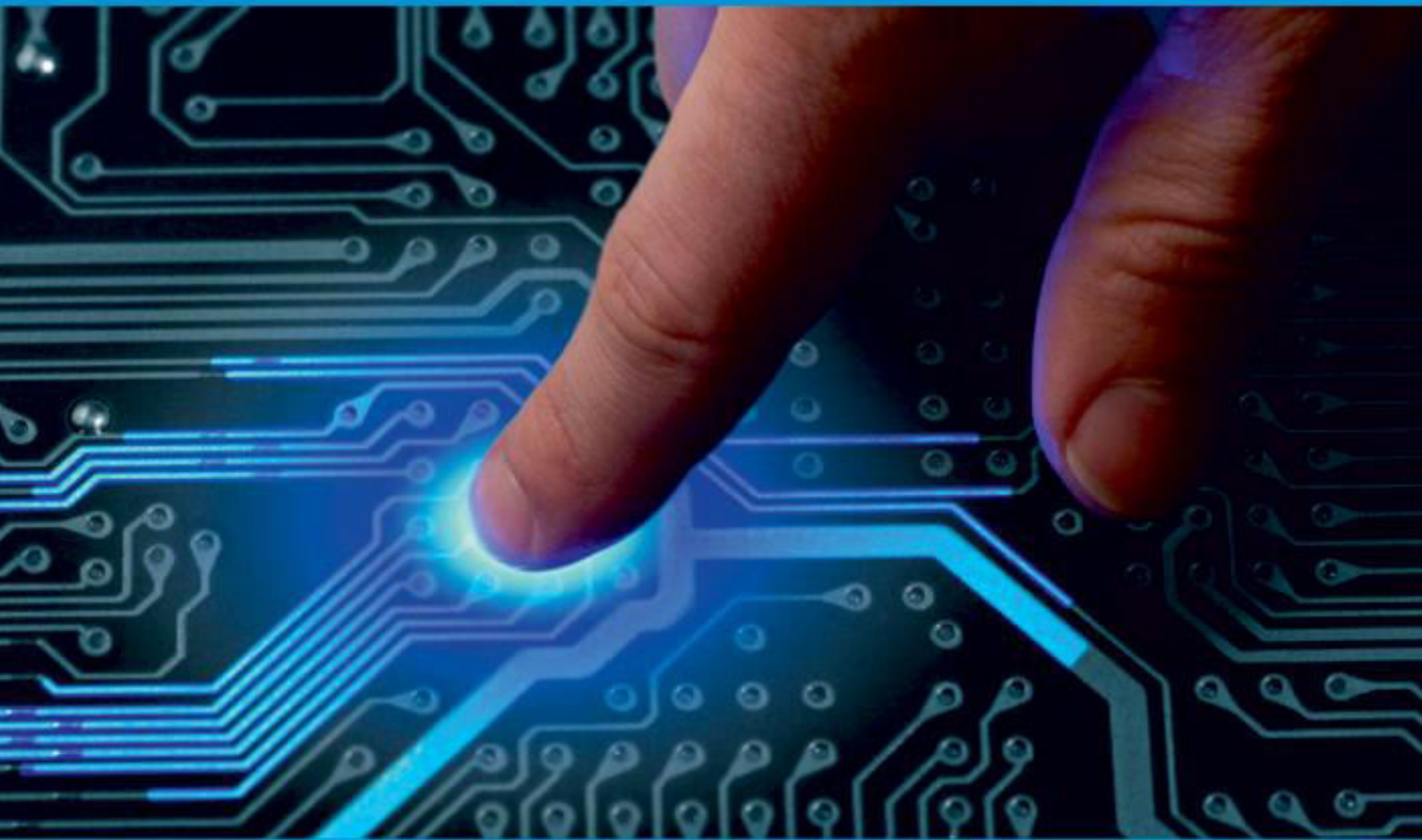




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IOT Based Health Monitoring System

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ABSTRACT: The use of healthcare monitoring systems in hospitals and other health institutions has increased significantly, and portable healthcare monitoring systems based on developing technologies are now a major worry for many governments across the world. The advancement of healthcare from face-to-face consultation to telemedicine has been aided by the introduction of Internet of Things (IoT) technologies. This study offers a smart healthcare system that can monitor a patient's fundamental health indications as well as the room situation where the patients are now in real-time in an IoT context. Heart Beat Sensor, Body Temperature Sensor, Pulse Oximeter, Respiratory Sensor, and Swelling Sensor are the five sensors used in this system to collect data from the hospital environment.

KEYWORDS: Healthcare Monitoring System, Internet of Things (IoT), Real-Time, Emerging Technologies.

I. INTRODUCTION

Medical practitioners can perform real-time monitoring, early diagnosis, and treatment for potential health hazards using the modern healthcare system. As wireless communication technology progresses, medical telemetry systems, often known as telemedicine, are fast growing. Commercial goods and research prototypes for remote health monitoring have made significant progress recently. For patient consultations and medical diagnosis, these improvements rely on wired/wireless communication networks. Modern healthcare is used to provide more efficient physician use, lower the cost of hospital stays, lower the skill level and frequency of home-care professional visits, lower hospital readmission rates, and promote health education at all levels. [1] .

A doctor or other paramedical staff frequently performs this task in hospitals where a patient's status must be regularly monitored. Due to a scarcity of qualified doctors in underdeveloped nations like India, it is difficult for a single doctor to supervise multiple patients at the same time. As a result, the doctor may be clueless of the state of all of the patients in this situation. In an emergency, even a minor delay in treatment might put the patient's life in jeopardy [2]. The rest of the paper is organized as follows. Section-2 provides short description of recently developed health monitoring systems. Section 3 deals with the architecture of the system. Section-4 provides the result of the proposed system. Section-4 concludes the overall paper and discusses future works as architecture in detail.

II. RELATED WORK

Many authors have recently proposed a patient health monitoring system. For severely ill patients, monitoring key functions and the functions of life support systems is critical. Modern patient monitors, on the other hand, as well as risk management, must be built in line with approval. Table 1 gives a brief overview of newly developed health monitoring systems.

Table 1 Short description of recently developed health monitoring systems

Journal	Title	Author	Method/Technology
SCITEPRESS – Science and Technology Publications, 2017	A Real-time m-Health Monitoring System: An Integrated Solution Combining the Use of Several Wearable Sensors and Mobile Devices	Salvatore Naddeo et al. [3]	Presented a physiological monitoring application designed for Android mobile devices.
International Journal of Advanced Engineering and Science, 2017	Automatic Wireless Health Monitoring System in Hospital for Patients	K. Spandana et al. [4]	Global System for Mobile Communication (GSM).
International Journal of	Patient Health Wireless Monitoring	Ashish Ganesh	AT89S52

Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering, 2016	System	Bajaj et al. [5]	Microcontroller
International Journal of Engineering Science and Computing, December 2016	Real Time Patient Health Monitoring and Alarming Wireless Sensor Network	Sachchidanand Jha et al. [6]	ARM microcontroller and wireless communication module (GSM)
2 nd International Conference on New Frontier of Engineering, Management, Social Science and Humanities, 2018	Patient health monitoring system using GSM	Ketan K. Lad et al [7]	Arduino Mega and GSM

III. SYSTEM ARCHITECTURE

Figure 1 depicts the system's block diagram. The five sensors employed in this system to collect data from the hospital environment are the Heart Beat Sensor, Body Temperature Sensor, Pulse Oximeter, Respiratory Sensor, and Swelling Sensor.

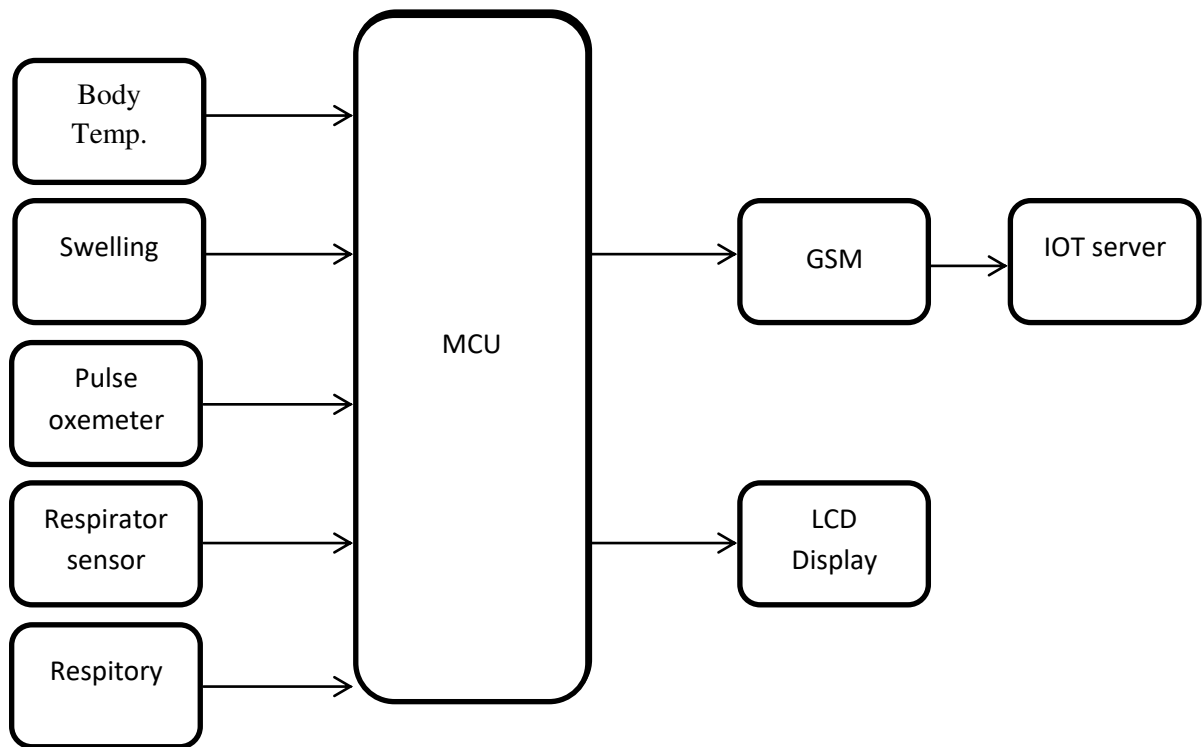


Figure 1 System's block diagram

A set of digital and analogue input and output pins are included on the boards. The USB drive is used to load programmers from a computer. Microcontrollers are often programmed with a combination of features from the C and C++ programming languages. LM The application of a basic semiconductor temperature sensor has outstanding linearity and high sensitivity, with a functional range of -40 to 150 degrees Celsius. Blood pressure sensors can enable continuous monitoring, i.e. 24 hours a day, 7 days a week. Blood pressure ranges are commonly expressed as a numerator and denominator. SYSTOLIC is the numerator; when your heart beats, it contracts and pushes blood through your arteries to the rest of your body; this force causes artery pressure, which is known as SYSTOLIC. DIASTOLIC is the denominator, and it occurs while your heart rests between beats. When a finger is placed on the heart beat sensor, an output of heart beat is expected. When the heart beats, the sensor detects the data and provides an output in the form

of beats per minute (bpm). PIR sensor is placed parallel to the patient and detects any movement. When motion is detected, the buzzer turns on and alert messages such as "MOTION DETECTED" are communicated to the doctor. If the patient's movement ceases, the buzzer switches to "OFF" mode and displays the message "MOTION ENDED." The PIR sensor has a 6 metre detection range. HC-05 module is an easy to use Bluetooth serial port protocol. It is transparent wireless serial connection setup. Range is approximately 10 meters (30 feet). In android phone we are using Bluetooth terminal HC-05 application. This application is able to receive the data from Bluetooth and displayed in received data Bluetooth terminal HC-05 screen. Buzzer is a Piezo electric audio signaling device. A Piezo electric buzzer can be drive by an oscillating electronic circuit or Arduino source signal. They are low power consumption. It alerts the doctor that it has exceeded the normal range. The SIM800L is a small cellular module that supports GPRS, SMS, and voice calls. This module is ideal for any project that requires long-range connectivity due to its low cost, small footprint, and support for quad band frequencies.

IV. RESULTS

The functional model of the patient monitoring system is shown below, which includes an Arduinouno, a UART blood pressure sensor, an LM35 temperature sensor, a pir motion sensor, a heartbeat sensor, a buzzer, and a 9V battery.

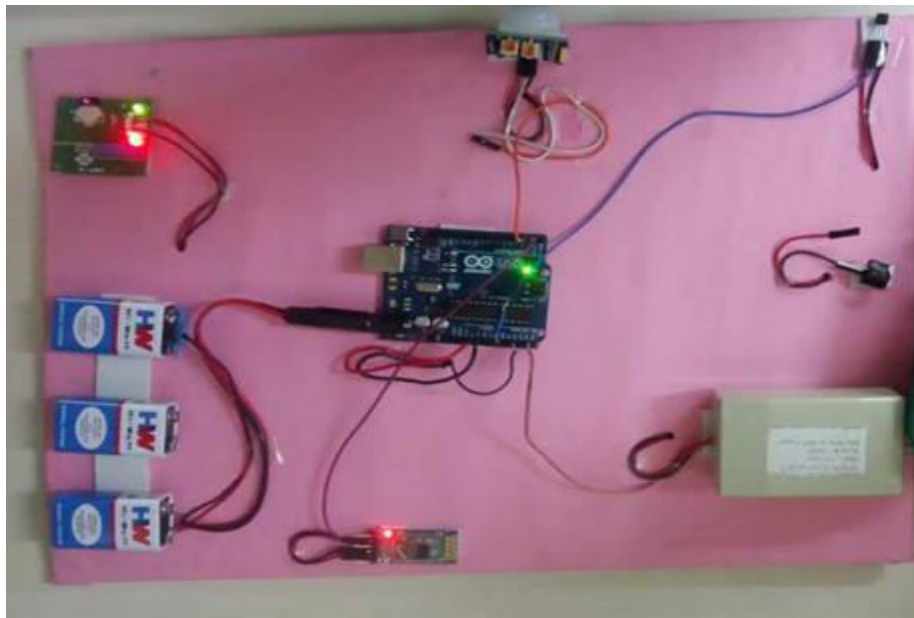


Figure 2 Model of patient monitoring system.

V. CONCLUSION

This paper has described a patient monitoring system architecture based on wireless sensor nodes that can monitor a variety of contexts, including hospitals, homes, and ambulatory settings. The device allows medical practitioners to keep an eye on their patients while they are on the go, check their vital signs, and give them advice on first-aid remedies. The ICU patient monitoring system is capable of measuring physical parameters such as blood pressure (mmHg), heart rate (BPM), temperature (degree Celsius), and PIR motion detector, all of which are dependent on human health. If these sensor values exceed the normal range, the buzzer sounds and an alert message is sent to the concerned staff, allowing them to attend to the patient right away.

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