# Health Surveillance System Using Arduino

**Karpe Aditya[1], Hajare Neha[2]**

*School of Computer Engineering & Technology[1,2]*
*MITAOE, Pune*
*aditya.karpe@mitaoe.ac.in[1], nphajare@comp.maepune.ac.in[2]*

***Abstract-***
*Technology plays a significant role in the modern world, not only in healthcare, but also in virtually every field, not only in sensors, as well as communication. The Internet of things plays a role of prominence that serves various types of health application. Patient's varied health markers are tracked in real time using smart gadgets and wireless sensor networks. A system for monitoring e-health is designed and implemented. Our main goal is to create a set of modules that will help doctors diagnose their patients better through tele-monitoring. An array of sensors is used to remotely track the patient's health parameters. Sensors pick up numbers, and a Wi-Fi module sends the numbers to the server. Through the server, the doctor monitors the patients in Instantaneous. To prevent future obstacles and to facilitate easy access and processing, this architecture stores the medical history of a patient on the cloud. This will facilitate individual patient monitoring, particularly at home and in hospitals and public healthcare facilities.*

*Keywords: Healthcare System, Internet of Things(IOT), Smartphone, Sensor Wireless Network, Smart System.*

# 1. INTRODUCTION

We can now use a wide range of gadgets for personal wellness & fitness, and activity awareness thanks to recent advances in changeable sensors. For collecting patient data, storing patient health information, and providing clinical access to it, remote health-care detection systems have a wide range of clinical uses. There are lots uses for the Internet, such as education, finance, business, entertainment, social networking, shopping, and e-commerce. It is said that the Internet of Things is the hottest trend in internet technology. Think about a situation where peripherals can sense, interact, and swap intelligence over a particular world wide web, assess it, and periodically take action to provide a flexible network for considering options, making plans, and making decisions. Invisible networks such as IOT allow programming, controlling, and sensing. It is possible to exchange information between products developed with IOT thanks to embedded technology. IOT is based on sensors, gateways, and wireless Technology that enable users to pass on and authenticate the Numbers. Only the consumer output is taken by the sensor and delivered to the server over wifi in the suggested system, thus only certain doctors may access the numbers.

Theater-connected items periodically gather data, which is then evaluated and utilized to guide appropriate activities. This process creates a beautiful maze for analysis, an arrangement, and conclusion. IOT uses remote connections to link gadgets and devices together. In light of machine-to-machine markets, this reinterpretation is part of IOT's evolution. IOT is creating a best technology which detects, manage and programmed. Based on IOT, results can exchange information, either with one another or the Internet. These innovations have improved lifestyles, strengthened and more active communities, and transformed healthcare. Yet, among all the areas, there is no field where IOT offers more prominent benefits than health awareness. To leverage technological advancements for better health, "wealth" is crucial. A framework which provides secure health awareness checking is needed as part of an IOT framework. Envision a device that utilizes sensors to capture patient statistics and then redirects the data through wifi to a server, only allowing authorized clients to see the data.

# 2. LITRATURE SURVEY

[1] Paper Name: IoT based Smart Healthcare Monitoring Systems
Author Name: Dr. R. Prabha, etc.
Description: This essay aids in picturing One of the key Internet of Things (IoT) program that connects the world wide web to mobile sensors, people, doctors, networks, and other linked equipment is the "Mobile Healthcare Software Application (MHS)". Clinicians can continuously check on patients who are located in remote places.

[2] Paper Name: IoT based health monitoring system
Author Name: Valsalan P, etc.
Description: In this study, a handheld biological surveillance system is demonstrated that can analyze the person's heart rhythm, the external air, and other critical house variables. With the help of Wi-Fi Module-based wireless access, we suggested a constant measurement and management tool to track status of a patient and store diagnosised data on a server.

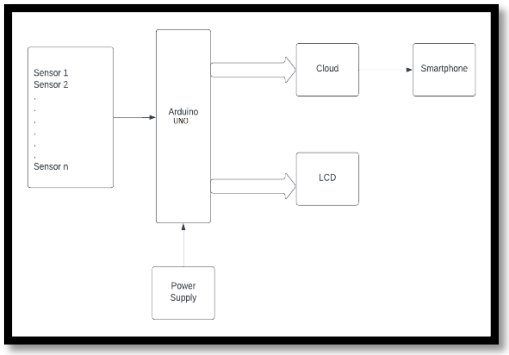
[3] Paper Name: Flexible And Scalable Patient's Health Monitoring System
Author Name: S. J. Jung, etc.
Description: On the basis of the 6LoWPAN, a flexible and expandable system for tracking patient health is suggested. This system includes 6LoWPAN modules for packet forwarding across an IPv4/IPv6 network and worn sensors for detecting biological signals. For surveillance and analysis purposes, the 6LoWPAN nodes equipped with embedded devices are connected to the 6LoWPAN gateway via the 6LoWPAN protocols. The 6LoWPAN gateway offers dependable IPv6 connection to send patients' biological signals over the internet to a specialist or servers. Signal processing is employed in the server to extract heart rate fluctuations signals, which are then used for both time and frequency performance analysis to analyze and give the patient's health condition. Our method for the non-invasive and continual health surveillance system employing the 6LoWPAN and Infrastructure network properly processes the enormous number of biological signals. Patients can use the IPv6 approach to easily evaluate their own medical issue in an inter-local coverage region.

[4] Paper Name: cell phone based health monitoring system
Author Name: K. S. Shin, etc.
Description: Wireless connectivity CDMA-based ubiquitous health-care surveillance system for diseases and illnesses inspection and patient productivity in the Medical Centre, household, or transportation situations is described in this paper. It includes an improved solo simple electrocardiogram (ECG) diagnostic method at mobile phone. This system uses an electronic hardware prototype as a Bridger to wirelessly track a client's health signs from a small wireless detector to communicate immediately to a Medical Centre oversight or using a pc to share information the clinical notes through Internet and telecommunication when outside the coverage LAN. Before any clinical history could be conveyed to the hospital, an outside solo electrocardiogram diagnostic was put up to enable for local agencies' observation and waveform analysis.

[5] Paper Name: IOT Based Health Care Monitoring System
Author Name: Akshay pote, etc.
Description: This study presents a cellular device remote health care strategy plan that can provide genuine web content on a user physiological conditions. Our framework is designed to capture and filter vital biological variables from a patient in order to accurately reflect the state of that patient's health. Using the information in the content or actual email, the human services specialist can provide vital therapeutic advice. The patient's pulse, number of steps, and environment are all documented. The Software will sound a warning and indicate the price and timing of drinking water.

# 3. METHODOLOGY

[1] Block Diagram




Multiple sensors, an Arduino UNO, and a regulated power supply are part of the system. The suggested system, as seen in the block diagram, incorporates a variety of sensors, including an ECG sensor, a thermometer for gauging body heat, a heartbeat detector for figuring out pulse rate, and a respiratory meter for keeping a record of respiratory rate. An Arduino UNO picks up the numbers and forward it to the Server using a wifi module, where, in the event of an emergency, a message is sent to the doctor.

## *A. Healthcare Sensing*

The system has a number of sensors, along with a thermometer, pulse sensor, respiratory sensor, and Electrocardiogram, to detect body heat, pulse rate, respiration rate, and Ppg.

## *B. Cloud handling and data transfer*

Numbers is redirected sequentially to the server via UART. Only authorized medical practitioners can retrieve the numbers since the server's data is secure.

## *C. User end application*

Medical practitioners will can use the native app as a dashboard to see patient reports. Using this user-end application, medical professionals are also notified about critical patients.

[2] materials recruited

A. Arduino UNO

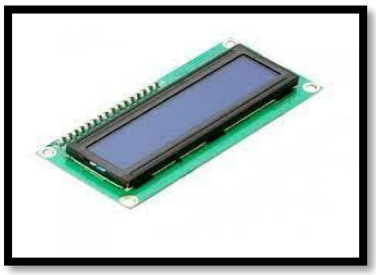
The Arduino UNO is a collection of ICs and components, which involves ATmega328P chips, is manufactured (input chart). Six analog inputs, a quartz crystal functioning at 16 MHz, fourteen digital input & output pins, six pins could function as PWM output, a Universal Serial Bus(USB) port, an access point for fuel that is electricity, an ICSP header. This kit includes with everything you will require to assist the Arduino UNO; all you have to do is attach it to a workstation through Universal Serial Bus(USB) or energize it with an Alternating Current(AC)-to-Direct Current(DC) transformer.

B. Heart Sensor

Heartbeat sensors measure heart rate, i.e. the speed of heartbeat, with computerized apparatuses. We track our physical temperature, heartbeats, and BP to stay healthy.

C. LCD (16*2) Display

An LCD 16x2 is an electronic device that displays data and messages. Each character will be made up of 5x8 pixels (40) each, so the display will include 16 columns and 2 rows in total.

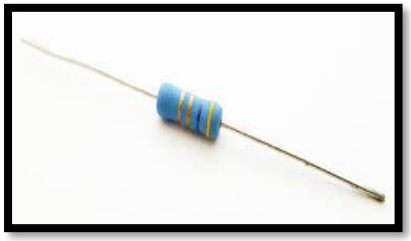


D. Temperature Sensor

In terms of temperature sensors, The Maxim DS18B20 is a customizable 1-wire gadget. Numerous difficult settings, such as organic solvents, quarries, and dust particles, are used to gauge heat. The sensor is easy to install because of its better durability and affordability in a water resistant version. It is capable of measuring a wide range of temperatures, ranging from -55° to +125°, with a reasonable accuracy of 5°C.

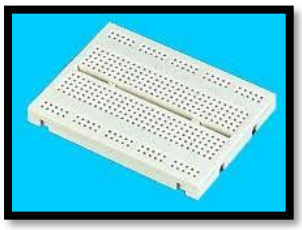
E. Register

As a circuit ingredient, Electrical resistance is present in registers as a passive two-terminal electrical device. In electrical circuits, a resistor lowers current flow, modifies signal levels, splits voltages, active components are skewed, and terminates transmission lines.



F. Breadboard

The breadboard consists of a rectangular plastic board with numerous holes. Prototyping (building and testing an early version of) an electronic circuit is made easier with these holes, like this one with a battery, switch, resistor, and LED.



G. Connecting Wires (Jumper wires)

By connecting wires, electrical current can be flow from one point on a circuit to another. Copper or aluminum is the most common material for connecting wires.

H. I2C Connector

Inter-Integrated Circuit, eye-Squared-C, often known as I2C or IIC, is a single-ended, synchronous, packet-switched serial communication bus developed by Philips Semiconductors in the 1980s. It has a wide variety of operators and controllers and targets.

## 4. RESULT

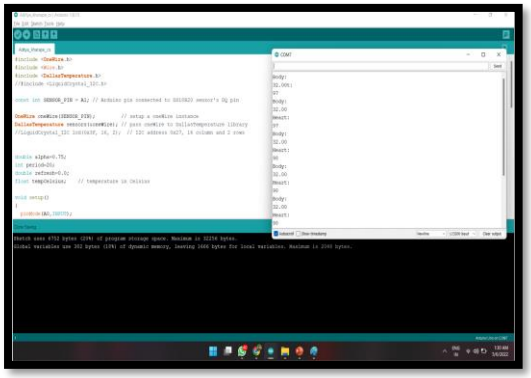


Fig.1. It displays the project's output as well as product code.

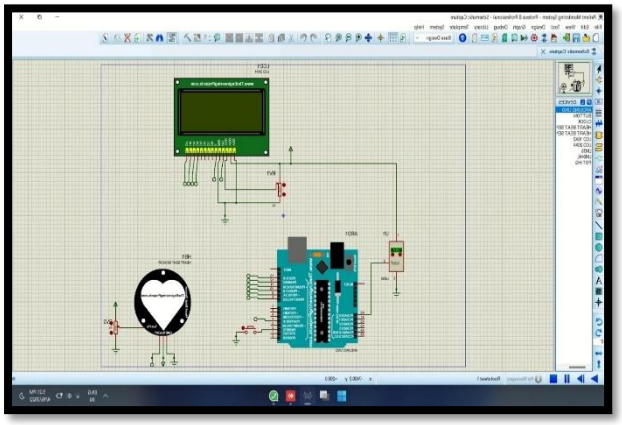


Fig. 2. It illustrates the project's simulation.

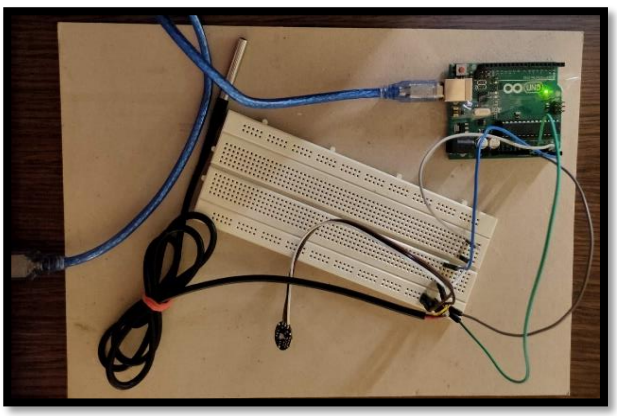


Fig. 3. It demonstrates the project's circuit.

## 5. CONCLUSION

Because cyberspace technology is so widely used, the suggested system's goal is to develop a gadget that can transfer numbers via the net. The outcome will be improved health. The server enables doctors with network connectivity who have been verified to exchange information. Due to the widespread usage of cyberspace technology, the suggested system's objective is to create a system that can interconnect over the internet. The objective is to create a perceptive wellness system that offers people high-quality, affordable healthcare services. Using a mobile app, a physician could examine a patient's health outcomes and track remotely by taking appropriate precautions.

For a variety of application areas, including Telemedicine, Medicaid, Emergency care, assistive care, and sharing, storing, and processing of massive medical resources, several research ideas are seen.

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