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Remote Based Wireless Framework for Diagnosing Covid-19 using Internet of Things

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Abstract: In the current situation, the majority of the patients have been infected with pandemic diseases like as COVID-19, SARS, and others. Fever, fatigue, and a dry cough are the most well-known side symptoms of corona virus infection. The majority of individuals recover from their ailment without the need for therapy. This condition can be complex in rare cases since it is more serious in older persons and can potentially be deadly. People who are older or who have other health problems may become increasingly powerless in the face of serious illness. They died before the medical concerns were properly diagnosed. Because it necessitates a significant financial commitment in maintenance, diagnosis, and treatment, as well as time to administer tests and study the patient's prior health history. Numerous studies have been conducted all around the world in order to find a better answer to this problem. Patients' previous healthcare records were saved in the cloud as a database in the suggested solution. Unauthorized people cannot access the patients' medical records. This cloud-based database gives doctors access to the patient's prior medical history, allowing them to save the patient in an emergency. Additionally, telemetry techniques are used to continually monitor the present condition of pandemic patients. The health professional advises medications and/or recommends precautions based on the patient's report state, and provides effective therapy without direct contact with them.

Keywords: Covid-19, Diagnosis, Internet of Things, Pandemic.

I. INTRODUCTION

Unfortunately, the ageing population, together with the rise in chronic illness, is putting a strain on today's human healthcare systems [1-2], and the demand for resources ranging from clinic beds to experts and medical caregivers is astoundingly high [3]. Rapidly rising demand on healthcare systems can be mitigated if the right measures are taken to ensure that the most vulnerable patients receive the best possible treatment.

The Internet of Medical Things (IoMT) has been identified as a viable means of decreasing the burden on healthcare systems [4–8]. A lot of this research is focused on watching people with specific illnesses, such as diabetes [6] or Parkinson's disease [7]. Further study aims to meet specific needs, such as assisting recovery (Aiding Rehabilitation) by monitoring a patient's progress on a regular basis [8]. Related works [9,10] have also identified emergency healthcare services as a possibility, although it has not yet been thoroughly investigated.

A few recent studies have looked on specific zones and improvements associated with IoT healthcare. In [11,12], a wide overview is presented, with an emphasis on commercially available arrangements, possible applications, and unresolved difficulties. Instead of being examined as part of a larger framework, each subject is analysed on its own. Several sensor kinds are accessible in practise, including pulse, temperature, pressure, and humidity, and are compared in [13], with a focus on communication. Finally, [10] considers physical quantity sensing and big data management to be critical for the network that enables communication.

As a result, this research is unique in that it identifies all major components of an end-to-end IoT healthcare system and provides a standard model that can be used to any IoT-based healthcare systems. This is critical since there are currently no end-to-end IoT frameworks in use for continuous remote monitoring of patients' health.

This article also provides a comprehensive overview of the most recent advances that fall inside the suggested paradigm. Sensors for monitoring various medical factors, short- and long-range communication measures, and cloud approaches are the key targets.

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II. PANDEMIC DISEASES

A pandemic is a major illness epidemic that affects many countries, if not the whole world. It impacts a bigger number of individuals in a smaller amount of time in a densely populated region and kills more people than an epidemic. When it became clear that the disease was dangerous and that it was spreading swiftly across a large geographic area, the World Health Organization (WHO) declared COVID-19 a pandemic.

Fig. 1 depicts a comparing the fatality rates of several pandemic outbreaks throughout the world.

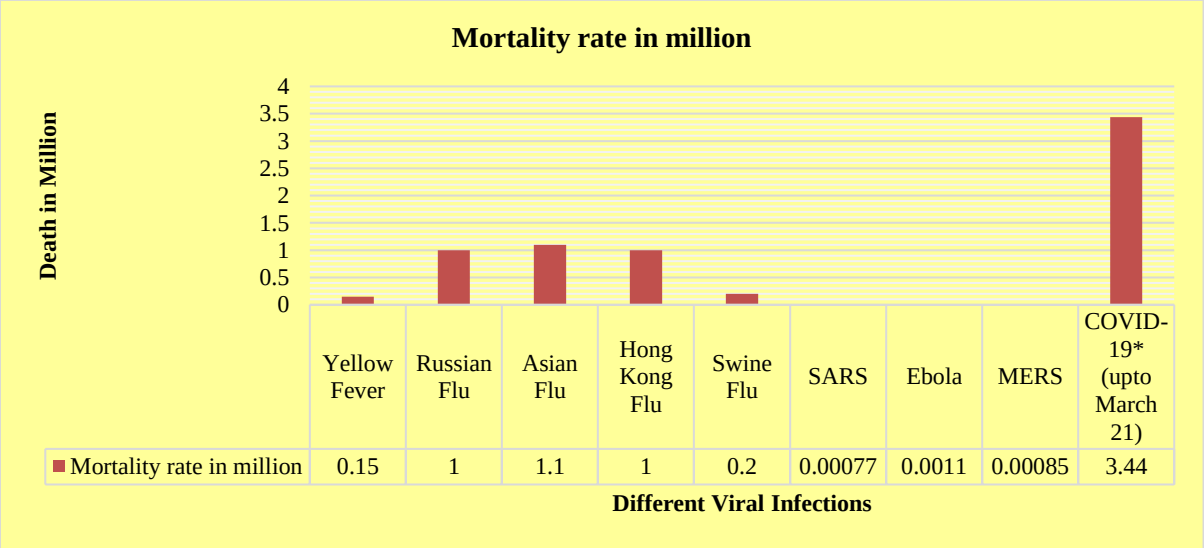

Fig. 1 Comparison of various Pandemics with Mortality rate

A. Data about COVID-19

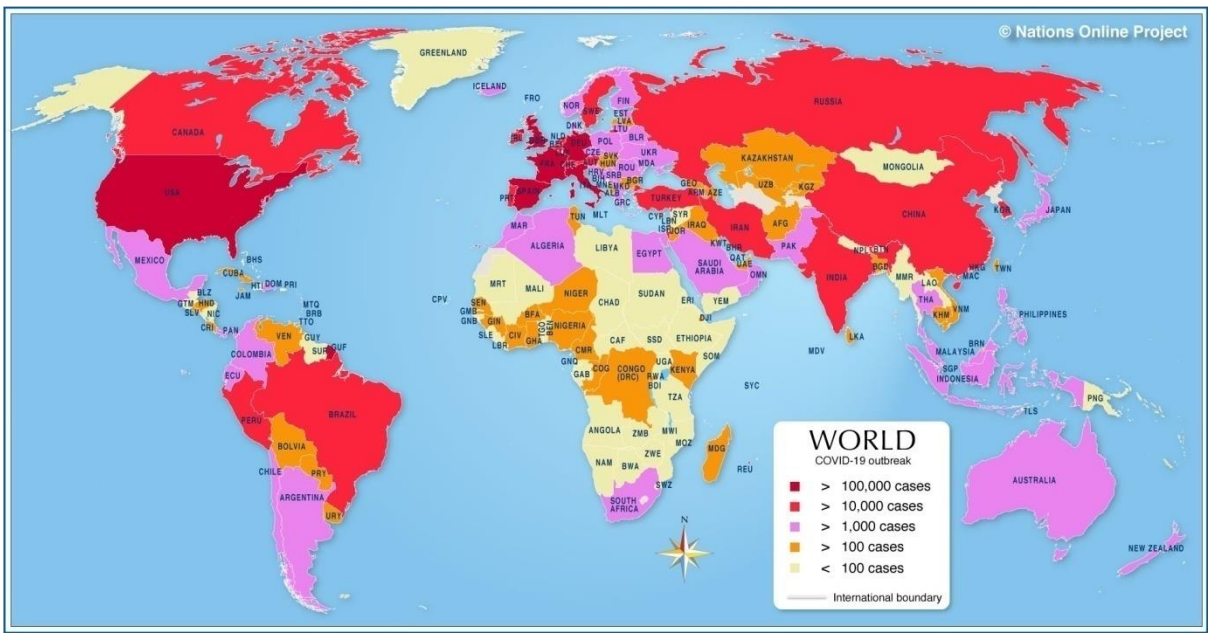

Fig. 2 Global Case Numbers reported (*data obtained from nationsonline.org) [14]

Figure 2 depicts the damaged and unaffected portions of the corona across the earth. WHO reports worldwide case numbers, which may be seen on the nationsonline.org website [14].

B. Symptoms: Corona infection can cause modest to serious health problems in patients. Elderly persons and individuals with serious health problems, such as a heart or lung infection or diabetes, appear to be more susceptible to COVID-19 infection.

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The COVID-19 is a new version of the COVID. Patients have a broader range of side effects to choose from, ranging from minor symptoms to life-threatening sickness. The symptoms may appear in Corona virus-affected people as early as the second day, and/or it may take up to 14 days following the infection.

The following are the most prevalent COVID-19 adverse effects, as reported by COVID-19 patients:

- Dry Cough
- Severe Fever
- Shortness of breathing or breathing difficulty
- Body/Muscle pain
- Chillness
- Lack of taste or smell
- Sore throat

This isn't a complete list of corona patient symptoms. Other adverse effects have been reported in a few cases, including gastrointestinal issues such as nausea, vomiting, and diarrhea.

C. Strategies used in COVID-19 diagnosis:

In order to diagnose and/or treat pandemic patients, several effective approaches are presently in use, [16]. The following are some of them:

The following are the strategies used to combat the spread of COVID-19,[15] :

1. Early detection of any COVID-19 patient crossing any country's border
2. Managing the proactive COVID-19 case and allocating containment.
3. Managing and allocating appropriate resources.
4. Raising public awareness of the issue.

III. Proposed Methodology

The proposed system's goal is to allow COVID-19 suspects with main symptoms and those patients to monitor crucial clinical data while being maintained in self-quarantine comfortably at home with the fewest issues and following all relevant safety recommendations. The block diagram of proposed methodology is shown in fig. 3.

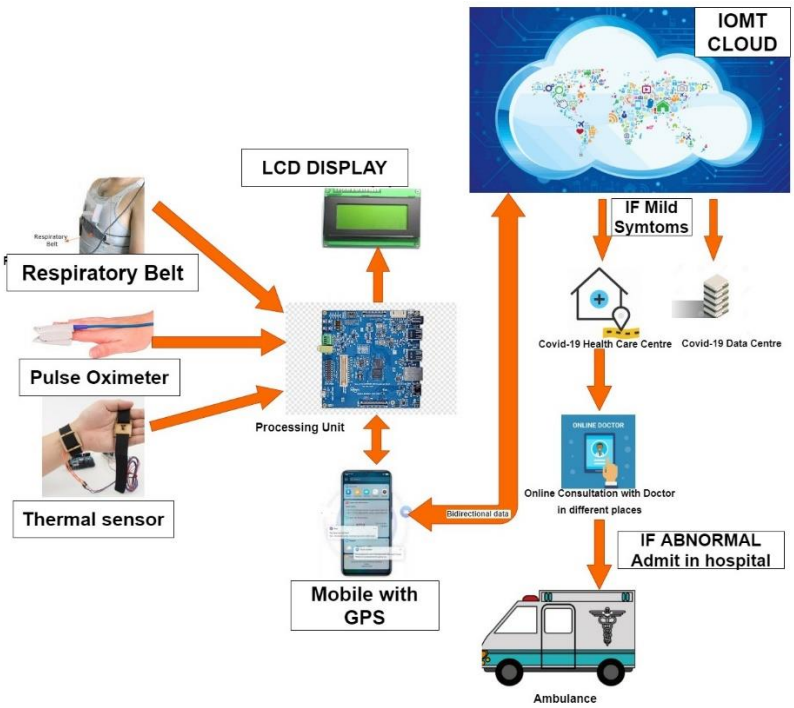

Fig. 3 Overview of the Proposed idea

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There is a peaceful atmosphere produced amongst the family and friends of Covid-19 patients as a result of adopting the recommended aiding and monitoring system.

This approach assists doctors and health care providers in making the best decision possible in a timely manner. This technology also enables health care providers to easily monitor the clinical data of Covid-19 patients, and data is obtained without the need for patients to be contacted. These systems include four sensors that collect patient data on a regular basis, mobile phones for monitoring and communication, and Internet of Things (IoT) that allows Cloud services and software to create connections.

The planned Covid-19 monitoring system employs a variety of sensors to track a patient's respiration rate, temperature, and pulse using data collected by a Signal conditioning unit coupled to mobile phones. In the given time interval, the suggested system checks Covid-19 patients in real-time. The data from the various sensors interfaced specifically with that system can effectively improve the efficiency of this proposed monitoring system, and the obtained data are stored in the cloud. The suggested healthcare system is very dependable and convenient for COVID-19 patients who are quarantined and advised to remain away for 14 to 28 days according to WHO criteria (WHO). This technology also assists suspected Covid-19 patients who seek to self-quarantine, as well as patients and health care professionals in monitoring a large number of patients who want to enhance their healthcare system by allowing home monitoring.

The suggested system is crucial because it not only monitors physiological data acquired via sensors from patients, but it also allows the data centre to preserve the patient's severe disease in real time. The data centre's record allows authorised health care personnel and doctors to access clinical data at anytime, anywhere in the country or around the world.

IV. CONCLUSION

With advancements in internet technology, a wide range of administrations may now be accessed, and the number of applications that use this technology is growing all the time. The present infrastructure and procedures make constant monitoring of patients in emergency clinic situations extremely difficult. Patients at medical facilities who are being monitored are depending on bedding, which makes them uncomfortable. Many medical conditions that require immediate attention might cause serious problems for the patient if they are not addressed on time. For individuals with coronary artery disease, a quick resolution is crucial. A remote patient monitoring device was used in this study to allow patients to be more flexible in their social zones. The developed framework reliably measures the patient's pulse and internal heat level and provides checking and monitoring via an android-based interface.

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