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Tele-Health Center and Cyber Hospital

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Abstract - *Nowadays, many diseases have developed as a pandemic with life-threatening clinical symptoms. A large-scale pandemic, such as COVID-19, places tremendous demands on the world's health systems, significantly devastates vulnerable groups, and poses a critical threat to global societies. The goal of this paper is to examine enabling technologies and systems, as well as possible application scenarios, for dealing with the COVID-19 situation and patient monitoring using cyber technology. The article will focus on 1) devices suitable for monitoring at-risk and quarantined populations, both for evaluating the health status of caregivers and management personnel and facilitating triage processes for admission to hospitals; and 2) unobtrusive sensing systems for detecting disease and monitoring patients with relatively mild symptoms; and 3) Telehealth technologies for remote monitoring and diagnosis, as well as cyber hospital technology for monitoring patients' worsening conditions. Finally, new difficulties and prospects for future development directions are discussed.*

Key Words: IoT, Hospital, Telecom, Cyber, Embedded, Sensor, Store, Secure

1. INTRODUCTION

This document is template. Science and technology have made life easier for everyone in all sectors of life through inventions and innovations. One example is in the field of medicine, where medical workers can now obtain important medical data from patients.

Before modern medicament came into the picture, life was quite fading for the humans. The surrounding atmosphere was satiated with invisible threats in the form of diseases and medical circumstances. Later, a methodized profession evolved from this medical practice serving humans a more desirable quality of life. Being encouraged by the latest innovations in medical science, the radius of medical technology stretched out to extraordinary limits. Nevertheless, the position of doctors in our society hasn't abated at all; doctors remain fundamental, despite of these technological innovations.

People nowadays in India are facing a lot of health issues. It is not convenient for all, to visit another doctor every time for a second opinion, as some doctors charge a lot of high fees or some are remotely located. In such a scenario, our web application acts as a second opinion provider. The patients need to enter their symptoms which they are facing and our web application will accordingly mention the probable disease as the output. Hereby, the patients can have a rough idea about the disease they might be facing.

IT has made it possible to decentralize the majority of employment that involves the electronic processing of information and can be considered the enabling technology for telehealth. Technology is moving at an increasingly fast pace, telehealth and telework is popular now and will continue to become even more popular as higher rates of data transfer and next generation communications are developed. There has been extensive debate in the media as to whether telecommunications can benefit or disadvantage business, expand or diminish individual freedom, improve or degrade working conditions and liberate or enslave people. This paper will discuss the social and business implications of telehealth in order to evaluate and better understand these and other factors. By doing so, managers and practitioners may be better informed when appraising telehealth as part of their business strategy.

2. LITERATURE SURVEY

2.1 Telemedicine Facilities on Ambulance for a Patient Pre-Hospitalized - A Raised Model

The proper management of tele-ambulance services necessitates a team of doctors, technicians, and professionals. Medical equipment and technology tools used in telemedicine must also be familiar to doctors, technicians, and experts. They must all be kind and energetic at work. Technicians or experts must be trained and experienced in the use of all medical equipment used in tele-ambulance, including blood grouping, pressure measurement, diabetes testing, and digital ECG monitoring. They should also be able to communicate with one another. The doctor at the hospital and the technician or expert in the tele-ambulance can communicate with each other, and the technician or expert can give the essential health services to the patient by providing proper advice based on the patient's condition. Tele-ambulance drivers must be trained in this area as well. So, they can assist the technician or expert if necessary.

2.2 Android based health care monitoring system

In most critical cases, patients' SP0 2, heart rate, and temperature should be monitored on a continuous basis. In previous techniques, doctors had to be physically present, or

in some situations, SMS messages were sent via GSM. Only current data is displayed in the previous case since the patient's history cannot be displayed. In this study, we propose a novel method for continuously monitoring a patient's health status. The health-care scheme focuses on measuring and monitoring various biological parameters of the patient's body, such as heart rate, oxygen saturation level in blood, and temperature, using a web server and Android application, so that the doctor can keep track of the patient's condition on his smartphone. In addition, the patient's medical history will be saved on the web server, and the doctor will be able to access the information whenever he or she needs it from anywhere without having to be physically present.

2.3 A health monitoring system for elderly people living alone

For older persons who live alone, we designed a health monitoring system. We used infrared sensors in each room of eight subjects' residences to track their in-house movements (average age 81 years). Monitoring might persist longer than other sorts of monitoring since their movements were uncontrolled. A total of 80 months of continuous monitoring was carried out. We discovered that each participant had a distinct movement pattern. We calculated their health status by comparing the length of time they spent in various places, such as the restroom, to previously collected data. We alerted the family of the incident if an unexpected status was discovered after analysis. Final choices should be made by family members rather than by computer software. Family members could, for example, call an ambulance or arrange for a doctor or home aid after speaking with the subject or a neighbour on the phone. As a result, both the elderly subjects who lived alone and their family members had less worry as a result of this system.

2.4 Mobile sensor data collector using Android smartphone

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3. EXISTING SYSTEM

An existing system from 2011 stated that 94.1 % of Indonesian households were located more than 5 kilometers away from the nearest healthcare centers. These drew them significant amount for travelling all the way to these healthcare centers that delayed their healthcare services. This sort of reciprocal action needed satisfactory concord between the requesting and consulting physicians who were responsible for making a decision to give appropriate analysis to the patients. By adopting these applications, doctors could have information about the patient's health such as clinical locations, doctor tutorial, etc. Doctors always wanted to ask about supplementary information such as videos, tutorial and tips.

Rural Health care is one of the biggest challenges facing by the Health Ministry of India. With more than 70 percent population living in rural areas and low level of health facilities, mortality rates due to diseases are on high. Rural residents face numerous challenges in obtaining health care services. As a result of these disadvantages, their morbidity and mortality rates are higher than those of their urban counterparts. The Rural residents due to geographic and financial barriers diagnose serious diseases and problems at the final stages at the point of time where it cannot be treated by any of the techniques.

3.1 Disadvantages

- Not efficient.
- Time consuming.
- It is not flexible.
- Cannot detect current location.

4. PROPOSED SYSTEM MODEL

The system's goal is to collect and analyse all of the various concepts that have surfaced in order to define the system and its requirements in terms of patients. Aim of this section is to provide a complete description of all of the features that are planned to implement to system and define the expectations from the tele-health system. It also explains how the application works and how users interact with it. Telemedicine is a remote clinical service that allows for simultaneous diagnosis and monitoring of the patient. On the other hand, an ambulance aid is a vehicle aid used to keep track of the patient while transporting to a hospital and provide first aid to the patient.

4.1 Model Working

Sensors start sensing continuously, the threshold values for heartbeat, temperature and all other sensors will be set. If the value exceeds the threshold value, then it will give an indication of abnormality. The patient needs to be admitted to the hospital. The proposed system is that the data from the sensor network are collected and processed by the microcontroller. The recommended outcomes will be saved in the cloud. The processed data can be obtained and analysed via the cloud. The analysed data is again stored in the cloud which can be retrieved by the doctors. The values obtained and the state of the person is made available. Any further steps and measures can be taken by the related person.

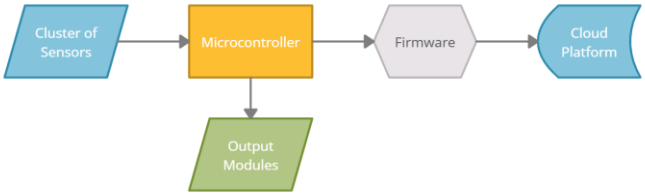

Fig -1: Block Diagram

4.2 Methodology

IRJET The system uses Arduino as microcontroller. The sensor cluster consists of Temperature, SpO2, Heartbeat, Lung sound, ECG and BP sensors which are connected to the Microcontroller. The Temperature sensor gives the temperature value in degree Celsius. To measure the heart rate, the pulse of the heart is detected and the number of pulses for one minute is counted to get the beats per minute.

To measure the Blood pressure, the blood level is detected and the number of pulses for one minute is counted to get the beats per minute. ECG detects the functioning of the heart. 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). SpO2 indirectly monitors the oxygen saturation of a patient's blood in the form of percentage. Sound sensor detects the breathing sound of the lungs such as wheezing sound in decibels. Temperature and SpO2 levels are measured and compared to a customizable threshold to determine if they are "low," "normal," or "excessive." In the event of an emergency, the NODEMCU module is utilised which is a firmware to send a message to the doctor's or related person's cell phone. The message contains all the values and the patient's latitude and longitude. With the help of this alert system, the doctor may take prompt action, and if the patient's position changes, the doctor can identify it using GPS data and send an alert to the concerned parties. Also, the doctor can send medical remainders to the patient.

- Identifying the pain areas where people are facing problems.
- To find a solution for the existing problem and to carry out the literature survey on the pain areas which are presently being faced by the people.
- To come up with the solution that eliminates the above-mentioned problem.
- To check the availability of required components in the market.
- Interfacing of the leads and the sensors to the corresponding modules.
- To check the outputs of the sensors for calibration if needed.
- To check the results on the LCD to verify the code.
- Set up the Wi-Fi for uploading of the obtained results.
- Store the results on flash memory upload it to cloud.
- To perform the cloud computation to analyze the results graphically.

5. CONCLUSION

Every day, the model records a person's heart rate and the number of other vital signs. This research will be utilized to remotely monitor a patient's entire body and to build technology for global patient monitoring by providing tailored and optimized services, resulting in a higher standard of living. It is simple to use and bridges the gap between doctors and patients. The system is straightforward and energy-efficient. In rural locations, the system's practical use is ideal because patients do not need to be followed up on a regular basis.

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