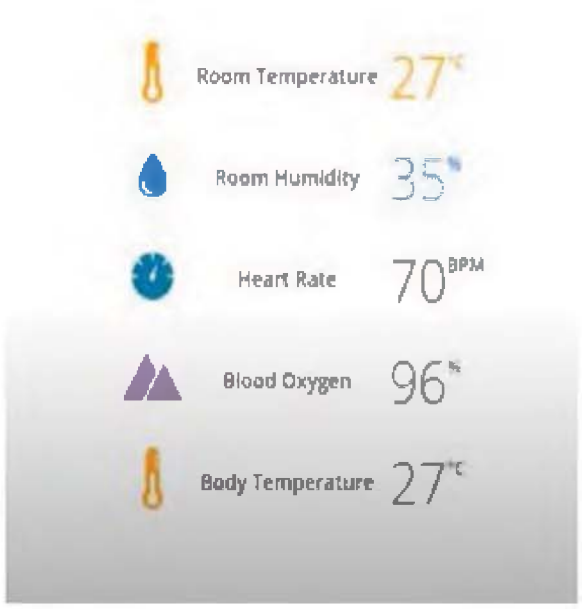

Fig.5. OUTPUT

The above images shown are the result from the readings, which are obverse from the human body, and when the person is fed with the band, it starts sending the continuous human body information to the database and after the certain evaluation, the person who was infected with the virus is found easily.

VIII. Conclusion

Life is most valuable thing in world, which cannot be bought again once it is lost with this dangerous virus like corona. Therefore, our proposed model can help the people by continuously tracking them. In addition, ensure to provide a safe and secure system while dealing with the dangerous virus. Therefore, our model has the ability to deal with them and provide the privacy with the concern person and has the great extendibility features.

IX. Future Work

In future, the model can be added with the extra modules like GPS, other required sensor units. There may be a chance the person can remove the band or move from the respected allocated space. During that time, the GPS is necessary to keep on tracking them with their outdoor moments. And removal band will cause a dangerous situation so the alert system notify the health department while continuous tracking information is lost, which will helps the model to avoid high risks.

Reference

[1]. Abdullah Aman Khan, Sidra Shafiq, Rajesh Kumar, Jay Kumar, Amin Ul Haq, " H3DNN: 3D Deep Learning Based Detection of COVID-19 Virus using Lungs Computed Tomography," 2020 17th International Computer Conference on Wavelet Active Media Technology and Information Processing (ICCWAMTIP), Dec. 2020.

[2]. Rajarshi Bhadra , Subhajit Kar, " Covid Detection from CXR Scans using Deep Multi-layered CNN," 2020 IEEE Bombay Section Signature Conference (IBSSC), Dec. 2020.

[3]. Luqy Nailur Rohmah , Alhadi Bustamam, "Improved Classification of Coronavirus Disease (COVID-19) based on Combination of Texture Features using CT Scan and X-ray Images," 2020 3rd International Conference on Information and Communications Technology (ICOIACT), Nov. 2020.

[4]. Sertan Serte , Ali Serener, " Early pleural effusion detection from respiratory diseases including COVID-19 via deep learning," IEEE, Nov. 2020.

[5]. Ali Narin, "Detection of Covid-19 Patients with Convolutional Neural Network Based Features on Multi-class X-ray Chest Images," 2020 Medical Technologies Congress (TIPTEKNO), Nov. 2020.

[6]. Tao Wang , Yongguo Zhao , Lin Zhu, Guangliang Liu , Zhengguang Ma , Jianghua Zheng, " Lung CT image aided detection COVID-19 based on Alexnet network," 2020 5th International Conference on Communication, Image and Signal Processing (CCISP), Nov. 2020.

[7]. Mohammed Seghir Guellil , Samir Ghouali, Emad Kamil Hussein, Mohammed Anis Oukebdane, Amina Elbatoul Dinar, Walid Cherifi, Abd Ellah Taib, Boualem Merabet, "WEB Predictor COVIDz: Deep Learning for COVID-19 Disease Detection from chest X-rays," 2020 International Conference on Decision Aid Sciences and Application (DASA), Nov. 2020.

[8]. Xiaoshuai Chen , "Subject-Independent Slow Fall Detection with Wearable Sensors via Deep Learning," 2020 IEEE SENSORS, Oct. 2020.

[9]. Adrian Florea , Valentin Fleaca, " Implementing an embedded system to identify possible COVID-19 suspects using thermovision cameras," 2020 24th International Conference on System Theory, Control and Computing (ICSTCC), Oct. 2020.

[10]. Sammy V. Militante , Nanette V. Dionisio, " Pneumonia and COVID-19 Detection using Convolutional Neural Networks," 2020 Third International Conference on Vocational Education and Electrical Engineering (ICVEE), Oct. 2020.

[11]. Omer Faruk Yakut , Fatih Ertam,"A Digital Forensics Analysis for Detection of The Modified COVID-19 Mobile Application," 2020 5th International Conference on Computer Science and Engineering (UBMK), Sept. 2020.

[12]. R. Arulmurugan and H. Anandakumar, "Early Detection of Lung Cancer Using Wavelet Feature Descriptor and Feed Forward Back Propagation Neural Networks Classifier," Lecture Notes in Computational Vision and Biomechanics, pp. 103–110, 2018. doi:10.1007/978-3-319-71767-8_9

[13]. Halgurd S. Maghded, Kevin Curran, Danda B. Rawat, " A Novel AI-enabled Framework to Diagnose COVID-19 using Smartphone Embedded Sensors," 2020 IEEE 21st International Conference on Information Reuse and Integration for Data Science (IRI), Aug. 2020.

[14]. Ravneet Punia, Lucky Kumar, "Computer Vision and Radiology for COVID-19 Detection," 2020 International Conference for Emerging Technology (INCET), June 2020.

[15]. Di Dong, Zhenchao Tang, Shuo Wang , Hui Hui ,Lixin Gong, "The Role of Imaging in the Detection and Management of COVID-19," IEEE Reviews in Biomedical Engineering, April 2020.