IOT BASED REMOTE MONITORING SYSTEM

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Abstract: **To avoid direct contact with patients, the product is linked to cloud storage and comes with a webpage. The patient can be monitored remotely without the need for additional personnel. As a result, we can anticipate and recommend patients' disease awareness. Monitor and update temperature, oxygen level, weight, and blood pressure via a remote monitoring system. Depending on the patient's age, the recordings are kept for 1 hour and can serve to reduce the likelihood of an emergency.**

Index terms: Internet of Things, Smart Chair, Patient Compatibility, Smart Monitoring

INTRODUCTION

The Internet of Things (IoT) is a network of physical objects that are equipped with sensors, electronics, software, and network connectivity to gather and share data, such as gadgets, vehicles, buildings, and other goods. The Internet of Things allows physical devices to be recognized and operated remotely utilizing existing network infrastructure, enhancing efficiency, accuracy, and cost savings. The need for easily accessible medical data gathering, storage, and management is demonstrated by the smart chair for medical pre-assessment. This enables health care to be delivered anywhere and at any time. In this system, we suggest an IoT device that monitors body temperature, pulse, blood pressure, and weight and stores the data in the cloud.

MOTIVATION OF THE PROJECT

The Internet of Things (IOT) is a network of intelligently connected devices that collect data through built-in sensors. This device measures and records the medical information of patients. Medical data includes the patient's body temperature, pressure, pulse, and weight. This technology is designed to reduce human reading and writing errors in patients records.

PROBLEM STATEMENT

We want everything around us to be automated in this digital world, minimizing human labor. Electronic circuits are becoming increasingly common, making life today easier and simpler. Human reading and writing errors might be found in patient records. Data retrieval takes a long time.

LITERATURE SURVEY

1. IOT COVID-19 Portable Health Monitoring System using Raspberry Pi, Node-Red and Thing Speak

Authors: Haeseok Jeong, Woojin Park

Findings: This project proposes a cost-effective budgeting approach to assist doctors and guardians in remotely monitoring their patients' welfare and health. This is especially critical during COVID-19, when staying away from people is required. This study describes a portable Internet of Things (IOT)-based patient monitoring device that may be attached to a remote patient without requiring the patient to be bound by cables or be in bed all day. The monitoring system is controlled by a Raspberry Pi. The Raspberry Pi platform's Wi-Fi enabled sensors relayed data to the database. In the same way, for each of the sensors connected (LM35 temperature sensor, AD8232 ECGSensor, MAX30100 pulse sensor).

2. A Smart Health Monitoring Chair for Nonintrusive Measurement of Biological Signals

Authors: Hyun Jae Baek; Gih Sung Chung; Ko Keun Kim; Kwang Suk Park

Findings: We developed nonintrusive methods for that do not require direct contact between instruments and bare skin. These methods were applied to the design of a diagnostic chair for Measuring the Temperature, Weight, Oxygen level and Blood pressure of the patient. This study demonstrates the feasibility of our method and device for biological signal monitoring that does not require user awareness and is not limited by physical activity.

3. ANN Assisted-IoT Enabled COVID-19 Patient Monitoring

Authors: GeetanjaliRathee,Sahil,Garg,Georges,Kaddoum,Yulei,Wu,DushanthaNalin,K.,Jayakody.

Findings: COVID-19 is a highly contagious disease, making it particularly dangerous. Artificial Neural Networks (ANN) are widely employed in a variety of applications, including healthcare systems, and are inspired by the biological idea of neurons. The ANN scheme offers a realistic option for managing healthcare data in the decision-making process. This paper demonstrates the applicability and usefulness of ANN by classifying COVID-19 patients' health into infected (IN), uninfected (UI), exposed (EP), and susceptible (SP) (ST).

4. Developing and Evaluating a Mixed Sensor Smart Chair System

Authors: M. Kim, H. Kim, J. Park, K. Jee, J. Lim and M. Park

Findings: The smart chair used a hybrid sensor system that included six pressure sensors and six infrared reflective distance

sensors. The evaluations were made to see how useful a design combining seat cushion pressure sensors and seatback distance sensors was. The mixed sensor system could be used for a variety of purposes, including the development of a real-time posture feedback system to prevent musculoskeletal diseases caused by sitting.

PROPOSED SYSTEM

1. Esp32 microcontroller

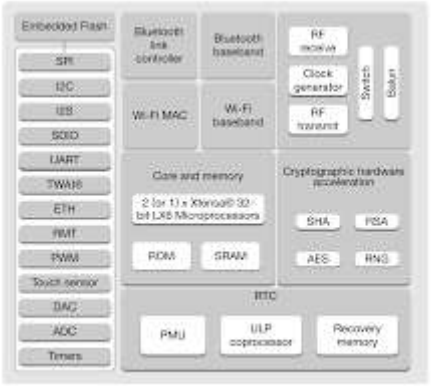
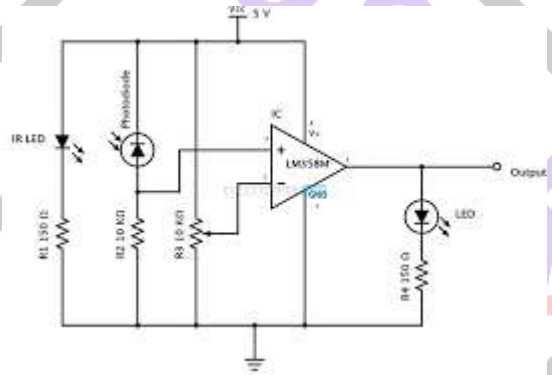


Figure 1: Functional Block Diagram

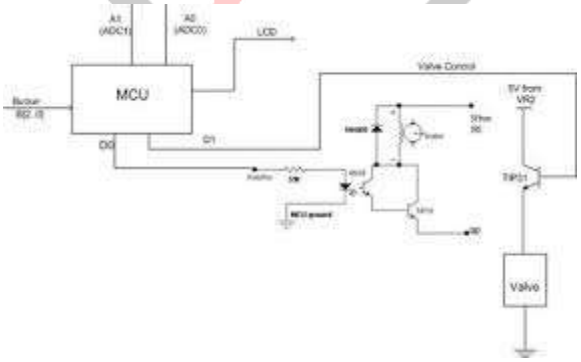
Esp32 has numerous hardware features. It's a low-power microcontroller with WIFI and Bluetooth dual-mode capabilities

2 .Temperature Measurement



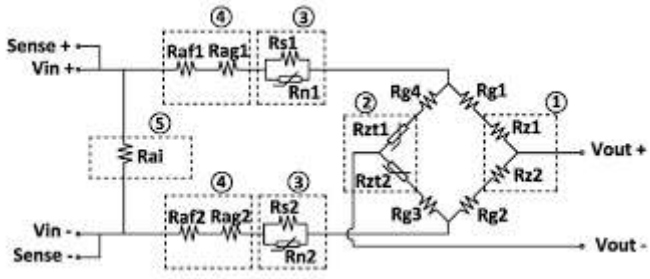
The Max0305 infrared sensor is used. When it placed near the ear, it emits an infrared ray that measures the temperature.

3. Pressure Measurement

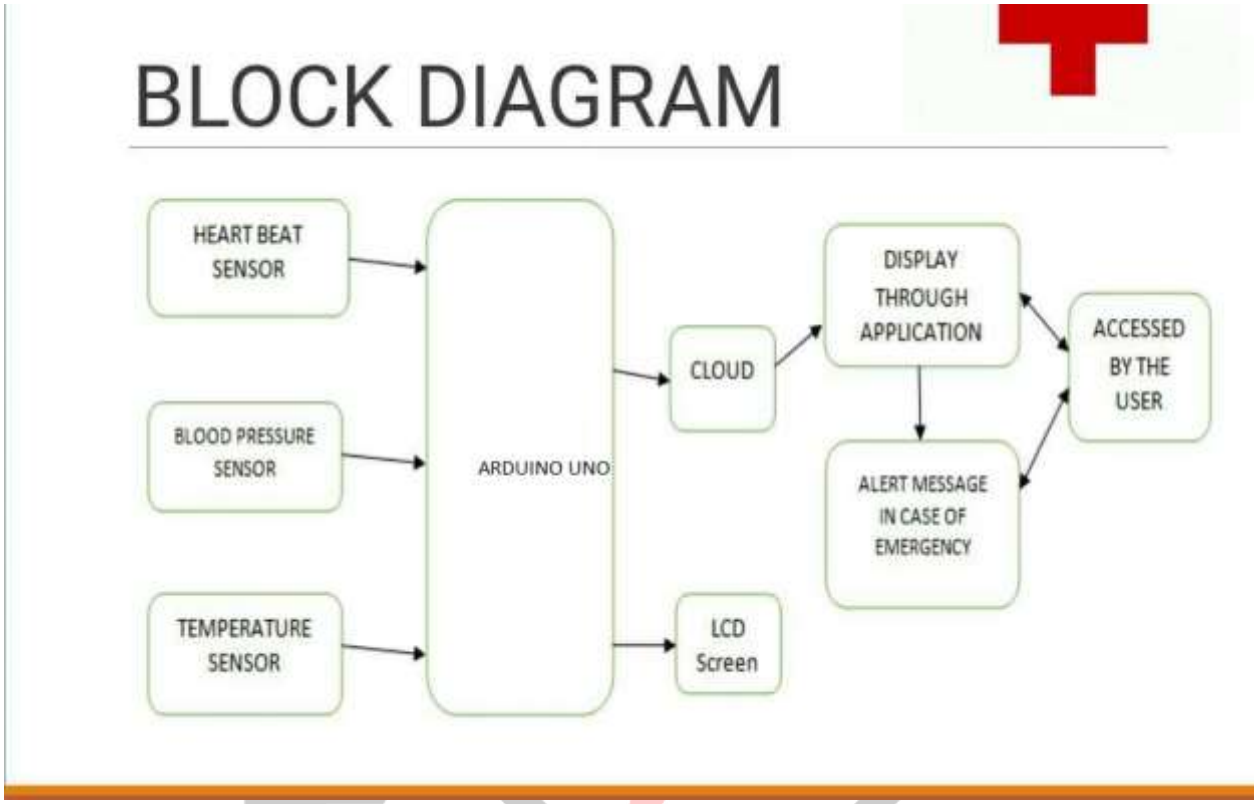


Blood pressure is the force exerted on the circulatory system by the heart pumping blood. Blood pressure is frequently measured using the systolic to diastolic pressure ratio. In millimeters of mercury, blood pressure is measured (mmHg).

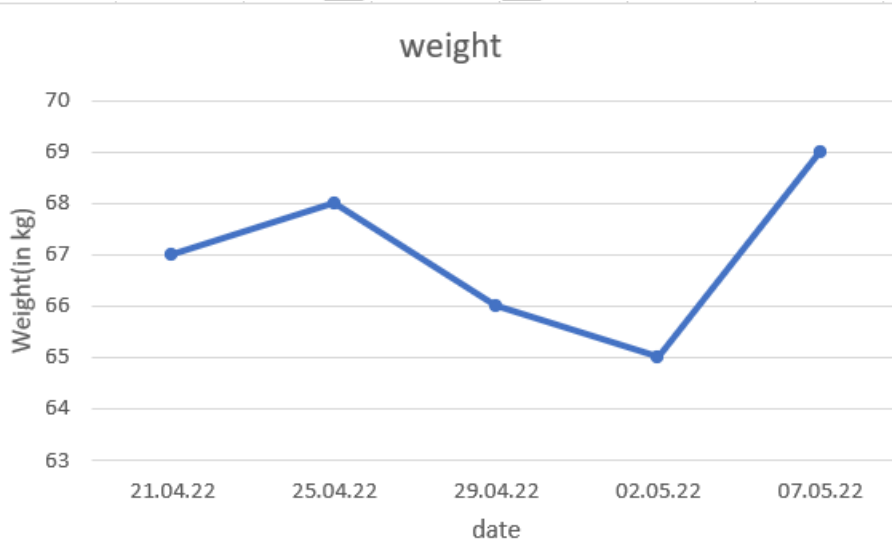
4. **Load cell sensor**



The bending moment principle is used in load cells. As a transducer, it generates an electrical signal whose magnitude is proportional to the force being measured. The load cell is used to determine the patients' weight.

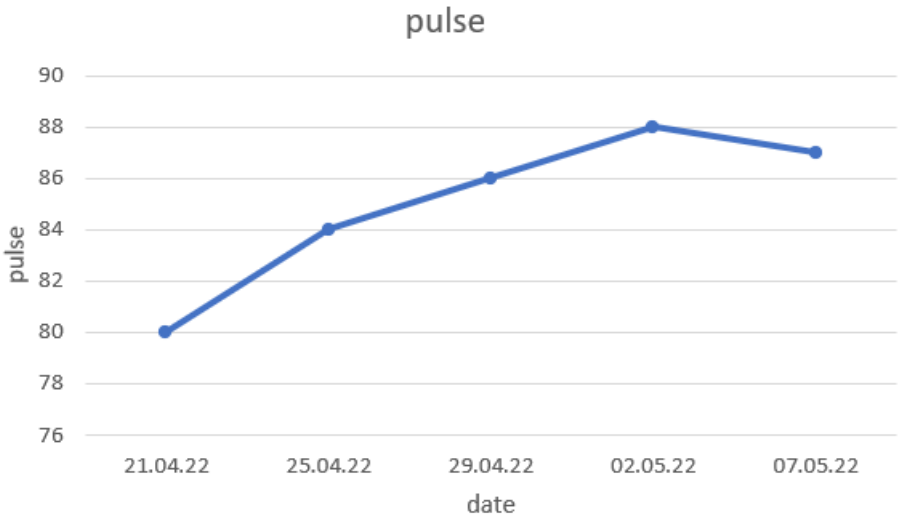


WEIGHT



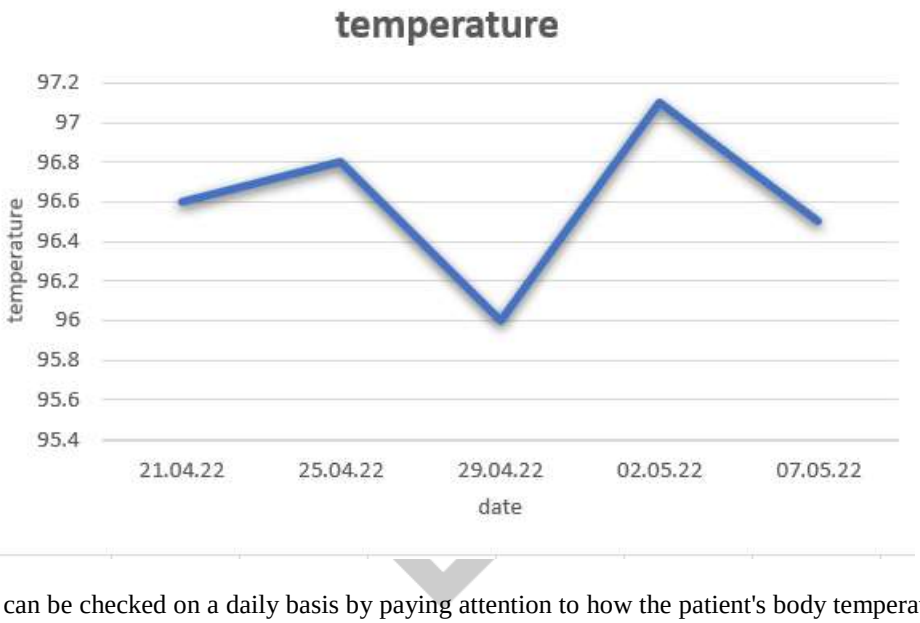
A weighted graph is one in which the edges are labelled with numbers (called weights). We only consider non-negative edge weights in general. Patients' weights should be measured every week, depending on their health.

PULSE



Every week, the patient's pulse should be tracked because the pulse rate is the determining factor in a patient's health and can be given to the doctor as a summary as the patient's pulse level.

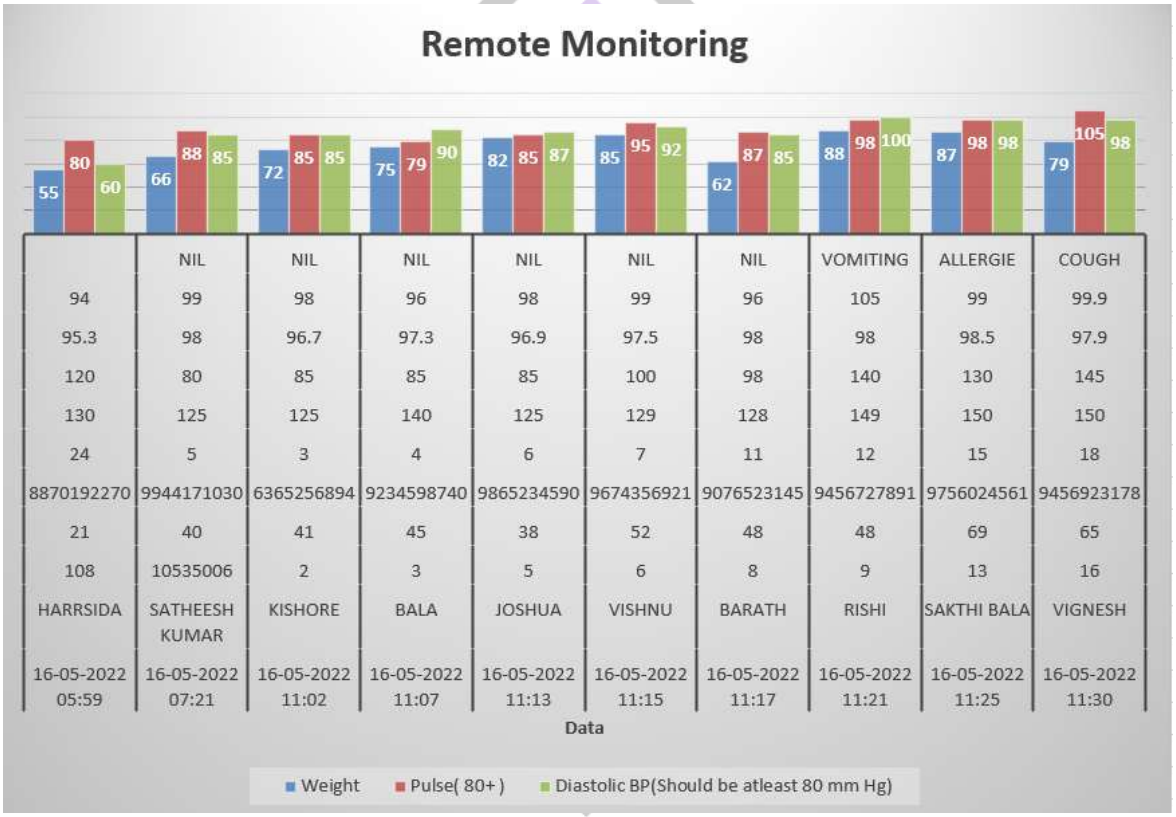
TEMPERATURE



A patient's temperature can be checked on a daily basis by paying attention to how the patient's body temperature is taken. We are monitoring the patient's health with the use of an infrared sensor to ensure accuracy. If the patient's temperature is elevated, an orange colored line appears.

DATASET

Timestamp	Enter Patient Name	Enter Patient ID	Age	Phone number	Room Number	Systolic BP(Should be atleast 120mm Hg)	Blood Glucose Level(Should Be 70 mg/dL to 150 mg/dL)	Temperature(Should be 98.6°F)	Oxygen Level(Should Be at least 95%)	If Any Other Symptom Kindly Mention It.	Weight	Pulse(80+)	Diastolic BP(Should be atleast 80 mm Hg)
16-05-2022 05:59	harrsida	108	21	8870192270	24	130	120	95.3	94		55	80	60
16-05-2022 07:21	Satheesh Kumar	10535006	40	9944171030	5	125	80	98	99	Nil	66	88	85
16-05-2022 11:02	Kishore	2	41	6365256894	3	125	85	96.7	98	Nil	72	85	85
16-05-2022 11:07	Bala	3	45	9234598740	4	140	85	97.3	96	Nil	75	79	90
16-05-2022 11:13	Joshua	5	38	9865234590	6	125	85	96.9	98	Nil	82	85	87
16-05-2022 11:15	Vishnu	6	52	9674356921	7	129	100	97.5	99	Nil	85	95	92
16-05-2022 11:17	Barath	8	48	9076523145	11	128	98	98	96	Nil	62	87	85
16-05-2022 11:21	Rishi	9	48	9456727891	12	149	140	98	105	Vomiting	88	98	100
16-05-2022 11:25	Sakthi bala	13	69	9756024561	15	150	130	98.5	99	Allergie	87	98	98
16-05-2022 11:30	Vignesh	16	65	9456923178	18	150	145	97.9	99.9	Cough	79	105	98



CONCLUSIONS

This project is beneficial to the medical business, as it simplifies practically every medical pre-assessment test. Patients and medical personnel can do their medical pre-assessment in the privacy of their own homes. The amount of manpower required to maintain and monitor data is reduced. The chair will be upgraded in the future with the intention of integrating numerous parameters such as ECG and blood glucose level. The patient will be given a unique identification number during the upgrade. This ID helps in the tracking of the patient's full treatment history. A patient's specific record can be obtained quickly using this unique ID, and these records will be kept confidential.

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