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Rover based Patient Monitoring System during Pandemic Using IOT

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ABSTRACT: In the present pandemic situation constant monitoring of patient's body parameters such as temperature, pulse rate and pressure level etc. becomes difficult to nurses. Monitoring and Recording of various medical parameters of COVID patient outside hospitals has become Wide spread phenomenon Hence to overcome this we implemented a robot which can monitor and assist the patient using Robotic system. In our project we are monitoring pulse rate, pressure level and temperature of the patient by using respective sensors and also sends the values to IOT Cloud platform through WIFI-Module. If any changes in patient's physical conditions it will be uploaded to cloud and alerts monitoring person through cloud. In this case, the robot provides constant assistance to patients while also wirelessly relaying information to the doctors; additionally, it allows the doctors to monitor the patient's health on their smartphones. The main objective of this work is to create a system that uses internet connectivity to monitor the COVID patient's body at any time. Thus, this will help to prevent the spreading of diseases. Hence it removes the problem of monitoring the patients suffering from communicable diseases.

KEYWORDS:IOT, Arduino , Pulse oximeter.

I. INTRODUCTION

Because of expanding work cost, medical institutions would constrain to decrease nursing staff for COVID patients. Our project aims to develop new innovations for the use of COVID Patients. In this project, we introduce a robot, IoT-based covid monitoring system. To achieve system efficiency simultaneously and robustness of transmission within public IoT-based communication networks, we will utilize robust crypto-primitives to construct two communication mechanisms for ensuring transmission confidentiality. By implementing robotic model will get a new dimension and every covid patient can be monitored remotely. By this on the basis of derived data if a patient is in critical situation, an immediate instruction can be given to the respective person through robot model. It may play a vital role to reduce labor cost, rather will be easy to assess from anywhere anytime and will be helpful to take immediate decision. Thus robotic system will be digitalized. In day to day life, people are affected by various varients of covid diseases which are highly sensitive diseases. So, people are continuously anxious about their health condition. They need to consult with doctors, according with reports and check up all of that. Internet of Things (IoT) is a growing present concept which has an effect of many aspect of human life. Various processes of different concepts including data acquisition, data transmission and data analytics enables IoT based robotic system to support smart solutions especially for health care.

In IoT based system, the work progress depends on 3 system which are sensor work, get away and cloud. Firstly, talk about sensor network which is the first step for monitoring patients as well as data collection. Secondly, the gateway system which is a continuous connection networks between sensors and cloud system. The death rate of 55.3 million people dying each year or 1,51,600 people dying each day or 6316 people dying each hour is a big issue for all over the world. So, we are proposing a robotic model where patient can measure temperature, oxygen level, heart beat rate and ECG by himself or herself and that report immediately sent to the doctors. Later that, those reports will used to consult with doctors within very short time. It is also reduce valuable time for both patients and doctors. They don't need to wait for the

reports because sensors are giving real time data. The model is very effective for rural areas people. IoT serves through GSM/3G/4G technologies data or patient report is sending to the doctors with time and date. This proposed model can use any type of persons like he or she affected with a disease or not. So, they can check it in regular basis because people pay more attention towards prevention and early recognition of disease. Here, all reports also live video recording will be recorded with real time. IoT devices produce large amount of data and information. These robotic health care services are getting better and less costly by recoding and collecting covid patients monitoring.

[1].Nabil Alshurafa (2017) et al describes an enhanced RHM system, Wanda-CVD that is smartphone-based and designed to provide wireless coaching and social support to participants. CVD prevention measures are recognized as a critical target by health care organizations worldwide i.e. the World Health Organization, the Institute of Medicine and a primary goal for Healthy People 2020. In a six month study designed to reduce CVD risk factors in young black women, Wanda-CVD was deployed to about half of the total study population. In a previous paper we described how to predict adherence in an RHM system exclusively using baseline contextual features.

[2].Marjorie Skubic (2015) et al presents an example of unobtrusive, continuous monitoring in the home for the purpose of assessing early health changes. Sensors embedded in the environment capture behavior and activity patterns. Changes in patterns are detected as potential signs of changing health. Wrest present results of a preliminary study investigating 22 features extracted from in-home sensor data. A 1-D alert algorithm was then implemented to generate health alerts to clinicians in a senior housing facility. Clinicians analyze each alert and provide a rating on the clinical relevance. These ratings are then used as ground truth for training and testing classifiers. Here, we present the methodology for four classification approaches that fuse multisensory data.

[3].Andreas K. Triantafyllidis (2016) et al presents the design and development of a pervasive health system enabling self-management of chronic patients during their everyday activities. The proposed system integrates patient health monitoring, status logging for capturing various problems or symptoms met, and social sharing of the recorded information within the patient's community, aiming to facilitate disease management. A prototype is implemented on a mobile device illustrating the feasibility and applicability of the presented work by adopting unobtrusive vital signs monitoring through a wearable multi sensing device, a service-oriented architecture for handling communication issues, and popular micro blogging services. Furthermore, a study has been conducted with 16 hypertensive patients, in order to investigate the user acceptance, the usefulness, and the virtue of the proposed system.

[4].Nabil Alshurafa (2015) et al provides a technique to improve smartphone battery consumption and examine the effects of smartphone battery lifetime on compliance, in an attempt to enhance users' adherence to remote monitoring systems. We deploy WANDA-CVD, an RHM system for patients at risk of cardiovascular disease (CVD), using a wearable smartphone for detection of physical activity. We tested the battery optimization technique in an in-lab pilot study and validated its effects on compliance in the Women's Heart Health Study. The battery optimization technique enhanced the battery lifetime by 192% on average, resulting in a 53% increase in compliance in the study.

[5].Misha Pavel (2015) et al improving health behaviors is an effective way to enhance health outcomes and mitigate the escalating challenges arising from an increasingly aging population and the proliferation of chronic diseases. Although it has been difficult to obtain lasting improvements in health behaviors on a wide scale, advances at the intersection of technology and behavioral science may provide the tools to address this challenge. In this paper, we describe a vision and an approach to improving health behavior interventions using the tools of behavioral informatics, an emerging Tran's disciplinary research domain based on system-theoretic principles in combination with behavioral science and information technology.

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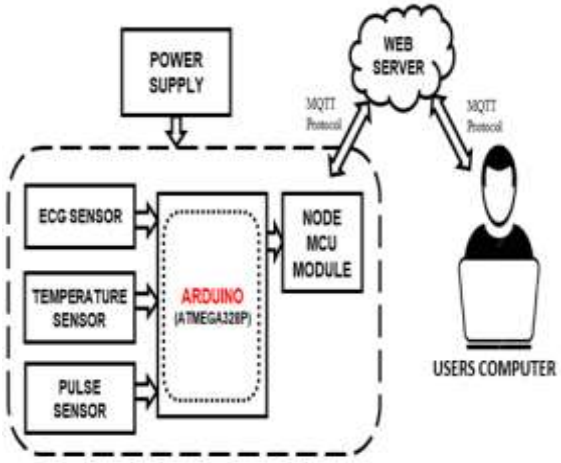
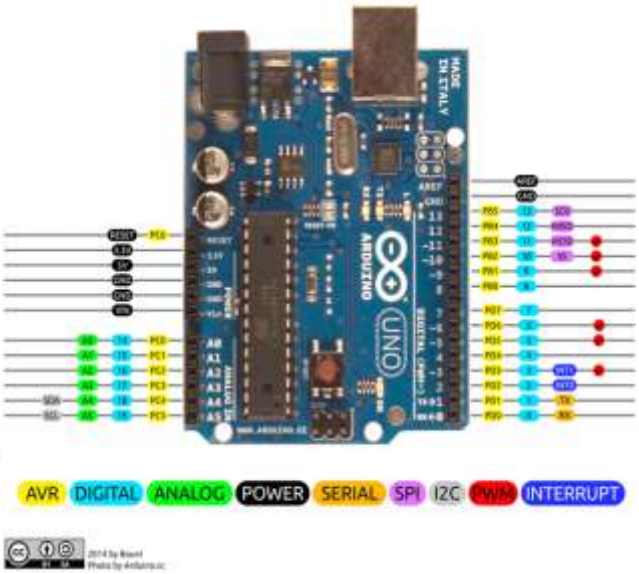
II. PROPOSED SYSTEM



Block Diagram



Arduino

In this proposed work the vital parameters such as oxygen level temperature, ECG readings which are monitored using Arduino Uno. These sensors signals are send to Arduino Uno via amplifier circuit and signal conditioning unit (SCU), because the signals level are low (gain), so amplifier circuit is used to gain up the signals and transmit the signals to the Arduino Uno. Here COVID patients oxygen level body temperature , EEG is measured using respective sensors and it can be monitored in the screen of computer using Arduino Uno connected to a cloud database system as well as monitored anywhere in the world using internet source.

The proposed methodology for a robot-based patient monitoring system uses an Arduino Uno to monitor the patient's health parameters. After connecting the Arduino Uno to the internet, it is linked to a cloud database system that serves as a server. The server then delivers data to the receiver system automatically. As a result, the doctor can keep track of the COVID patient's health parameters at all times. Any sudden increase or reduction in these parameter values can be identified early on, allowing the doctor to begin administering essential drugs right once.

The system has been designed to take several inputs to measure physiological parameters of human such as temperature, heart rate, detection of any fall and the saline level. The inputs from the sensors are integrated and processed. The results are sent through the IOT, which stores the data into an Access Database. The values can then be displayed on the Graphical User Interface (GUI) running on a computer. If it is inferred that the person is medically distressed, an alarm may be generated. The program is a user interface, allowing a report on the current status of the individual.

III. HARDWARE REQUIREMENTS

In this project, some hardware devices are used such as pulse sensors, temperature sensors, pressure sensor and electronic platform Arduino. The hardware is connected with Wi-Fi module which enable the system to connect and share the information through internet.

There are many types of power supply. Most are designed to convert the Voltage AC Mains electricity to a suitable low voltage supply for electronic Circuits and other Devices. A power supply can by broken down into a series of blocks, each of which performs a particular function. Here the AC supply main is given to the step down transformer. The transformer having the different voltages. The output from the transformer is given to the rectifier circuit. In this rectifier circuit the AC voltage is converted to DC voltages. The rectified DC voltage is given to the regulator circuit. The output of the regulator is depends upon the regulator IC chosen in the circuit.

Arduino is an open-source electronic platform that is based on connection between hardware and software and it is easy to use and implement. They are designed in such a way that it

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read the input – water reaches a certain threshold and turn it into an output – sending the alert.

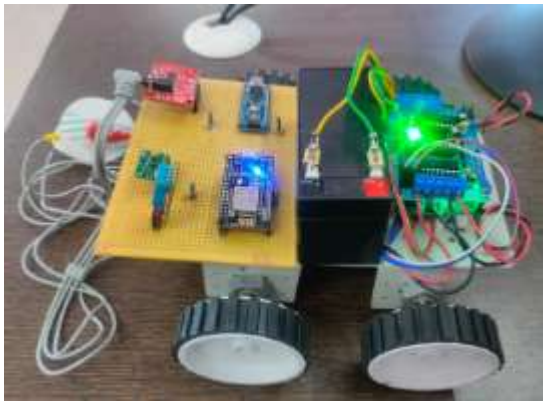
The basic heartbeat sensor consists of a light emitting diode and a detector like a light detecting resistor or a photodiode. The heart beat pulses causes a variation in the flow of blood to different regions of the body. When a tissue is illuminated with the light source, i.e. light emitted by the led, it either reflects (a finger tissue) or transmits the light (earlobe). Some of the light is absorbed by the blood and the transmitted or the reflected light is received by the light detector. The amount of light absorbed depends on the blood volume in that tissue. The detector output is in form of electrical signal and is proportional to the heart beat rate. This signal is actually a DC signal relating to the tissues and the blood volume and the AC component synchronous with the heart beat and caused by pulsatile changes in arterial blood volume is superimposed on the DC signal. Thus the major requirement is to isolate that AC component as it is of prime importance..

To achieve the task of getting the AC signal, the output from the detector is first filtered using a 2 stage HP-LP circuit and is then converted to digital pulses using a comparator circuit or using simple ADC. The digital pulses are given to a microcontroller for calculating the heat beat rate, given by the formula- BPM (Beats per minute) = 60*f Where f is the pulse frequency.

The most frequently measured environmental quantity is "Temperature" This might be expected since most of the systems are affected by temperature like physical, chemical, electronic, mechanical, and biological systems. Certain chemical effects, biological processes, and even electronic circuits execute best in limited temperature ranges. Temperature is one of the most frequently calculated variables and sensing can be made either through straight contact with the heating basis or remotely, without straight contact with the basis using radiated energy in its place. There is an ample variety of temperature sensor on the market today, including Thermocouples, Resistance Temperature Detectors (RTDs), Thermistors, Infrared, and Semiconductor Sensors. Usually, a temperature sensor is a thermocouple or a resistance temperature detector (RTD) that gathers the temperature from a specific source and alters the collected information into understandable type for an apparatus or an observer. Temperature sensors are used in several applications namely HV system and AC system environmental controls, medical devices, food processing units, chemical handling, controlling systems, automotive under the hood monitoring and etc. The most frequent type of temperature sensor is a thermometer, used to determine the temperature of solids, liquids, and gases. It is also mostly used for non-scientific purposes as it is not so accurate. The different kinds of sensors are categorized by the sensing capacity of the sensor as well as the range of applications.

IV. OBESERVATIONS

The Hardware view of the proposed method is shown in the figure. After observing the patient each sensors transmit the command signals to the Arduino. Then the analysed data can be collected and displayed through IOT using blynk android application in the mobile.



When you open the Arduino program, you are opening the IDE. It is intentionally streamlined to keep things as simple and straightforward as possible. When you save a file in Arduino, the file is called a sketch – a sketch is where you save the computer code you have written.

The coding language that Arduino uses is very much like C++ ("see plus plus"), which is a common language in the world of computing. The code you learn to write for Arduino will be very similar to the code you write in any other computer language – all the basic concepts remain the same – it is just a matter of learning a new dialect should you pursue other programming languages.

The code you write is "human readable", that is, it will make sense to you (sometimes), and will be organized for a human to follow. Part of the job of the IDE is to take the human readable code and translate it into machine-readable code to be executed by the Arduino. This process is called compiling. The process of compiling is seamless to the user. All you have to do is press a button. If you have errors in your computer code, the compiler will display an error message at the bottom of the IDE and highlight the line of code that seems to be the issue. The error message is meant to help you

identify what you might have done wrong sometimes the message is very explicit

V. CONCLUSION

From this proposed system, it is conclude that Wireless sensor technology is emerging as a significant element of healthcare services. In this proposed system a mobile physiological monitoring system is presented, which is able to continuously monitor the COVID patients heartbeat and other critical parameters in the hospital. The system is able to carry out a long-term monitoring on patients condition and is equipped with an emergency rescue mechanism using IoT. Thus robotic system will be digitalized. In day to day life, people are affected by various variants of covid diseases which are highly sensitive diseases. So, people are continuously anxious about their health condition. This project deals with Internet of Things (IoT) is a growing present concept which has an effect of many aspect of human life lead to smart technology in our day to day life..

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