

# E-Lifeferve

<sup>1</sup>Sahil More, <sup>2</sup>Aashutosh Jaswani, <sup>3</sup>Ritesh Sandbhor, <sup>4</sup>Mr. Harsh Bhor

<sup>1,2,3</sup>UG Student, <sup>4</sup>Asst. Professor, Information Technology, K. J. Somaiya Institute of Engineering & Information Technology, University of Mumbai, India.

<sup>1</sup>sahil.more2@somaiya.edu, <sup>2</sup>aashutosh.j@somaiya.edu, <sup>3</sup>ritesh.sandbhor@somaiya.edu,  
<sup>4</sup>hbhor@somaiya.edu

**Abstract—** Healthcare facility to people anytime and anywhere in the world in a more economic and patient friendly manner. Therefore, for increasing the patient care efficiency, we need to improve the patient monitoring devices and make them more remote. Sometimes patients need to be continuously monitored for their heart rate, oxygen saturation level and temperature. The medical world today faces many problems when it comes to patient monitoring. Firstly, the needs of health care's provider's presence near the bed of the patient and secondly, the patient is restricted to bed and wired to large machines. The doctors are needed to be present physically near the patient. Machines only display the current data of the patients and the history of the patient cannot be displayed. To achieve better quality patient care, we have to overcome these problems. As technologies are advancing, it is possible to design a more advanced portal for patient tele-monitoring systems to acquire, record, display and to transmit patient data from the hospital to any place. In this paper real time transmission of patient self-tested blood pressure data to doctor is obtained. This system is very convenient to use for doctors as well as patients. The modern visionary of healthcare industry is to provide better outcome. In this paper, we are using different methods and techniques used for health care monitoring system where doctor can continuously monitor the patient's condition on his smart phone and all the patient history will also be gathered from various IoT devices and stored on a remote server and doctor can access the information from anywhere around the globe.

**Keywords—** Healthcare, Blood Pressure, Oxygen Saturation Level, Heart Rate, IoT.

## I. INTRODUCTION

The current lifestyle current lifestyle and food habit have increased diseases such as Cardio Vascular disease (CVD), hypertension, stroke and diabetes. According to World Health Organization (WHO), around 31 percent of the global deaths are because of these diseases. The cost of healthcare facilities has also increased due to increasing demands on getting more efficient and effective healthcare. This Paper aims to fill in these gaps to provide a quicker way of service using popular technologies such as IoT. Internet of Things (IoT) is a blooming technology which allows interconnection of humans and IoT devices. These devices can interact and exchange data with users. In technical terms it is a combination of Telecommunication and Information Technology.

In this paper we are building a real-time IoT monitoring system which will always keep a tap on patient's health. ECG, heart beat count sensor, temperature sensor's will be used in a single unit to keep track of overall health of a patient. The doctor as well as the patient's family will be able to keep track on this data using a remote mobile device. A

website of the same will also be deployed if we want to access it through desktop. The doctor will be able to provide guidelines remotely based on patient's real-time performance. All the information gathered will be stored safely on cloud and will be accessible anytime.

## II. LITERATURE SURVEY

**Health and Care Monitoring System Based on IOT:** In this proposed system user have to check Blood Wright, body temperature and the respiration rate by using Raspberry pi as a main module. In this system overall data is saved to the server and then check with the values of already given in the database if the value match then you are fine otherwise alert message id displayed and you have to go to the hospital and take the medication as given by the doctor at hospital. [1]

**E-Health Care:** In this system thermometer or temperature sensor convert the analog single into digital signal by using A to D convertor. Here by using programmable pulse oximeter device will get the oxygen saturation and also count of pulse there is one another sensor for sensing the blood pressure which will calculate the different blood levels from the patient's body. [2]

**Smart Healthcare kit:** It is the system which is robust and intelligent which monitors the patient condition using of IoT based sensors. In this there are various sensors which will collect the data from the patient which will include the data like patients' blood rate, ECG etc. it also includes the alert message when there is emergency and sends the message to the doctor with patient condition and full data report. From this report doctor can analyze the patient and get back to the patient as soon as possible. By this patient will get its cure at home without visiting the hospital. [3]

**A smart patient health monitoring system using IoT:** In this smart patient health monitoring system data is stored to the server in real time basis and this real time data is continually checked by the doctor thus doctor can examine the patient any time anywhere in the world. In this they are using Arduino Uno which will be used to get the proper data from the patient and send it to server. Any changes in the patient health will quickly let doctor know and doctor will get quick actions according to it. [4]

**Health Monitoring system using IoT:** In this health monitoring system using IoT patient data is to be collected using different sensors. Communication of patient and doctor will be done through internet. All data which will be collected from the device will be processed on the server. To analyze data and readings of the patient will be later displayed on the website which will be seen by a doctor and patient at any time. This webpage or site eventually does the work of data management. [5]

**Smart Hospital based on Internet of Things:** In this system, named as smart hospital based on Internet of Things is totally based on medical IoT in this system overall devices of hospital is replaced with smart device or sensors of IoT. These devices are link with Hospital management devices and software's which will include overall transformation of simple hospital into E- Hospital and they will also change layer technology and also implement the security which is also based on layered approach. Here they are talking about OSI layers which consists of Application layer, physical layer, network layer etc. In this paper they are building the overall structure of hospital through which they will define where which sensor will get installed. This is the overall implementation idea of smart Hospital based Internet of Things. [6]

**An IoT-Cloud Based Wearable ECG Monitoring System for Smart Health Care:** In this System, they have built skeleton of the project on IoT based sensors. Based on the skeleton they have created ECG monitoring system which anyone can wear.

After wearing this device, the device will get the data from the body using sensors and send this data to the server by using IoT based wifi module without using additional device. Comparing this Wi-Fi\_\_33 devices with another device this will provide faster network speed at less price.

For giving the security to the data when data is sent to the website then that site will be secured with https and other security protocols. This data will be stored in non-sql database which will provide faster access to the data. Through the use of Routers they will improve the transmission speed and provide flexible data transfer. The GUI will be provided in Graphical and well organized manner through which doctor and patient can communicate easily and securely. This overall system is fully tested and deployed to provide reliable and effective application. [7]

### III. PROBLEM DEFINITION

#### Detailed Statement of Problem:

Today's lifestyle has taken a toll everybody's health. There are never ending queues in the hospitals and increase in this number has ultimately raised the bills of their payments. There are very less number of doctors who are not enough to meet this demand. So real-time and continuous attention to each and every patient is not affordable. In the absence of such a mechanism it is a very hefty job getting a proper attention which often leads to longer waiting intervals as well as increase in healthcare cost.

#### Scope of System:

This paper aims to collect the information from the devices such as body temperature sensor, heart rate sensor, oxygen saturation level sensor, ECG sensor. The system will basically consist of three different users who would be interacting for providing a better medical service through use of some popular technology stacks. The users are:

- 1.Administrator.
- 2.Doctor.
- 3.Patient.

Administrator is a person who will be able to control over the whole project i.e. website as well as the mobile app. Administrator will be having rights to verify the doctors as well as the patients. His/her will make sure that the project functions properly.

The role of a doctor is vital in any healthcare process; we will provide the provision in our project to give guidelines to the patients. Doctor's will be having their dashboard where all the patients assigned to them will appear along with their current health details.

Patients will be able to send their reports to their respective doctors. If they feel satisfied with the data provided by our application, they can continue their treatment and medication as it is.

## IV. FUNCTIONALITIES OF PROPOSED SYSTEM

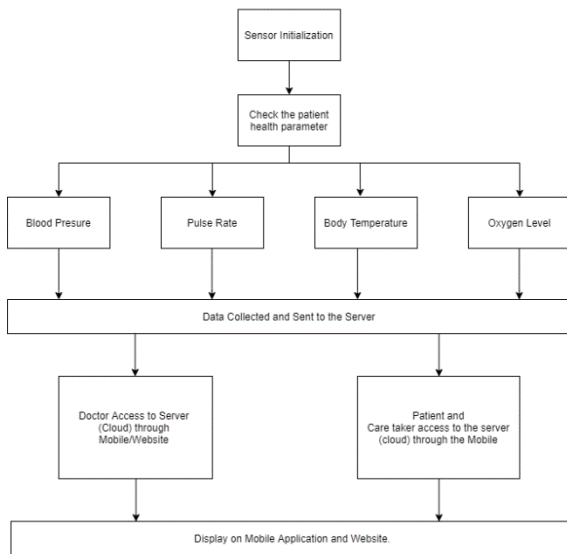


Fig. 1 - Workflow

Firstly, there will be a portal which will allow the doctors as well as patients to sign up and create their respective accounts. Doctors will have the feature to check the live health status of the patients to whom he/she is treating. Different Iot sensors will get the readings of their allotted patient and send it to the server for processing. The data from the server will be processed and will be displayed to the patients on the profile which has been allotted to them. If the patient is discharged, automatic health check-up recommendation's will be given on a regular basis depending upon the patients health history. A detailed analysis on weekly basis will also be available to the user if needed.

## V. IMPLEMENTATION

### • Software:

#### 1. Patient Dashboard:

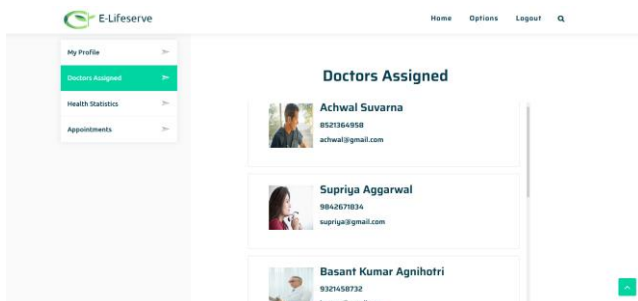


Fig. 2 – Patient Dashboard

Patient can see doctors assigned to him/her directly on the dashboard.

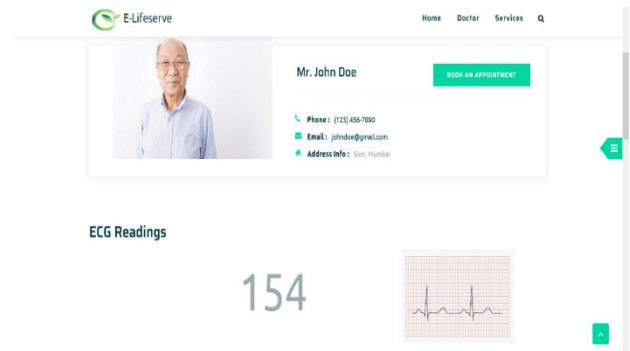


Fig. 3 - Readings on Patient Dashboard

ECG readings are displayed on the doctor's as well as patient's end remotely.

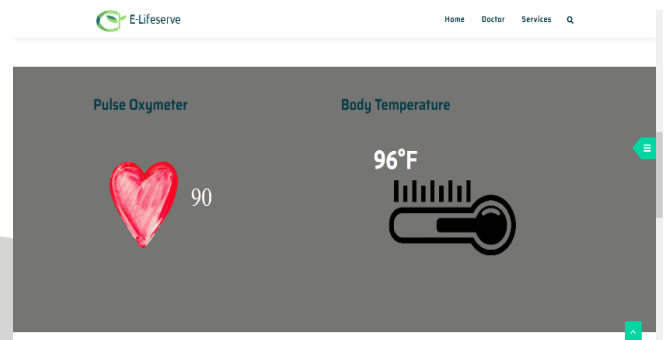


Fig. 4 - Temperature and Pulse readings

Pulse Oximeter as well as body temperature readings are collected from the patient's end and displayed on a remote dashboard.

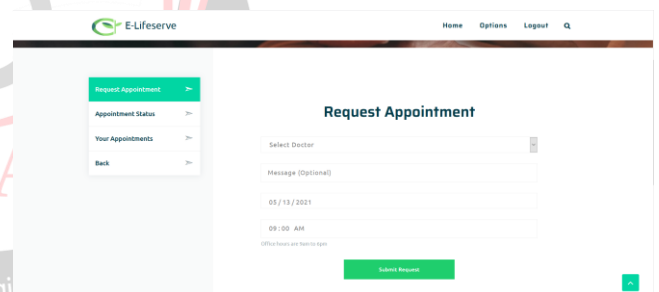
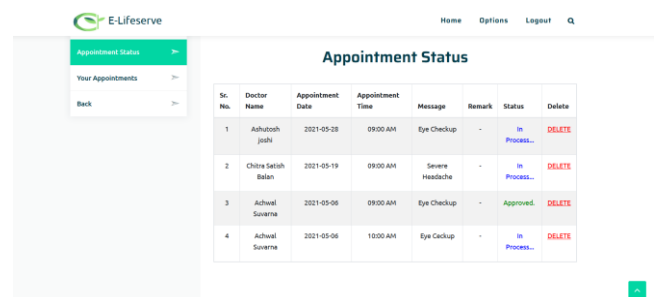


Fig. 5 – Request Appointment

Patients can book an appointment directly from their dashboard.



Sr. No.	Doctor Name	Appointment Date	Appointment Time	Message	Remark	Status	Delete
1	Ashutosh Joshi	2021-05-28	09:00 AM	Eye Checkup	-	In Process...	DELETE
2	Chitra Satish Balan	2021-05-19	09:00 AM	Severe Headache	-	In Process...	DELETE
3	Achwal Suvarna	2021-05-08	09:00 AM	Eye Checkup	-	Approved	DELETE
4	Achwal Suvarna	2021-05-08	10:00 AM	Eye Checkup	-	In Process...	DELETE

Fig. 6 – Appointment Status

Appointment status is shown and accordingly status is shown about each appointment's acceptance.

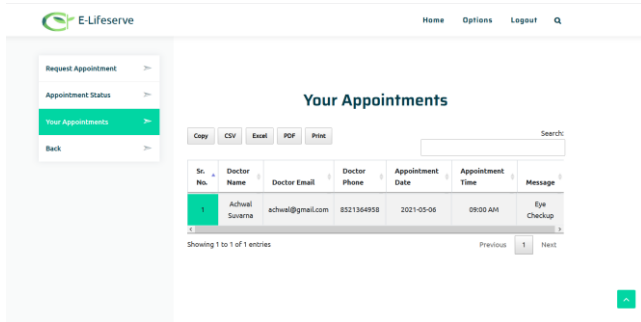


Fig. 7 – Your Appointments

Approved appointments are displayed in a different tab and can be copied as text and also be exported in pdf, document etc.

## 2. Doctor Dashboard:

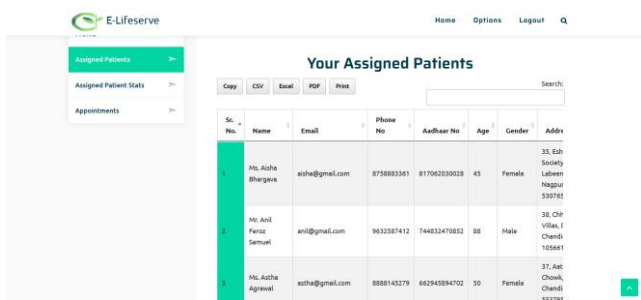


Fig. 8 – Doctor Dashboard

All the assigned patients to a particular doctor will be visible on his/her dashboard which will make it easy to list out the patients under their treatment.

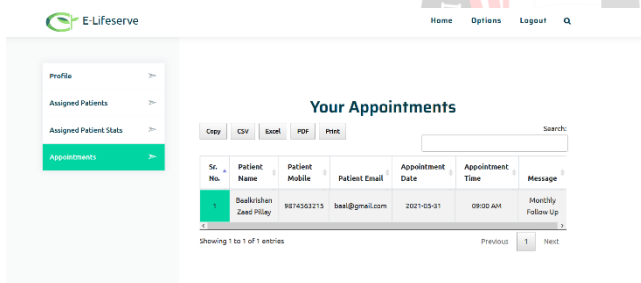


Fig. 9 – Doctors Assigned Appointments

Doctors can view their appointment schedule daily which will be approved by the reception counter from the admin panel.

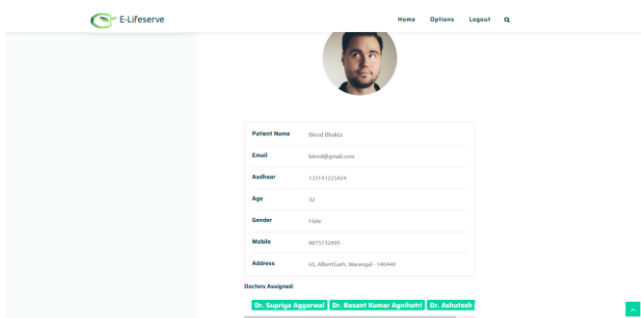


Fig. 10 – Patients Detail Information

Doctors can view all information including patient's real-time health readings which are allotted to them respectively.

## 3. Admin Dashboard:

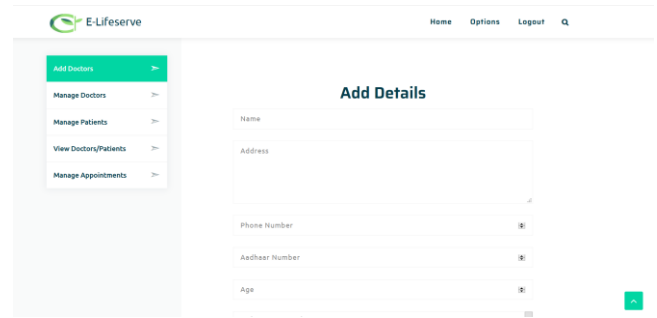


Fig. 11 – Admin Dashboard

Admin will be able to add doctors to the system by verifying their accounts from the dashboard.

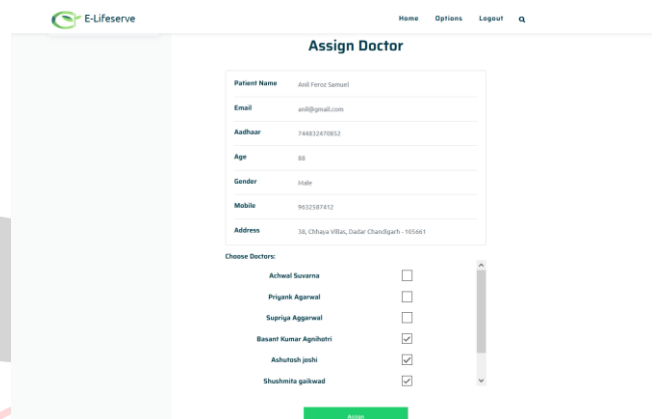


Fig. 12 – Admin Assigns Doctor to Patient

Admin can assign patients according to the need with their respective doctors.

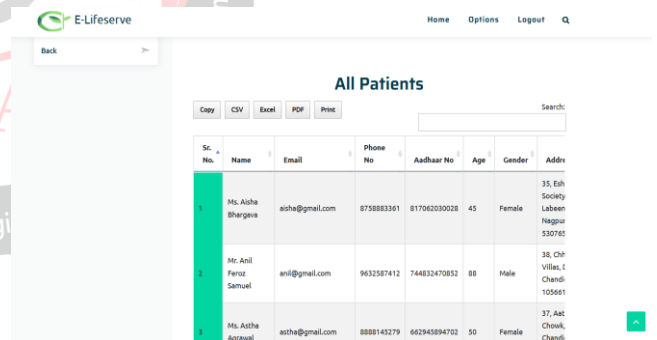


Fig. 13 – Patients details

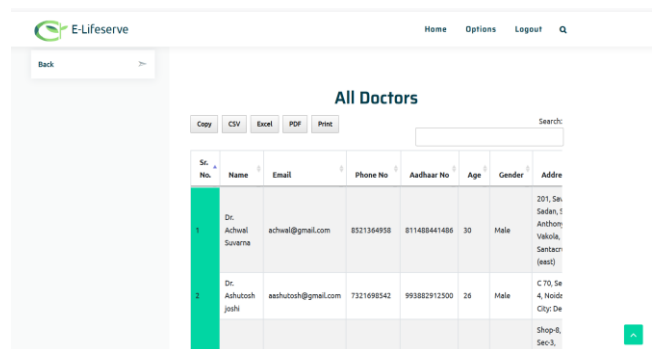


Fig. 14 – Details Of Doctors

Admin will be able to view all the doctors and patients registered on the panel. For documentation admin can also



export this data in pdf, document etc.

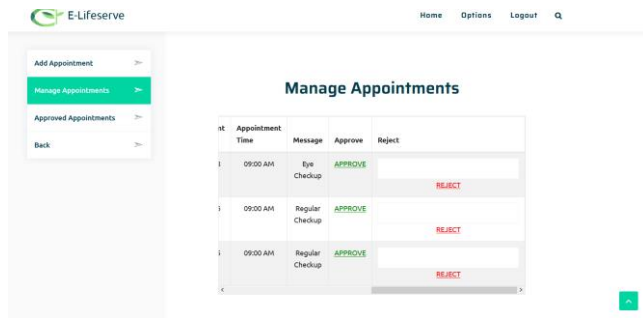


Fig. 15 – Manage Appointments

Admin has the right to “Approve” or “Reject” the appointment by discussing it with respective doctors.

#### Hardware:

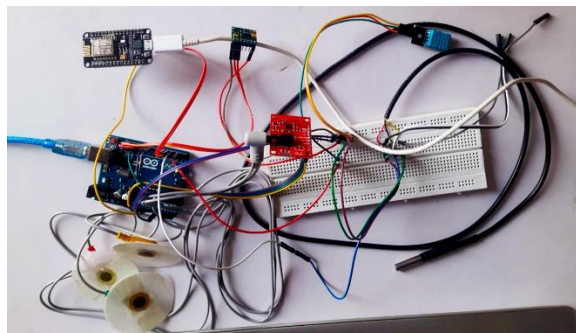


Fig. 16 – Integrated Hardware

Connection Diagram to connect all the sensors to the Arduino and the Values would be sent server via WIFI module.



Fig. 17 – Live Simulation

3 probes of ECG Sensors are connected on abdomen. Water proof temperature sensors is in mouth. Right hand has Humidity/Temperature sensor to calculate room condition. Left Hand has the Pulse Oximeter which calculate the oxygen level in the body.

#### Applications:

1)The prime purpose is to provide quick and in budget service to patient.

2)It is used to get patient’s health care services at home.

3)It can be used in wireless technology.

#### Advantages:

1) Securely sharing electronic information with patients and other clinicians.

2) Helping providers more effectively diagnose patients,

reduce medical errors, and provide safer care.

3)Improving patient and provider interaction and communication, as well as health care convenience.

4) Enabling safer, more reliable prescriptions.

## VI. OUTCOMES

Hence through the combination of this hardware and software its easy to take care of the patient from anywhere. Also the application provides the prediction of primary phase of the disease from the real time data through different devices combined. More the updated devices the accuracy level increases we have observed it to be 80% as per our testing data and the application is working perfectly for all the modules. Its secure as all values are encrypted and other important security issues are also taken care of. This kind of device will give a boost to healthcare industry considering current pandemic scenario.

## VII. CONCLUSION

The main aspect of the paper is providing better medical facilities to common people. E-Lifeserve is an IoT based real-time health monitoring system in the form of a website as well as a mobile app. In the final project the experts/doctors will be able to make use of a detailed health report of each and every patient for their treatment remotely. Emergency mail facilities are also available for better reach. Interaction between the patients and the doctor will always be available.

Patient will be given guidelines by the doctors remotely if there is no any need of visiting the hospital personally. Medication changes can also be forwarded through the same channel.

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