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*Research Article*

# Internet Of Things (IoT) based Reliable Health Monitoring System –Solefit

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**Abstract:** Observing important patient boundaries is often limited to hospitals or other health care facilities, which makes the process time-consuming and expensive. We see that with the advancement of technology and the use of small nerves, there have been efforts to use new technologies in various areas to improve human health. People in need of health care find it very expensive and this is especially true in developing countries. As a result, this project is an attempt to solve the health care problem currently facing the community. The main purpose of this project was to design a reliable health care system. It consists of three main parts. The first part was to detect the patient's health using nerves, the second was to send data to cloud storage and the last part was to provide the details of remote vision. Remote viewing of the data enables the physician or caregiver to monitor the patient's health progress away from the hospital premises. The purpose of this project was to develop a Reliable Health System that could be developed by local licenses with the aim of making it less expensive for mass production. The proposed construction therefore collects sensory data via Arduino microcontroller and transmits it to the cloud when it is processed and analyzed for remote viewing. Response actions based on analyzed information can be sent back to the doctor or caregiver via email and / or SMS alerts in the event of an emergency.

**Keywords:** Internet of Things (Iot), Sensors of system disruption; Arduino Microcontroller

## 1. Introduction

Health monitoring can provide useful physical information at home. This precaution is helpful for older or chronically ill patients who may want to avoid long hospital stay. Wireless sensors are used to collect and transmit reproductive signals and the processor is designed to automatically receive and analyze sensory signals. In this project, you have to choose the right sensors according to what you would like to find and design algorithms to see your discovery. Examples are fall detection, monitoring of heart signals. Using a single parameter monitoring system the route to a remote health monitoring system is designed to extend health care from a traditional clinic or hospital placement to a patient's home. The system was supposed to collect heart rate data, fall system data, temperature data and a few other parameters. Data from single parameter monitoring systems were then detected remotely [1]. During the design the following aspects of future medical applications are followed: a) Integration with current practices in medical and technical services, b) Real-time, long-term, remote, low-sensitivity, wearable sensors and long battery life of the designed device. c) Assistance to elderly and chronically ill patients. The device must be user-friendly. In this project, we monitor various patient parameters using the Internet of Things. In a patient monitoring program based on an Internet of Things project, real-time patient life parameters are sent to the cloud using an Internet connection. These frames are sent to a remote Internet site so that the user can view this information from anywhere in the world. In an Io-based system, patient health information can be seen by many users [8].

The reason for this is that the data needs to be monitored by the Android app.

Continuing technology will have a dynamic impact on all health and individual health monitoring; will dramatically reduce the cost of health care and move forward with more accurate predictable diseases. In this paper, we present the concept of a technical service model as well economic ideas for patient comfort and open challenges in using IoT in the real-world medical field.

## 2. Property Outstanding Assets Of The System

- Physicians can take reference to these changes or patient history while recommending treatment or medication to the patient.
- Hospital stay is reduced due to Reliable Patient Monitoring.
- Visits to the hospital for routine tests are reduced.
- Tolerant health parameter data is stored over the cloud. It is therefore more beneficial than keeping records in printed papers kept in files. Or digital records are stored on a particular computer or laptop or memory device such as a pen-drive. Because there is a chance that these devices will be corrupted and data may be lost. While, in the case of IoT, cloud storage is more reliable and has less chance of data loss.

- RHMS is practical and portable so it is very easy for doctors to manage patients from a single application, and it is also very easy for patients to monitor their health by wearing simple equipment such as a bracelet.
- The remote health monitoring system is especially useful for monitoring patients with chronic illnesses. Many chronic illnesses are incurable, so it is necessary to monitor the patient's condition while at home, and to respond quickly if health symptoms worsen.
- The system GUI is easy to use.
- The system is robust and environmentally friendly.

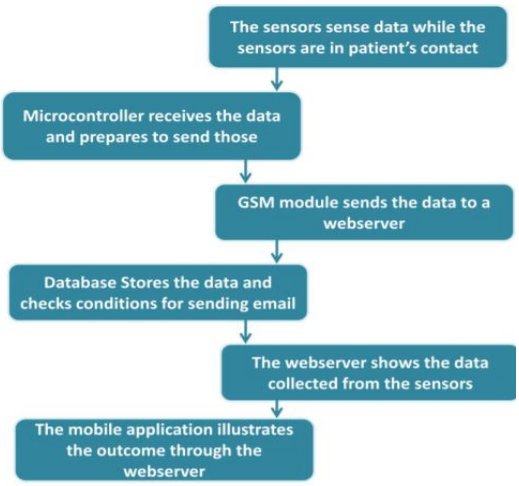


**Fig 1:**Workflow

**Bio Medical Nurses Used:**

**ECG:** The ECG records the electrical activity caused by the contraction of the heart muscle, which is distributed by attracting electrical waves to the skin.

**TEMPERATURE SENSOR:** A temperature sensor is a device designed specifically to measure the temperature or temperature of an object. The LM35 is an accurate IC temperature sensor for its output in terms of temperature (in ° C).

**HEART HEALTH:** The heartbeat sensor provides an easy way to learn heart rate that can be measured based on the goal of mental and physical signal used as a true real system stimulus.

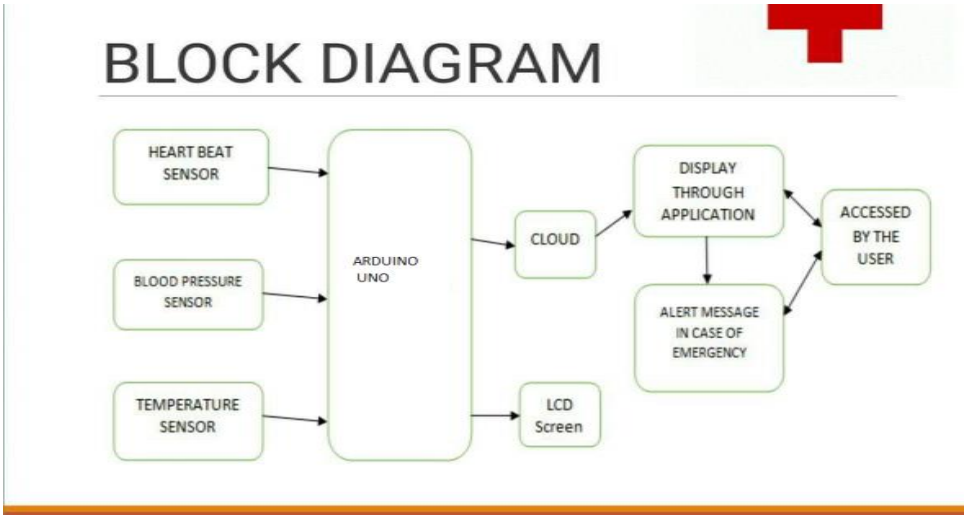


**Fig2**:BlockDiagram

**Modules in the application**

- Login / Registration
- Doctor's sign-in: Personal details and health buttons
- Patient Entry: Personal details and health status

- After clicking the details or health status button
- Data is retrieved from Cloud
- Notification Service (In case of Emergency)
- Location Details

**Special Functions**

**User interface:** The user interface of our program called "SoleFit" is simple and easy to use. We have two different types of User Interface: One for patient patience One for a doctor.

The doctor will therefore log in as a doctor and patients will log in as a patient in turn on their cell phone. In the next section we will explain the details of the operation of the doctor and patient application application.

**Tolerant User Template:**

Registration with a login account: Very soon a patient needs to create an account if the patient has not created an account before. For this, the patient needs to sign up for an account.

The patient needs to provide the necessary basic information such as username, password, first name, last name and email address. After the registration has been successfully completed the patient can log into the account by signing in. Login requires only a username and password.

**Update Details:** After the login is done, there will be two patient options. One option is to update patient information by providing details about name, age, emergency email and Id which is actually the device id and actually the unique id of each patient.

**View Information:** Another option is to view all relevant information about the current patient's medical condition. This option will show the temperature and heart rate. It will show any advice from a doctor. In addition,the patient can describe his or her condition by selecting the given symptoms or by describing the problems in the selected box that will go directly to the doctor's request.

**Doctor's Interface:** Registration and Account **Login**: As a patient, the doctor will also need to create a new doctor's account. The doctor can then log in to his account. Also the doctor needs to register his account by providing the basic information needed to open an accountant or (patient caregiver) can log in to the account using his username and password.

**Patient selection from patient list**: A physician can have multiple patients under his or her treatment. The doctor will therefore be able to see a list of all the patients who will be treated by that doctor. And the doctor can select one patient by clicking on the patient's name in the patient list.

After clicking on a particular patient, the doctor will be able to view all patient records. You will also be able to see if there are any symptoms or any kind of message sent to the doctor.

Depending on the patient list, the interface is 43 to the symptoms a doctor can give you. There is an option called "delete patient data". It means that if the doctor wants to, he can remove the patient's previous record.

**Email Notification:** We have another feature of our app. While registering, the patient needs to provide an email address. This email address could be a patient email address or it could be a patient relative's email address. We think this email address is the patient's emergency email address. So whenever patient data changes from normal to up or down, as soon as a new record is available with unusual symbols email contains alarming symbols will be sent to direct to an emergency email address.

This is the perfect workflow for our app. The app certainly has an easy-to-use connection. We have successfully used the first application model for communication between patient and physician.

**3. Web Server Implementation**

**Web Server Launch:** A web server is a pc framework function that processes applications via http, which is the basis of a network protocol for distributing data to the World Wide Web. data to client. In our project we used GSM to send data and used a web server to store data. We have implemented the MySQL data management system in our project. The reason for using the MySQL database is because it is an open source, widely used and well-known SQL database management system that is distributed, developed and supported by Oracle Corporation.Also, another reason to choose MySQL supports related information. So it's easy to use because we can put the details in a different table than we can put all the details in one table. Initially we used our localhost to develop, create, manipulate database and test our project and ensure quality testing as it is sometimes difficult to find a bug online and stay in it. We used the agile method, because it is a useful method for dynamic transitions

and to make the t stronger and faster. After a successful launch on localhost, we purchased paid hosting and downloaded our real-time testing app.

**4. Database Implementation**

**Creating a website table for web server:** For our database we have started he created a table called "users". This table contained information for all users regarding the physician and patient. The purpose of the table is to store data for registered people and to assist users while signing in to the account. Here we will store user information such as username, first name, surname, password and email.

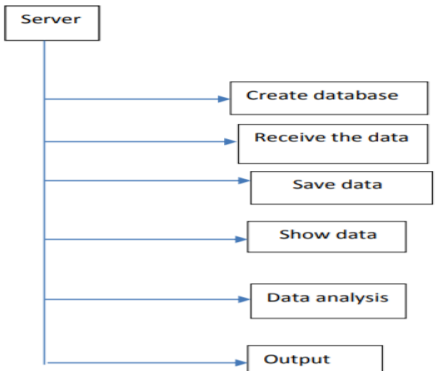


**Fig 4**:Database implementation

**5. Working**

This activity will involve highlighting / focusing and extensive knowledge to deal with it.

- **The first step** is to make another pledge with any name where the text is compiled and since we know that Gradle is built, we will have activity_main.xml and MainActivity.java and here we have MainActivity which will be known as the main screen of the homepage with two buttons.
- **In the second step**, we need to create a user interface for our app. The user interface will be particularly great and easy to use.
- After the UI is complete, we will proceed to the encoding section.
- To monitor IOT patients there are three sensors (the first) temperature sensor, the second heart rate sensor and the third is an ECG.
- A small controller or Arduino board with all the sensors. The sensors are then integrated into a small controller that allows you to test health readings and transmit them over a WiFi network using a WiFi module.
- The Arduino board continues to read input from these sensors and send data to the cloud.
- In the MainActivity.java section, Purpose is used to access the database in the cloud. The purpose is the stage used to indicate the work to be done. It is an important way to help developers by initiating some movement within the app. It can be used in the same way as a transfer tool between tasks.
- In all functions, we must declare objective filters in the expression file.
- The Google API can be used to locate a patient in an emergency.
- Our Health Monitoring System now uses the Google Maps API v2 to perform patient identification in case of an emergency saving a doctor's prescription.
- Next, we set all the paths, audiences, and buttons needed for all pages.
- We will now check the progress.

**WAYS(Approach)**

Context is nothing other than the current and expected condition of the patient. It is very important to keep electronic medical records safe while keeping them in the cloud. To prevent unauthorized access, appropriate precautionary measures should be taken when transmitting offline data to the cloud. Therefore, protect cloud storage structures

The approach used in developing the proposed system has been introduced to address critical medical information

Integrated Integrated Process (RUP). The RUP approach is based on the fact that the system represents a systematic approach to business mobilization

needs and to formulate a project goal. This was hired, because it is an object-oriented and web-enabled web development program and software development framework. And clearly outlines the various roles of project

participants, such as project manager, business analyst and developers. Other features of the Rational Unified Process include;

Creating iteratively: This includes software upgrades with repeated cycles. For each cycle,but still a challenge.

Analytics and Prediction: As databases are rich in quantity, data analytics is also a major task. Machine learning algorithms perform this function of combining sensory parameters with clinical data. By analyzing this for a long time, the accuracy of medical tests can be improved. Data from the wearable sensors will address the process of pattern recognition and machine learning techniques [6]. In order to deal with complex and ever-changing sensory details, machine learning must be continuously improved.

Also, those algorithms must be able to cope with the additional features designed and developed in the system with unmatched data rates, streaming data and information until the system is fully operational and ready to deploy different sizes and semantics as customer build.

**Requirement management:** This includes the obvious documentation of user requirements and keeping track of changes regarding demand. It also analyzes the process and the impact those changes will have on the system before considering them.

- Using component-based formats: This involves organizing system-structured components into components.
- Visualizing the software: A graphical UML is used to present a powerful and powerful software view
- Quality Assurance: Ensures that the software meets the quality standards of the organization
- Change management: provides the environment for changes in software that will be effectively managed using the change management system and configuration management processes and tools.

**Processing Cloudlet:** These days, smart phones come with advanced and advanced features for use like LTE and WiFi. Such smart phones can act as critics in this program. The data collected by the concentrator will be transferred to the cloud for storage.

Such data, if stored, will be very helpful in obtaining it at the request of doctors or through analytics. A little sensors often change. There are three major challenges while performing the mathematical process in the implementation of IoT in the medical field. First, in the medical field, new measuring devices and equipment will be introduced almost daily. Also, they need periodic updates for IoT devices and sensor data will also vary. Obviously, it will have a huge impact on data creation and IoT devices must be able to manage all of them [8]. Machine learning algorithms are expected to be continuously developed to manage ever-changing sensory data. Second, always depending on the patient's condition, the information that will be collected will vary according to the doctor's instructions. It is therefore not possible to in any way add additional variables over time. It is possible to compare previous sensory data with clinical records, however it is challenging due to rare patient conditions.

The concept of segregation and retrospective methods can help to adjust the standard training data to provide machine learning algorithms, but it will also be an additional burden on physicians. Eventually, as we take input from different sources, sensory data will produce different pathways. This variation remains a challenge for machine learning methods as it handles relevant data. Graphic models can help integrate a unique input processing unit called a cloudlet that is used to both store data in a highly customizable framework.It also helps to perform sensitive tasks during medical data for patients. When data is stored in a cloudlet, it enables regular access to data analytics to produce better diagnostic data [9].

Cloudlet Computing has been suggested as the best solution for health applications via PAN as they often deal with offline data.

The concenter and cloudlet are allowed to communicate via a WiFi interface to reduce data transfer delays for sensitive data collected. Eventually, the data in the apartment will be stored in the cloud so that it can be stored securely and spread the data access.

The data integration made between cloud and cloudlet can be separated by contextual comprehension torture there.Even if the data center is numerical; medical information is organized with diagrams to continuously monitor the patient's health. The concept of visual acuity is very important in health care.

Data from IoT warble sensors are scanned using various predictive detection methods. Visual aids should always be ready to communicate complex data for fast and accurate forecasts for emergencies [8]. Views should be able to manage still images by comparing medical reports of patients.

**6. Results And Discussions**

In these covid times it has become increasingly difficult for patients with a disease that needs constant monitoring. In these cases our app is up and running.

With the help of our app we can make things easier in some ways:

- Tolerant health parameter data is stored over the cloud. It is therefore more beneficial than keeping records in printed papers kept in files. Or digital records are stored on a particular computer or laptop or memory device such as a pen-drive. Because there is a chance that these devices will be corrupted and data may be lost. While, in the case of IoT, cloud storage is more reliable and has less chance of data loss.
- RHMS is practical and portable so it is very easy for doctors to manage patients from a single application, and it is also very easy for patients to monitor their health by wearing simple equipment such as a bracelet.
- The remote health monitoring system is especially useful for monitoring patients with chronic illnesses. Many chronic illnesses are incurable, so it is necessary to monitor the patient's condition while at home, and to respond quickly if health symptoms worsen.

**7. Conclusion**

These days, many people have problems with people with diabetes and high blood pressure, they need regular checkups and appropriate precautionary measures. Almost everyone has phones these days. Therefore, an app like SOLEFIT helps patients to be looked after and healthy. Their precious time is kept as reduced by doctor visits.

In this paper, we have identified the importance and benefits of making IoT in reliable health monitoring systems. Combined nerves with IoT will make a huge impact on the health of each patient, that even if they are not at home with the doctor, this helps them reduce their fear of danger. Sensor details can be found at home or workplaces. Also, the challenges of hearing, analyzing and predicting the disease are also highlighted and those that can be considered to provide a seamless integration in the medical field.

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