JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

Wearable Band For Covid-19 Patients For Tracking And Safety

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Abstract : Due COVID-19 has become a pandemic with potentially fatal clinical signs. A large-scale pandemic, such as COVID-19, puts enormous strain on global health systems, wreaks havoc on vulnerable populations, and poses a serious threat to global societies. While front-line efforts are focused on identifying the virus, administering treatments, and producing vaccinations, it's also critical to look at the technologies and systems that may be used to combat disease emergence, stop it from spreading, and, most importantly, develop a disease prevention strategy. The goal of this paper is to look at enabling technologies and strategies for dealing with the COVID-19 dilemma in a variety of situations.
This paper will concentrate on
1) Wearable devices for monitoring at-risk and confined populations, as well as assessing the health of cares and management professionals and facilitating hospital admissions triage
2) Unobtrusive sensing devices for detecting disease and monitoring patients with modest symptoms whose clinical condition in makeshift hospitals could quickly deteriorate.
3) Remote COVID-19 and related disease monitoring and diagnosis using telehealth technologies. Finally, new challenges and possibilities for future development paths are examined.

Index Terms – Covid-19, Pandemic, wearable devices, Arrhythmia Detection

I. INTRODUCTION

Heartbeat Corona virus disease-2019 (COVID-19) has infected over 210 countries throughout the world. COVID-19 is highly contagious, with case death rates ranging from 6.2 percent to 7.2 percent in the hardest-hit countries, and it is a major public health problem. According to the most recent estimates from the World Health Organization (WHO), the epidemic has infected over 3,349,000 people worldwide and killed over 238,000 people. The number of confirmed cases of COVID-19 is over 400 times that of the preceding corona virus-induced severe acute respiratory syndrome (SARS) outbreak in 2002-2003, and the number of persons infected with COVID-19 is expected to climb.

The COVID-19 outbreak is not only a threat to global public health, but it also has a wide variety of ramifications.
COVID-19, which is caused by the SARS corona virus 2 (SARS-CoV-2), causes respiratory symptoms that can progress to pneumonia and, in severe cases, ARDS, as well as carcinogenic or distributive shock. Despite some clinical parallels between SARS-CoV-2 and SARS-CoV, a new study shows that SARS-CoV-2 is highly efficient in person-to-person transmission and frequently causes silent infections. Clinical deterioration can occur swiftly, particularly in the second week of illness, resulting in ICU admission and a high mortality rate. COVID-19 symptoms range from asymptomatic, subclinical infection and mild illness to severe or fatal illness. Asymptomatic, mild, moderate, severe, and critical COVID-19 instances are categorized into five categories. According to Chinese statistics, 15-20% of the population is poor.
Because of its severity and rapid spread, the COVID-19 pandemic has caused substantial issues for global healthcare systems. COVID-19 has the potential to quickly overwhelm health-care systems, limiting their ability to deliver treatments not only to COVID-19-infected people, but also to those with unrelated health concerns. According to experiences gathered from epidemic centers such as China, Italy, and the United States, COVID-19 can reduce the capacity of health-care systems even in countries with abundant health resources and universal treatment. In most countries, people with COVID-19 are currently triaged based on the severity of their disease to reduce the burden on health-care systems; critically ill patients are admitted to the hospital, while patients with mild symptoms and no underlying chronic illness are discharged.

II. LITERATURE SURVEY

1. Dhruv R. Seshadri Frontiers in Digital Health, 2020, et al.

Commercial gadgets are used to evaluate health status by measuring physiological variables. The COVID-19 pandemic will be managed via digital health tools. Preventing false positive diagnoses with commercial instruments Commercial gadgets are employed in decision making. Covid-19 is being monitored using a clinical approach and commercially available wearable sensor devices. Create and test an algorithm to keep track of the issue of data privacy and sharing.

2. Electronics, Nora El-Rashidy et al., 2020

The goal is to close the gap between today's technological environment and health-care systems. Information from patient x-ray scans is used to forecast the state of the art using a CNN-based deep learning model. A three-layer framework with patient, cloud, and hospital layers. Pretrain, forecast, and test new classifiers using deep learning classification model architecture using Dataset. Wireless sensors consume a lot of power, and vital indicators are automatically transmitted in aggregate. Early detection and isolation of sick patients, cloud monitoring effectiveness, and x-ray.

3. Actuators, Leonardo Acho et al., MDPI, 2020.

The goal is to monitor and discover whether a patient's lung state is healthy or sick. Potential advantages of utilising a mechanical ventilator are depicted in this diagram. Respiratory frequency, patient air volume, and respiration cycle are used in intensive care units (ICUs) to define inhale and exhale. A pressure sensor, an Arduino, a Raspberry Pi, an interface, a servomotor, a monitor, and a resuscitation bag were used to collect data. To classify, the fault is in the equipment operation. Signals collected from healthy and ill patients are misinterpreted. For a lung monitoring system, a numerical approach of classification and the clegg-integrator philosophy are used.

4. Fayez, Qureshi, and others Sensors are devices that detect changes in the environment (2020)

The goal is to build wearable gadgets using the Internet of Medical Things. Biomedical wearable front end API. Wearable PPG, accelerometer, EMG sensors, Raspberry Pi-based edge computing, and a dashboard that acts as a physician. Biomedical signal sample, design variables such as economic cost, and human safety concerns, as well as the cost of sensors and comparative research Arduino, microphones, and the cloud.

5. Petrovic and colleagues (2020). IcETRAN

Through social distancing, mask detection, contactless temperature sensing, and this IOT-based solution aims to build interior safety. Thermal camera, Arduino Uno, Raspberry Pi, OpenCV, MQTT, Mask detection algorithm, mobile application.
Although the quantity of frames handled per second limits performance, opensource software is reliable. Accuracy and frame rate of mask recognition, as well as social distance and temperature sensing.

III. PROPOSED METHODOLOGY

To develop a system that can detect a person's body temperature and pulse rate through the sensors and deliver the information regarding the same for the concern health worker. Track the patients movement during quarantine period. Intimating the message to the concern person if patient come out of the quarantine before complete cure. The COVID-19 pandemic is emerging, spreading quickly, and causing havoc on the lives of our nations. Governments and health experts have already proposed strict anti-coronavirus measures in response to the pandemic's threats. However, nothing is known about the role of technology in this situation. We want to learn about IoT engineers' attempts to address the ongoing pandemic and act to keep their communities safe in this RQ. It's vital that the community understands what's being built for them and how to make the most of technological improvements. We accomplish so by examining the percentage of COVID-19 IoT projects and IoT engineers, as well as the evolution of COVID-19 IoT project publication.

A. Objectives

1. To design a system that can control spreading of COVID-19.
2. To provide a information of person's body temperature and pulse rate by using the sensors.
3. To develop a device this can ideally be integrated with an alarm to remind the patients to take their medication.
4. To design a system that can track the information of the patient if the person moves from one place to another

The system is controlled by a microcontroller. The Microcontroller is coupled to a SPO2 sensor and a temperature sensor. Temperature is measured in degrees Celsius by the temperature sensor.
The heart beat/pulse is detected and the number of pulses for one minute is counted to get the beats per minute. The intensity of light received on the other side of the finger is measured when light is transferred from one side of the finger (using an LED) (using an LDR). The microcontroller is connected to the GPS and Nodemcu modules. The GPS module determines the patient's latitude and longitude. Temperature and Spo2 measurements are taken and compared to a user-defined threshold to decide if the numbers are "low," "normal," or "extreme."
"In the event of an emergency, the Nodemcu module is used to deliver a message to the doctor's cellphone." The patient's latitude and longitude, as well as the temperature and Spo2 levels, are all provided in the message. With the help of this alert system, the doctor may take quick action, and if the position of the Covid Patient changes, the doctor can identify it using GPS data and send an alarm to the concerned parties.

By sending the collected data to a Thing Talk or Blynk, the concept of IOT (Internet of Things) has been implemented. Using the Google Maps API, a map of the entire region is created using the patient's geographic coordinates. The map will show all of the nearby doctors/hospitals in that area, along with their contact information and directions.

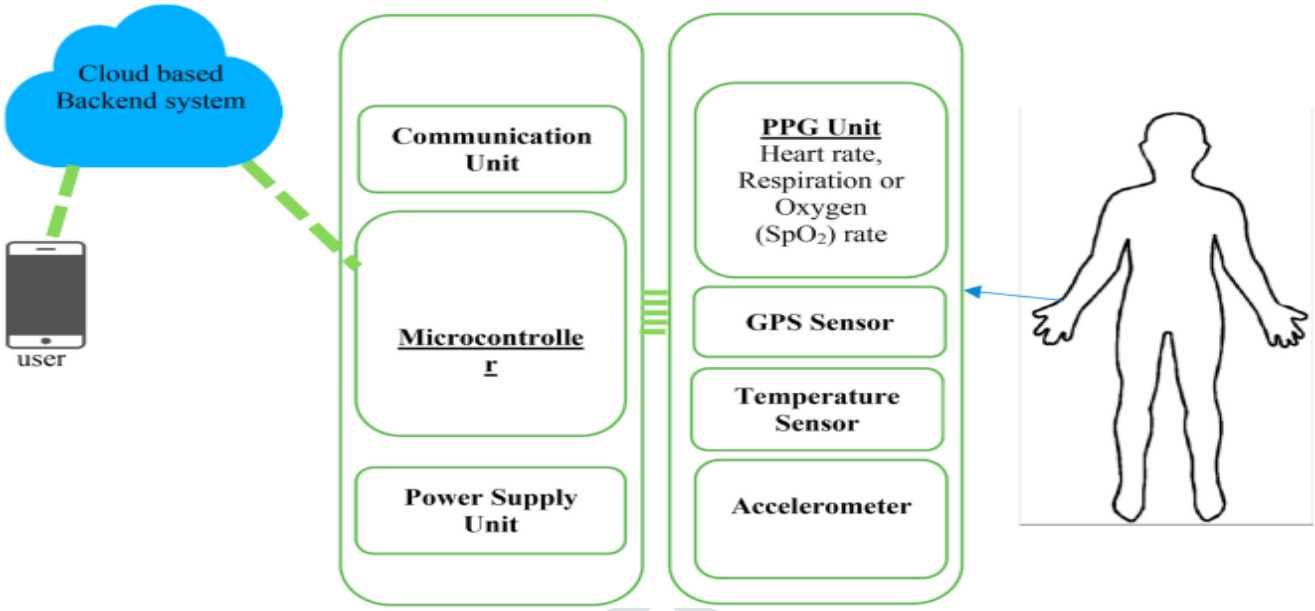

Fig 1. Proposed Methodology

V. RESULTS AND DISCUSSION

The suggested system includes a web-based application for medical authorities as well as an Android-based mobile app for patient family responses. Both interfaces work together to collect and notify health-related data. To learn more about an IoT-based wearable device's design architecture, which is represented by three different parties: The prospective infected patient (PIP) has a wearable sensor device that may be worn as a bracelet on any wrist or ankle and is used to transmit the patient's physiological health symptoms and location to the API cloud processing system. At the receiver end, there are two parties involved: one is the registered user family member who is primarily responsible for receiving alerts and notifications of critical health symptoms of the patient in quarantine, and the other is the registered user family member who is primarily responsible for receiving the alerts and notifications of critical health symptoms of the patient in quarantine.

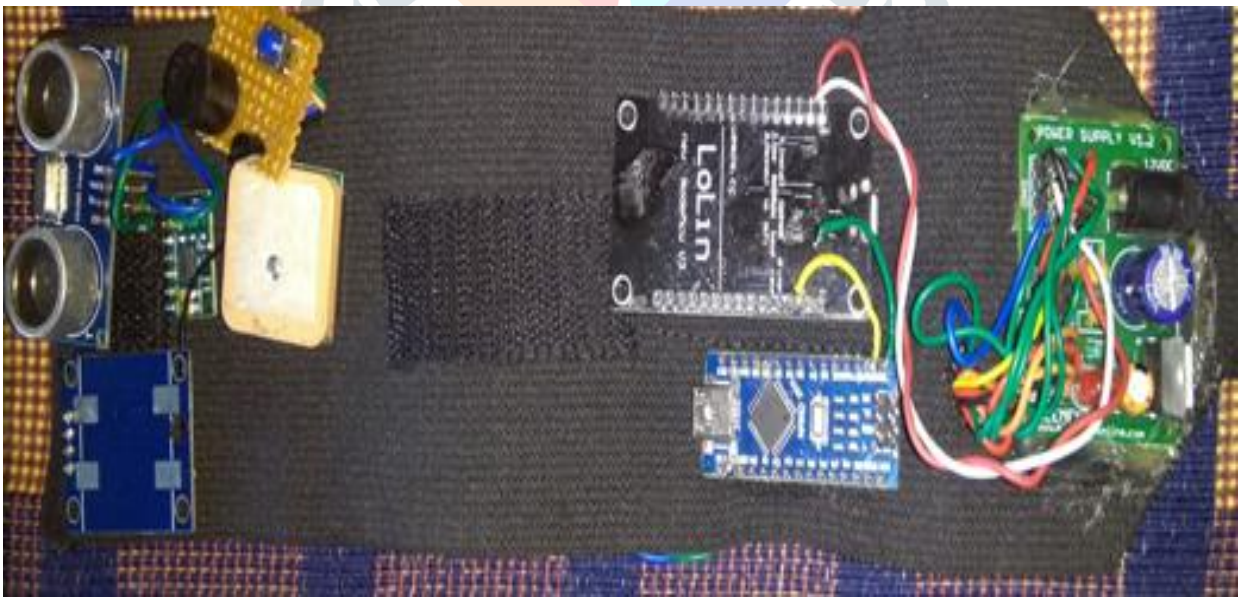

Figure 2 COVID Band in IOT KIT

The Application peripheral interface (API) housed on a web domain with cloud flare for storing and retrieval is the other party on the receiver side. This API is controlled by medical authorities, who use it to monitor and manage the crucial situation in which medications and consultations are delivered. While the patient is quarantined, the API interface is linked to a mobile Android application that delivers periodic updates on the patient's health symptoms.

Table 1. Real-time patient location information.

TIME	DATA	LAT	LON	ALT
16:27:22	28-03-22	40.986855	20.708899	98
16:27:24	28-03-22	40.986865	20.708807	98

16:27:26	28-03-22	40.986871	20.708815	98
16:27:28	28-03-22	40.986882	20.708822	98
16:27:30	28-03-22	40.986890	20.708832	98
16:27:32	28-03-22	40.986907	20.708844	98
16:27:34	28-03-22	40.986915	20.708858	98

Experimental results show that the minimum time for updating location information is 2-4 seconds. This time can be configured according to the individual movement.

VI. CONCLUSION

The suggested IoT-based solution has the potential to save lives and provide valuable service in the health sector. It could be a valuable tool for medical experts and law enforcement in the fight against the infection. This system can also provide critical healthcare to infected and suspected cases, as well as provide proper monitoring. The chance of healthcare service providers becoming infected from treating any patient can be lowered since physical distance can be maintained with the use of the system while delivering treatment. COVID-19 has been affecting various countries since March 2020. As a result, India has created the COVAX vaccine, an indigenous COVID-19 vaccine developed and manufactured by Bharat Biotech in conjunction with the Indian Council of Medical Research (ICMR). Only 30% of the Indian population has been vaccinated so far. To avoid the third wave of COVID-19, the whole Indian population must be vaccinated. We can reduce the spread of COVID-19 by vaccination and utilising the COVID wearable band.

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