

# **(SELF DIAGNOSTIC SYSTEMS USING IOT)**

Project report submitted in partial fulfillment of the requirement for the degree of Bachelor  
of Technology

in

**Computer Science and Engineering/Information Technology**

By

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Under the supervision of

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to



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## CANDIDATE'S DECLARATION

I hereby declare that the work presented in this report entitled “**Self Diagnostic systems using IOT**” in partial fulfilment of the requirements for the award of the degree of **Bachelor of Technology in Computer Science and Engineering/Information Technology** submitted in the department of Computer science & Engineering and Information Technology, Jaypee University of Information Technology Waknaghat in an authentic record of my own work carried out over a period from August 2018 to May 2019 under the supervision of **Dr. Vivek Sehgal**, Associate Professor, Computer Science & Engineering and Information Technology.

The matter embodied in the report has not been submitted for the award of any other degree or diploma.

Vasundhra Jaswal,

151432

This is to certify that the above statement made by the candidate is true to the best of my knowledge

Dr. Vivek Seghal

Associate Professor

Computer Science & Engineering and Information Technology

Dated:

## **ACKNOWLEDGEMENT**

It is my privilege to express our sincerest regards to our project supervisor Dr. VIVEK SEHGAL for their valuable inputs, able guidance, encouragement, whole-hearted cooperation and direction throughout the duration of our project.

I deeply express my sincere thanks to our Head of Department Prof. Dr. Satya Prakash Ghrera for encouraging and allowing us to present the project on the topic “Self-Diagnostic Systems using IOT” at our department premises for the partial fulfilment of the requirement leading to the award of B.Tech degree.

At the end I would like to express my sincere thanks to all my friends and others who helped me directly or indirectly during this project work.

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## **ABSTRACT**

In present scenario there has been great development in the in the Internet of Things (IoT) sector. So it's time to use take technology in way that can be beneficial for ourselves, Now a days as there is a need to improve in the health sector as it is expensive and sometimes proves to be inefficient in the remote areas where we don't have such facilities. So to improve human health, patient monitoring systems based on IOT, in which comprises of smart home or in hospitals, exists a connecting point (i.e., passage of connection). The gateways are established so that services of higher levels can be provided so as to store the data in their respective memory, which will process the data further, with the help of data mining etc. The implemented connection established for Health-IoT platform has been given for the field trials. And it proves to be reliable and has several advantages like low latency and high data transfer.

# 1. INTRODUCTION

Internet of Things is a process in which physical devices are connected, vehicles, appliances used at our homes and other electronic items, software sensors, actuators and establishes a connectivity that helps us to enable the devices to connect, collect and exchange data.

IOT can also involve to exchange connectivity of Internet connections besides using some of the standard devices including computer PCs, laptops, smartphones and tablets for a particular range and also devices not enabled with Internet as well as any other physical devices used in everyday life. Systems which are embedded with latest technologies, are able to communicate with each other and also interact over the Internet and can be used to remotely monitor as well as can be controlled.

These applications can be extensively used as set in IOT devices and can further be divided as follows:

1. Consumer
2. Commercial
3. Infrastructure spaces.

Internet of things provides an application for medicinal and purposes which are related to health, collection of data and used to analyse research work and monitor it.

Internet devices also can be used to enable some of the devices monitoring health in remote conditions and identifying some of the emergencies notifications. Some specialized sensors are used in living conditions and spaces for monitoring of health of patient's and checking the well being and condition of elderly people thus, ensuring that the proper treatment of patient is administered.

Hospitals need for a better management has increased a lot in the present scenario. The records of the data of all patients should be well maintained and the data should be

privatized. The most important concern of many countries in the world is healthcare. The lives of patients especially in the weaker parts of the society should be taken care of which include the different sections of people which needs to be improved. At present, the data is maintained in the form of paperwork or on files. The data is accessible to all the staff and doctors only which could also be a problem if look at the larger picture of it. So an innovative way where patient and doctors able to communicate through mobile application and web application has to come up because for continuous monitoring of patients here are facilities in the hospital. Example like heartbeats are continuously monitored but once the patient return to home there is no provision to check . There are chances that it may return the disease again. Patient's data sent to server and will be frequently measured.

### **The benefits of IoT are:**

The Internet of Things as new tools that accommodate an integrated healthcare network, has gives us a fresh outlook subsequently the care that is provided is of a higher standard.

Many hospitals use connected devices to control the airflow and temperature in operating theatres and the subsequent use of IoT in healthcare allows for the automation of processes that have previously taken time.

The advantages of IoT in healthcare are:

**Error Reduction-** It reduces the risk of error and IoT too allows for the accurate collection of data, automated workflows and minimise waste.

**Minimal reduction in costs** –Connected home care facilities will also help reduce hospital stays and re-admissions have drastically cutting down the need for doctors going out and making visits.



**Better patient experience** –Enhanced treatment options and improved diagnosis accuracy and a connected healthcare system creates an environment that meets each patient’s needs make for a better patient experience

**Management of diseases have improved** –They can spot any disease before it spreads and becomes serious with real-time data healthcare providers can continuously monitor patients.

## **2.1 MOTIVATION**

It is now a necessity for the soldiers living in stations for identifying their health status and his surroundings is a must for soldiers behind enemy lines. Tracking the location of soldier may help him if he is off course and blind navigating. Monitoring health parameters gives us assurance of the soldier's safety and his environment. Both of them together might assist rescue operations and guidance of an injured soldier. From the literature survey it can be found out that most of the systems used require a lot of space and some were bulky depending on various microcontrollers or technologies used. There were few systems which used the processing power of newer systems like Raspberry Pi and Arduino, which are also easier to program and more focused on implementing ideas rather than supporting circuitry.

## **2.2 PROBLEM STATEMENT**

Create an automated system using a smartphone that can monitor the patient's status, create alerts and manage records.

In addition to this, sensors can be used to store data from applications used in clinics and monitoring of remote health systems to maintain records in their respective databases, administration and access of clinical information to the patient's health related information.

By using the information provided the doctor can create a very accurate diagnosis of the patient's health and advise for treatment.

## 2.3 OBJECTIVES

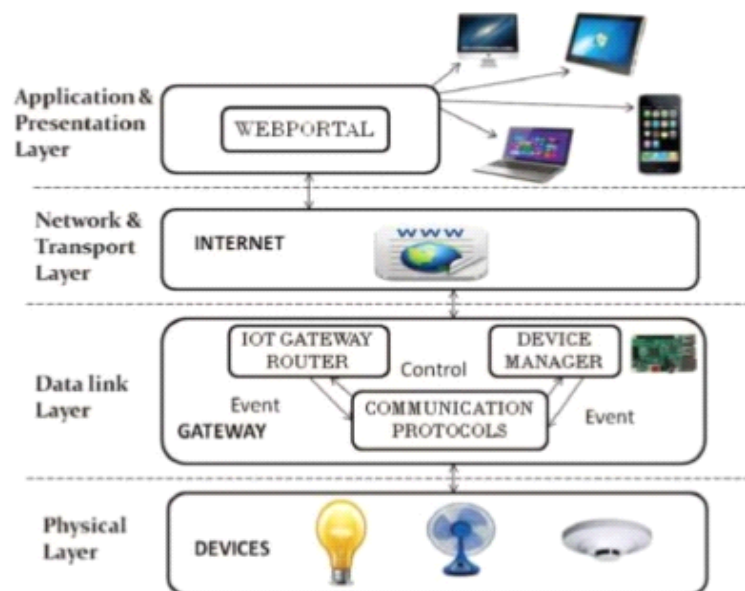
There are many new technologies which can help in reducing the cost overall used to prevent or to manage very chronic or serious diseases. The devices may help which can constantly be used to monitor some indicators showing health status, instruments which help in self monitoring therapies and/or device which help in tracking of real time data used for checking health if a patient needs to auto administer for a therapy. Since this has an immense access to a good speed internet connection as well as to smartphone devices, patients now have started using android applications for managing varying health needs. The devices used and android applications have now increased and also embedded with medicines and Health with the help of medicinal internet of things.

Major objectives are:

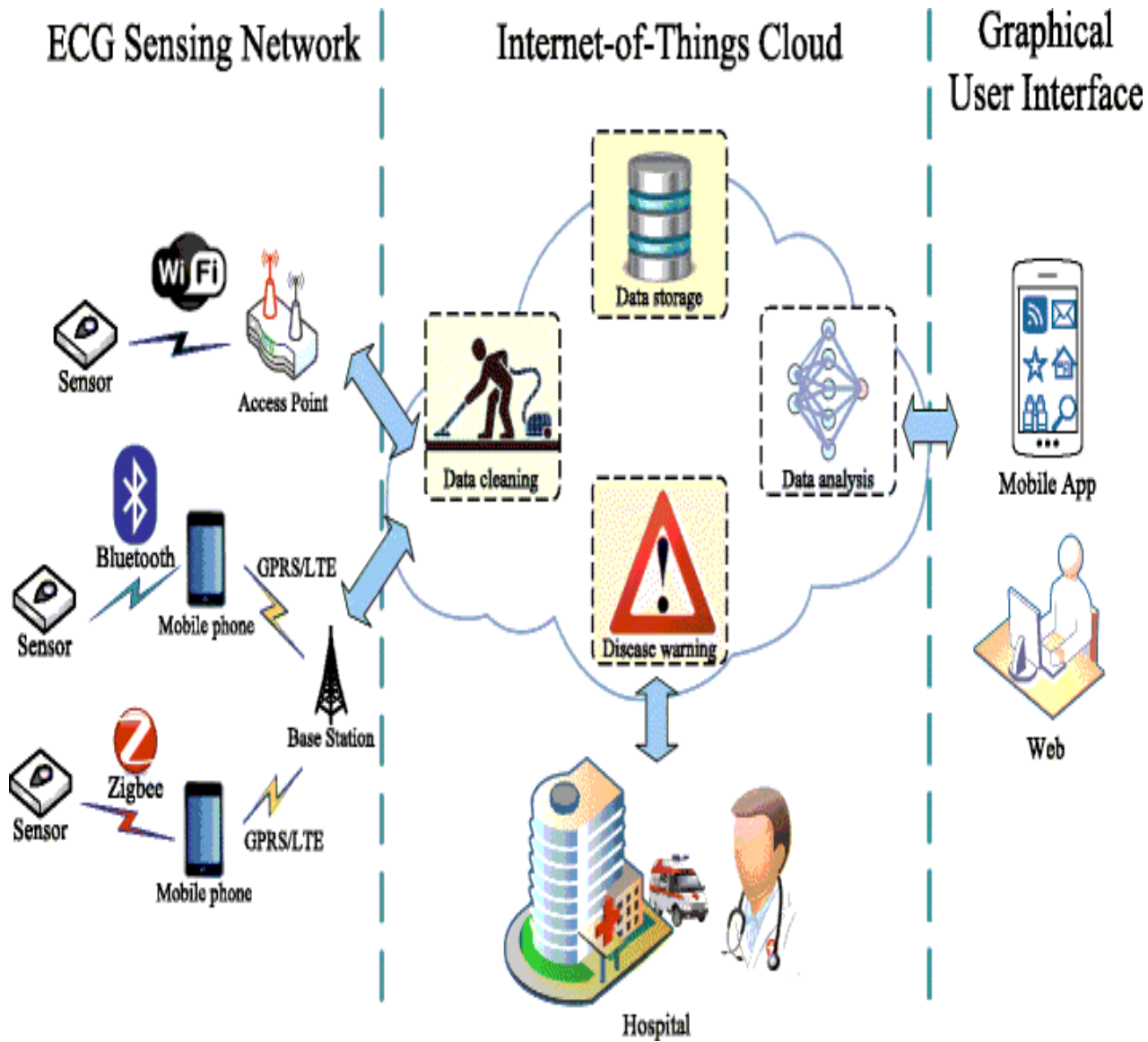
1. For creating an industry in IOT in India and having USD of 15 billion. This also will lead to an increase from the unconnected devices to connected devices. According to a gartner report published total revenue comes from IOT industry as is approximated to be USD 300 billion. It has also been approximated India will have a share of approx. 5% of total IOT industry.
2. For undertaking development of capacity in the issues related IOT and implementing of specific skills required in domestic and international markets.

## 2.4 METHODOLOGY

### PROPOSED IoT ARCHITECTURE



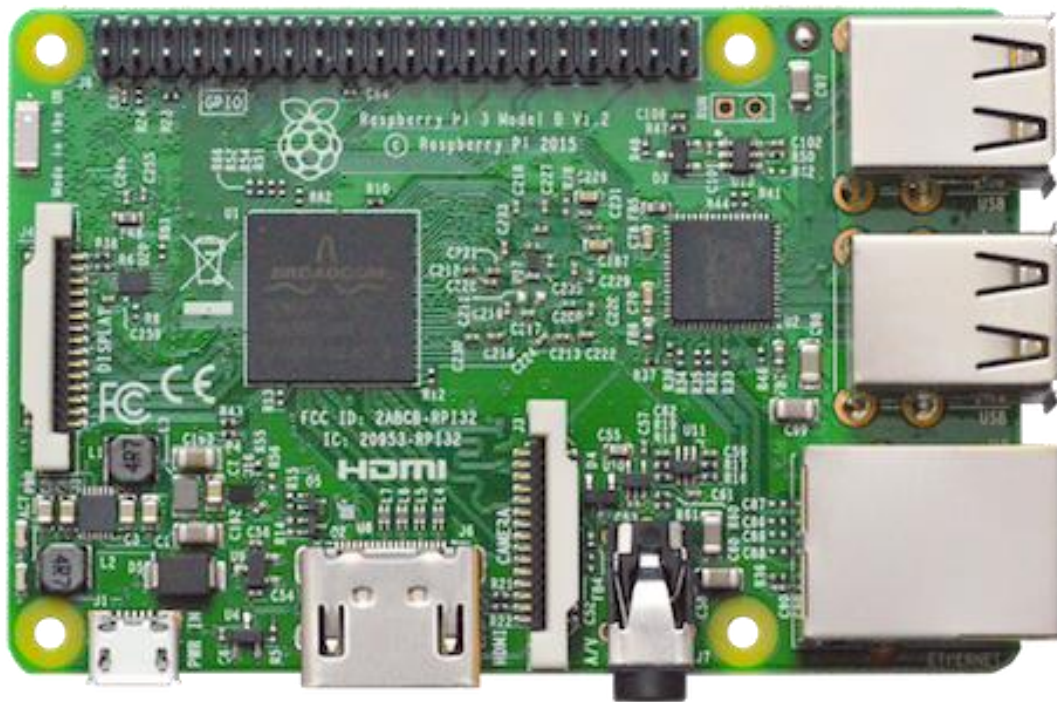
This project consists of a temperature sensor, blood pressure sensor, an ECG sensor and heart beat sensor for measuring that can be used to monitor using Raspberry Pi. The signals sent to sensors are then sent to Raspberry Pi with the help of an amplifier circuit and also a signal conditioning unit, as level of signals is very low.



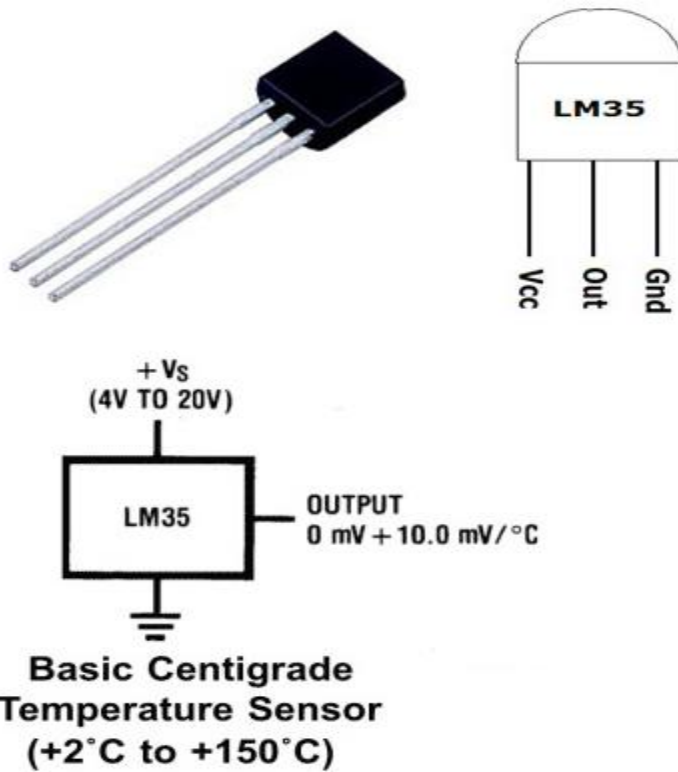
## 2.4.1 Hardware used :

### 1. Raspberry pi

A processor which is low in cost and is credit size computer. Uses standard keyboard and mouse, it can be plug into a computer monitor or television. People of all ages to explore computing and it is capable little device. It act as server when internet is connected to raspberry pi. The cloud is automatically by the server. So the parameters are monitored like heart rate, electrical activity of brain, temperature etc. Automatically send alert message to the Doctor and buzzer will ring this parameter goes above or below the threshold value then it will.



## 2. Temperature sensor



## 3. Heart Beat and Blood Pressure sensor

The digital output of heart beat when a finger is placed on it by the heart beat sensor. The LED flashes in unison with beat, when the sensor starts. Beats per Minute (BPM) rate is the output generated.

#### 4. ECG sensor

Recording of the electrical activity of the heart over a period of timing using electrode placed on the skin is the process commonly called as electrocardiography. Pick up ECG signals is the ECG electrode sticks to chest.

#### 5. LCD Display

#### 6. GSM Module

For Remote Control ( Gate Control, Temperature Control) the GSM Mobile is used. The two advantages it has are

- a) We can simply replace it with a different module without having to replace the entire circuit board if the GSM module stop working.
- b) The option of choosing between two different mobile phones according to one's needs is given by the double-faced printed board.





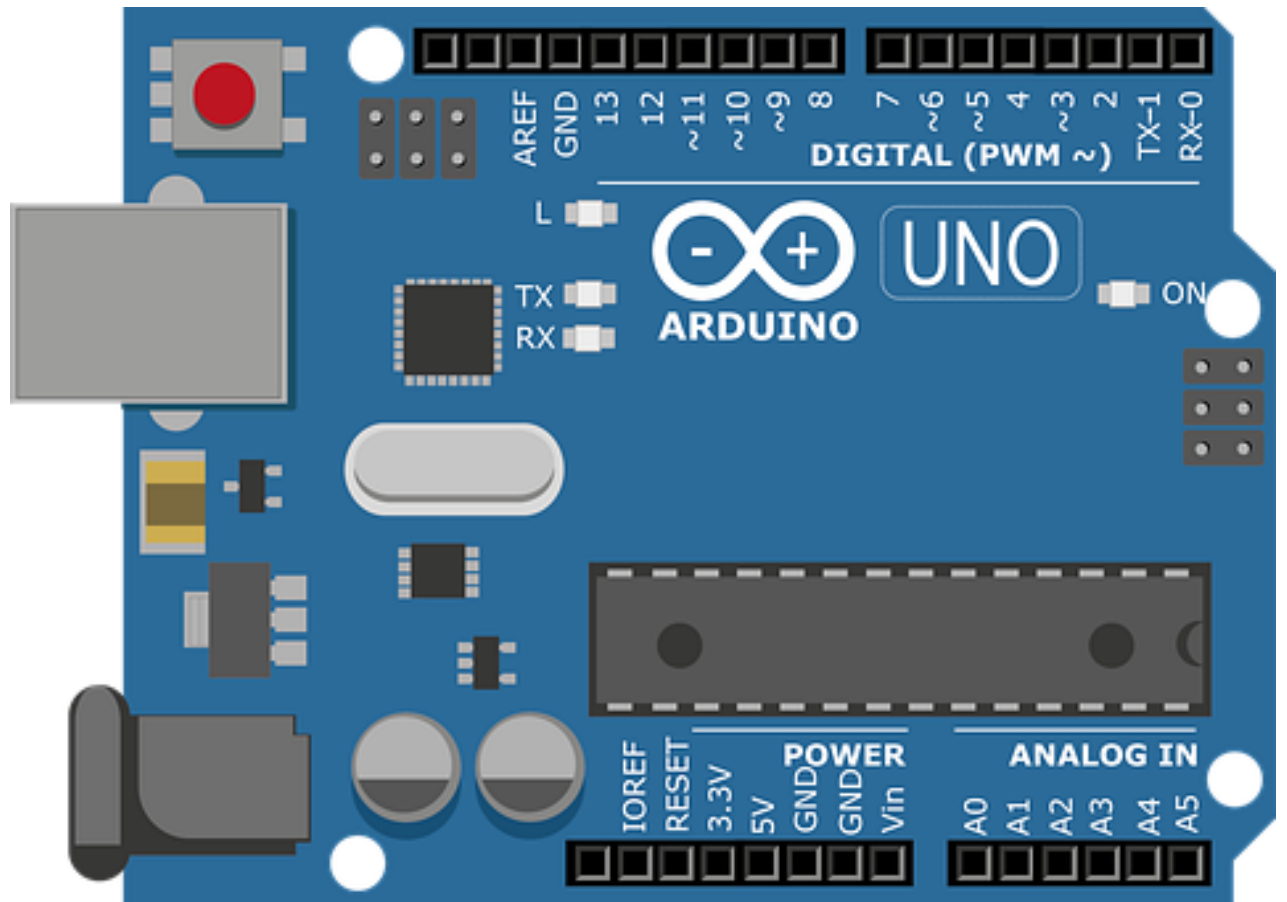
## 7. Wi-Fi connection

ESP8266 it is actually a microcontroller but commonly called as a WIFI module. WIFI related activities are thus used by this commonly known microcontroller.



## 8. Arduino Uno

A programmable input/output peripherals which has a processor core, memory and a microcontroller is a small computer on a single integrated circuit.

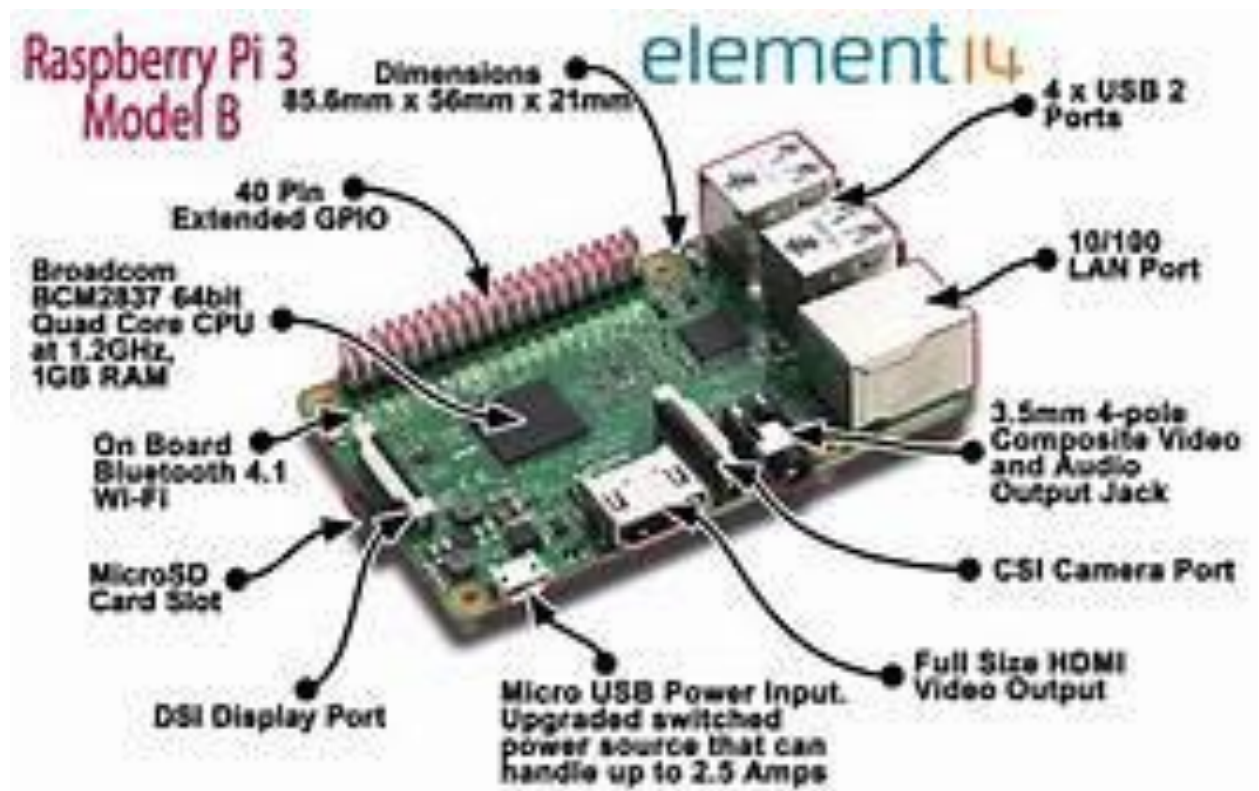


## 2.4.2 Software used:

### 1. Raspbian OS

Raspberry Pi are single board computer. Raspbian is highly optimized for the Raspberry Pi line's low-performance ARM CPUs.

As its main desktop environment as of the latest update Raspbian uses PIXEL, Pi Improved X-Window Environment, Lightweight.



## **2. Python IDLE(Integrated Development and Learning Environment)**

It is an integrated development environment (IDE) for Python. For Windows the python installer contains the default the IDLE module.

In Python distributions for Linux IDLE is not available by default. Ubuntu is one of the example.

## **3. Server**

## **2. LITERATURE SURVEY**

### **2.1 Patient health care monitoring system using IOT**

Regular check-ups are required over a period of time; keeping under surveillance for health related problems at home is essential for an beneficial way for early diagnosis, treatment, and prevention of diseases related to our way of living such as diabetes and heart related are large or heavy and therefore difficult to carry or problems diseases. These days many devices are available commercially for home health care monitoring are widely used, as in sensors can be easily be attached and operations can be self handed.

A health monitoring system is being made with the help of a microcontroller with Wireless Body Area Sensor Network. This includes, the sensors like Temperature sensor, Blood pressure sensor, Heart beat sensor.

These sensors are used to monitor the health condition without creating any interruption in the daily schedule of the patient and these reports are further are forwarded to doctor's server with the help of GSM technology.

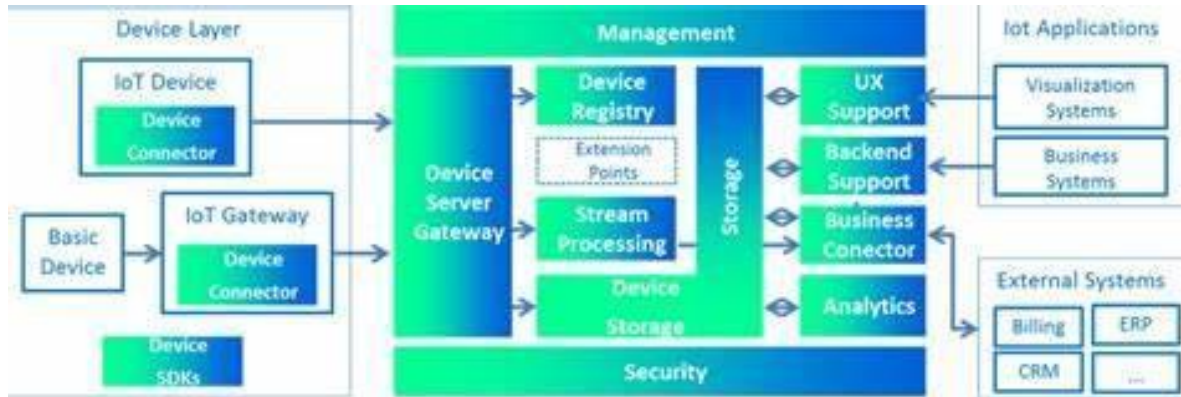
Health monitoring system consists of sensors, microcontroller, LCD display and GSM modem to transmit or receive health related data to or from the doctor. Similarly, at hospital same GSM modem is used. GSM modem helps in the establishment of network between patient's server and doctor's server. LCD(Liquid Crystal Display) display is providing to show the instant result to the patient.

### **3. SYSTEM DEVELOPMENT**

The IOT enable remote health surveillance system has great advantages over the old health surveillance system. The health screening components have become small and highly portable, allowing patients to use them 24 hours a day for observation.

The virtual patient has micro-physiological conditions because the patient is real. The doctor will see the patient several times a day, however significant health problems will occur at any time. Therefore, the monitoring of health information 24 hours a day, 7 days of how to access patients with Internet of Things through network and alternative devices, patient's health status can be monitored constantly, allowing the diagnosis of illness on time so that appropriate measures can be taken . Additionally the internet will facilitate the collection of health records .the generation of mathematical information related to the state of health can be achieved by machines. It is a variety of knowledge that is faster, bigger and error free and no manual forms can be achieved. Statistics, police investigations and disease risk mapping can be done using telemedicine

### 3.1 BASIC ARCHITECTURE



**3.1.1 MEDICINE BOX-** People today are busy in their respective fields so they do not pay attention towards their health so as a result they do not take their medicines at the right time. Medicine box consists of three a separate section or part of a structure or container. An LED is attached with each compartment. When it's time to take medicine LED from the right compartment glows. If wrong compartment is opened then the buzzer will get activated. A wifi shield is attached to the arduino board which automatically updates these details to the hospital webpage. The Medbox could be integrated with sensors. A temperature sensor is integrated here with the box. It reads patients temperature value and notifies if it goes beyond a limit.

## 3.2 PROPOSED SYSTEM

### 3.2.1 Sensors of Heart beat:

Sensors detecting heart beat are designed to give a digital output of heart rate whenever patient's finger is placed inside the system. The output in digital form will now be connected directly to Arduino board for measuring BPM rate which is beats per minute.

The principle it works is based upon modulation of light by flowing of blood through a finger on each pulse at each time. IC named LM358 is used for this type of sensor. It has low dual operational power amplifier and consists of a bright red LED bulb and a light detector. From these, one will act as an amplifier and the other will be used as a comparator. So LED thus needs to be as bright as the light and must therefore pass through the finger of patient and gets detected. When pulses of heart beat are pumped through blood vessels patient's finger slightly becomes opaque and this causes less light to reach at the detector end.





### 3.3.2 Sensors used as accelerometer:

To measure the activity of patient and keep a check on the possibility of falling an ADXL213 accelerometer sensor is used. It has low cost and is used for measuring both the static and dynamic acceleration. It is also used for determining if the patient is stable or is in a good position and/or may have fallen down. It also has the ability to provide output in digital form.



### 4.3.3 Sensor used for ECG detection:

ECG is considered as a primary tool for checking of cardiac diseases. A device used for sensing of ECG normally consists of some electrodes for detecting electrical events in patient's heart. The sensor used in ECG is the electrical modulation of activities going on in the the heart, and are used to record quite easily using the help of electrodes at the surface and on the limbs or in chest. This rhythmic movement of heart measured in terms of beats per minute are easily approximated using the count and readily identifying waves. The ECG sensor amplifier will take the input in from of three electrodes which are being connected to the patient's body.



## 4. Circuit Implementation

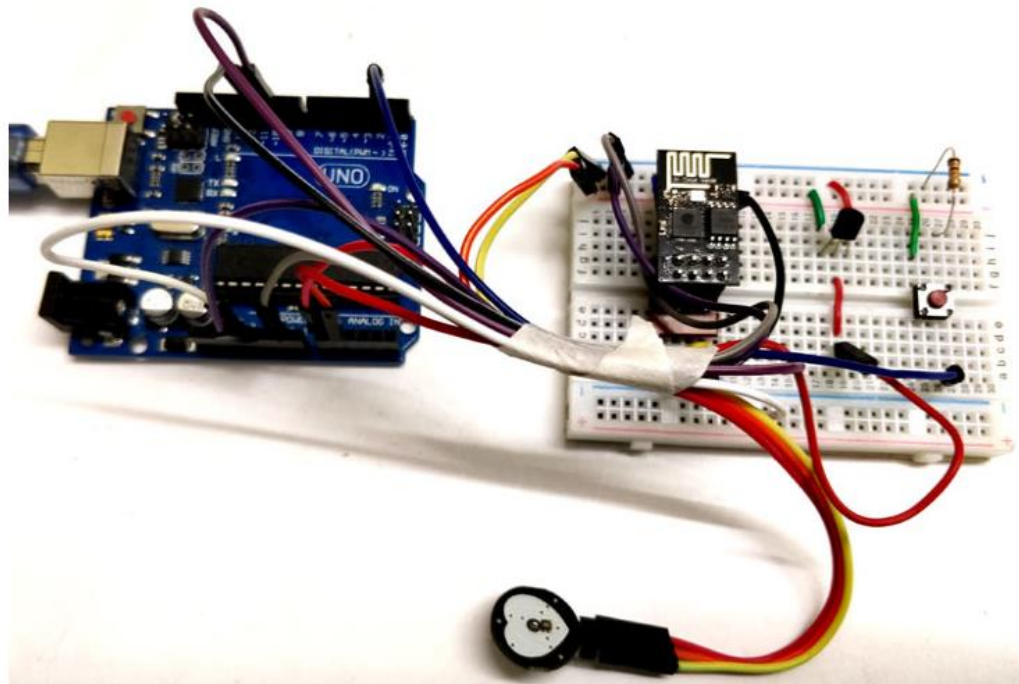
The circuit drawn is showing monitoring of heart beat sensor using a microcontroller namely ATMEGA16 (AVR) and also a LM358 microcontroller is used. The use of this microcontroller is used in almost each and every field. We can even use it for the design and fabrication of biomedical instruments.

Below is an example which shows the use of circuit. Here microcontroller named as AT89S51 is been used for the development of a system monitoring heartbeats of patients. The patient can place the finger in between of an LED bulb and a photo resistor in which a person's pulses of heart can be easily detected and some analog voltage is processed further using an amplifier called as LM 358. This chip contains two built in op amps.

The next step is when digital pulses are being fed to the interrupt of AVR microcontroller in external mode. A software is used to counter the code and can count the no. of pulses, and after processing the result is then displayed on an LCD screen. For e.g if the reading is as  $HB = 5144/t$  Where  $t$  is average time delay between two pulses and 1<sup>st</sup> five pulses are used for calculation of hemoglobin.

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Patient Monitoring System in Action



**4.1 SENSOR DETECTING TEMPERATURE (LM35)** – The series shown consists of a which is quite precise and a circuit which contains temperature sensors . Their output voltage is linearly proportional to the temperature measured in degree Celsius. The LM35 temperature sensor does not need any calibration from outside or any trimming for providing accuracy of at room temperature.



**4.2 SENSOR MONITORING HEART BEAT-** It gives the output in digital form of a heartbeat when patient's finger is being placed on the machine. The operating voltage is kept as +5V regulated, current is operating at 100mA, output data is at 5V TTL level and the detection of heart beat is shown by an LED bulb and output high pulse.

**4.3 SENSOR FOR ECG DETECTION-** This sensor operates on the phenomena of "piezoelectric effect" for measuring of pressure, acceleration, strains or any force by

converting into an electrical signal. Different modes of operation are transversal , longitude, and shear.

**4.4 ADC WORKING** - In this the ,microcontroller is able to send addresses from the port to ADC machine.

The next step is that adthen sends SOC which is the start of conversion pulse, so that it can start to perform operations in a successive manner for the conversion of digital signal on selective channels. This ADC then starts processing input for data information from its channel in digital form.

When the data is received on its port adc again sends an EOC which is end of conversion pulse to the microcontroller. This microcontroller is continuously monitoring this EOC pulse. Whenever it is low, the data provided from ADC is again sent back. LM 555 sensor is connected to ADC externally in a stable mode for giving clock pulses.

## 5. WORKING PRINCIPLE AND ITS DEMONSTRATION

Main target of the box containing medicines is to maintain , regulate and optimize the availability of medicines as well as for implementing prescription by doctors in a more simple and in a user friendly manner.

The main functionalities of this project includes:

### a) **A server in hospital:**

The patient makes an entry in the hospital register and in the hospital the data is stored on their server by asking the patient's required details. These details are then sent to the server. A doctor will be assigned to each patient and corresponding doctors shall register on the hospital's website. Doctors are able to see the details of the information about patients . The work of administrator is to manage details of prescriptions and make appointments. Whenever there is a change in the dosage of medicines, notifications are first sent to the hospital server and then it will be updated on the patient's android app.



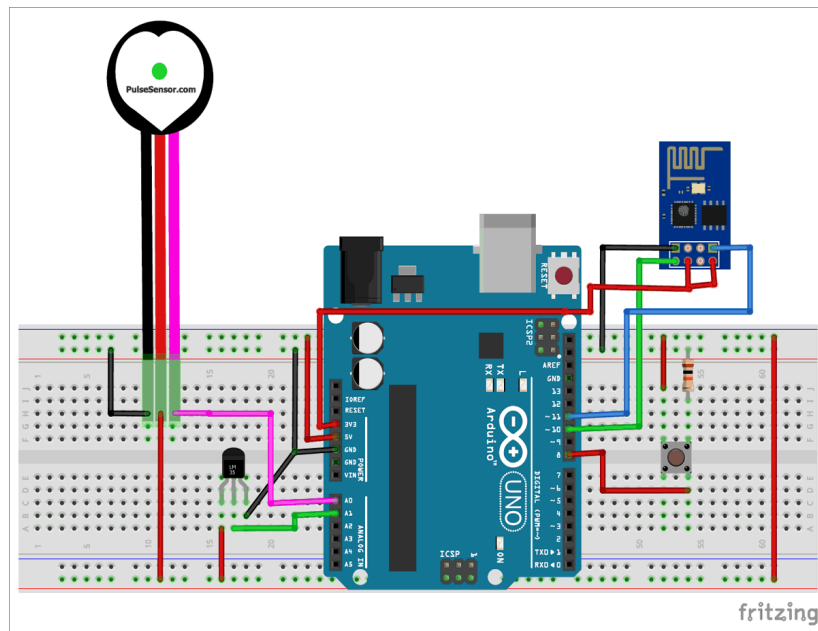
## b) Application on android and giving alerts:

Both patient and the doctor are required to install an android application namely health IOT. To every patient a login id is given at the time of registration only. Through this both the patient and doctor are allowed to see the details easily. These details normally include personal details, corresponding doctors details or the patient's details. Patient's have an option in which they can select a date for their appointment while doctor also has an option to apply for a leave. Administrator keeps a check on these details and confirm appointments. Another major function of this is the application to chat which helps to communicate between doctor and patient. Whenever there is a change in the dosage of medicines, updates can be given through application. This app also has to feature which provides alerts whenever it is time to take medicines. These details can be updated through the server automatically.



## c) Hardware Unit:

In this the , hardware unit consists of 3 major components namely each consisting an LED bulb to indicate that which box is to be taken. Each box consists of a reed switch and a magnet for ensuring that the box is closed or not. There is also an Arduino board and an ethernet shield is also present. Buzzer gets an activation alarm when there is a wrong compartment being opened. Sensing devices are also attached with in the box to take the reading of the vital signs of patients.



Data of patient can be gathered in the following ways:

The sensors gathers the data. By triggering a reaction analyze and visualize the data and acts.




**Step 1:-** To get started with it the user needs to create a Account & sign In.

**Step 2:-** click on New Channel option on the same page for further process from the Channels menu.



## My Channels

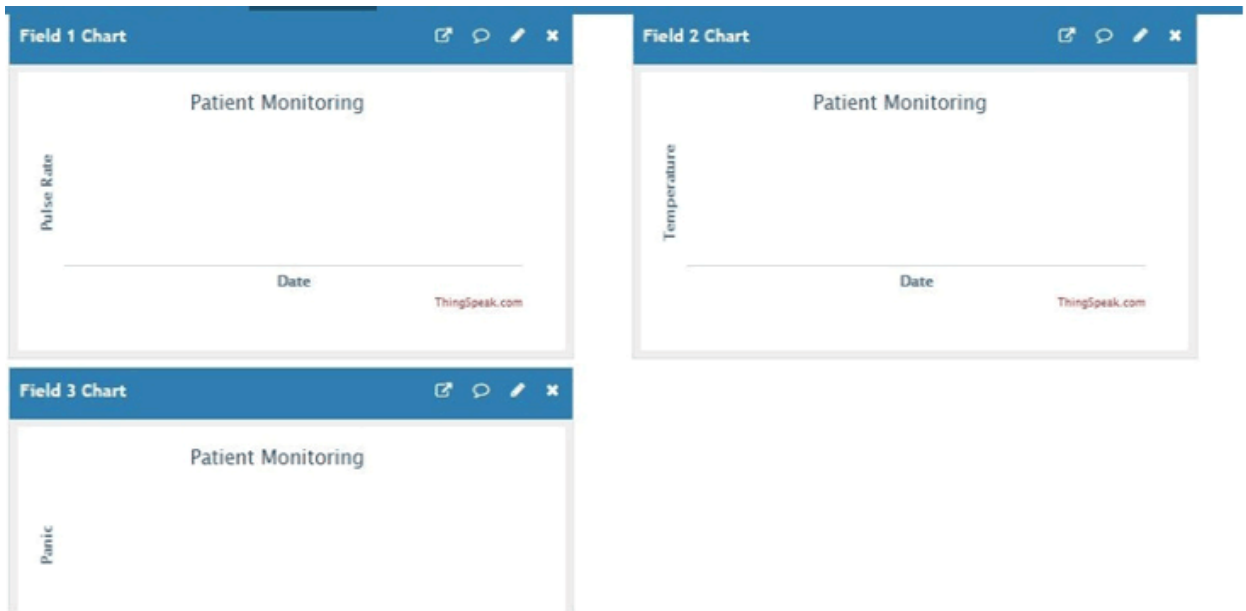
New Channel

Name	Created
 Home Automation <a href="#">Private</a> <a href="#">Public</a> <a href="#">Settings</a> <a href="#">API Key</a> <a href="#">Data Import / Export</a>	2016-01-06
 Humidity &Temperature <a href="#">Private</a> <a href="#">Public</a> <a href="#">Settings</a> <a href="#">API Key</a> <a href="#">Data Import / Export</a>	2016-06-13
 Humidity &Temperature <a href="#">Private</a> <a href="#">Public</a> <a href="#">Settings</a> <a href="#">API Key</a> <a href="#">Data Import / Export</a>	2016-06-14

**Step 3:-** Fill in the Name and Description as per your choice see a form for creating the channel.

Name	<input type="text" value="Patient Monitoring"/>	
Description	<input type="text"/>	
Field 1	<input type="text" value="Pulse Rate"/>	<input checked="" type="checkbox"/>
Field 2	<input type="text" value="Temperature"/>	<input checked="" type="checkbox"/>
Field 3	<input type="text" value="Panic"/>	<input checked="" type="checkbox"/>
Field 4	<input type="text"/>	<input type="checkbox"/>
Field 5	<input type="text"/>	<input type="checkbox"/>
Field 6	<input type="text"/>	<input type="checkbox"/>
Field 7	<input type="text"/>	<input type="checkbox"/>

**Step 4:** we will use API key in our code.



**Step 5:-** For data entry to Google sheets and send email/sms we will use HTTP app of the server to trigger the IFTTT applet.

Name	Created
Patient_Monitor <input type="button" value="View"/> <input type="button" value="Edit"/>	2018-06-22
Panic <input type="button" value="View"/> <input type="button" value="Edit"/>	2018-06-25

**Based on Values configuring IFTTT for triggering Mail/SMS**

**Step 1:-** Search for Webhooks and click on it after Login is done to IFTTT.

🔍 webhooks

### Services



**Step 2:-** Go to the Documentation.



**Step 3:-** . We will use Type Patient\_Info in the event box and copy the URL.

Your key is:



◀ Back to service

### To trigger an Event

Make a POST or GET web request to:


`https://maker.ifttt.com/trigger/Patient_info/with/key/`

**Step 4:-** In *my Applets* option click on *New Applet*.



**Step 5:-** Search for Webhooks and click on it by Clicking on +this . for receiving a web request choose trigger.

[← Back](#)



## Choose trigger

Step 2 of 6

**Receive a web request**

This trigger fires every time the Maker service receives a web request to notify it of an event. For information on triggering events, go to your Maker service settings and then the listed URL (web) or tap your username (mobile)

**Step 6:-** Click on Create Trigger and type the Event Name which is same as you write in the event box in webhooks URL.



## Complete trigger fields

Step 2 of 6

### Receive a web request

This trigger fires every time the Maker service receives a web request to notify it of an event. For information on triggering events, go to your Maker service settings and then the listed URL (web) or tap your username (mobile)

#### Event Name

The name of the event, like "button\_pressed" or "front\_door\_opened"

**Create trigger**

**Step 7:-** Search for Google Sheets and click on it by Clicking on “+that” and add row to spreadsheet.

[← Back](#)



## Choose action

Step 4 of 6

### Add row to spreadsheet

This action will add a single row to the bottom of the first worksheet of a spreadsheet you specify. Note: a new spreadsheet is created after 2000 rows.

### Update cell in spreadsheet

This action will update a single cell in the first worksheet of a spreadsheet you specify. Note: a new spreadsheet is created if the file doesn't exist.



**Step 8:-** In formatted row box give any name to your sheet along with BPM value, body temperature event name, date and time.

**Add row to spreadsheet**

This action will add a single row to the bottom of the first worksheet of a spreadsheet you specify. Note: a new spreadsheet is created after 2000 rows.

**Spreadsheet name**

IFTTT\_Maker\_Webhooks\_Events

Will create a new spreadsheet if one with this title doesn't exist

Add ingredient

**Formatted row**

{{OccurredAt}} ||| {{EventName}} |||  
{{Value1}} |||{{Value2}}

Use "|||" to separate cells

Add ingredient

**Step 9:-**Click on finish and review your applet.

## Review and finish

Step 6 of 6



If maker Event "Patient\_Info",  
then Add row to Rishabh  
Jain's Google Drive  
spreadsheet

86/140

## 6. Is IOT the future of pharmacy ?

Many pharmacy companies had realized this long ago that just by selling of traditional and old medicines cannot be able to increase more growth and nor be able to sustain such higher competition . It is now a fundamental and basic change required which is popularly being known by ‘beyond the pill’ which has typically been arrived from some of the statements or realizations:

1. Alone only medicines may not serve enough for achieving the optimal results for patient’s in clinic and hospitals.
2. As many of the pharmaceutical pipelines are being dried so ‘beyond the pill’ business have now become a very important source of revenue and income and in today’s world is now creating much interest in the methods, strategies and tools for utilization of new technology as well as for some of the business deals and processes in the recent development of patient’s health care and guiding to new way in IOT in pharmacy.

Pharmacy involving concept of IOT can include digitalization( medical products as well as which are related to process the care by the use of smart and well connected medical devices including some if the main IT softwares such as usage of web technology , mobile development and android apps, etc. which can be detected during development of drugs and tests in clinics as well as taking care of patient.

These results by the studies of Pharmacy in IOT has developed and by many trials involving clinical instruments are also used to employ a major combination of technology and services in advanced version for creating a new kind of possibilities involving some diseases .

For taking care of patients pharmacy in IOT is deciding to enable and help many suffering patients and healthcare people including professionals to switch to use of latest medicines involving hardware such as sensors in advanced version and also usage of some of the personalized service including care and its processes .

Major examples of pharmacy in IOT can include some of the solutions such as connecting wearable sensor for diseases such as Parkinson's disease and also for multiple sclerosis patients for them which provides management of medicines and also help to improve the condition of patient as well as the results and also improves the quality of life .

Additionally these devices and medical products for e.g. inhalers and insulin pens used for patients are added to sensor detectors and connect technologies involving to collect data from user for further use and also personalize some therapy mechanisms . This will eventually improve upon personal health and medication processes to care as patient's data and information serves to provide new methods for innovation and competition increases.

This change now will involve some major challenges and simultaneously pharmacy companies will have to take into account the upcoming European Union protection of data and also privacy , a major factor which will help to control patient's data.

## 7. Conclusion

This gateway is serving to act as a bridge in medicinal sensing or to a house/hospitals buildings where automated instruments or appliances to an IP are based on networks and cloud computing platform.

This is a unique position of strategies which is being applied to gateways in IOT structure which are an Intelligent E-Health gateway and has the capacity to tolerate a lot of challenges in this severe and tough health system in which efficiency of energy, scalability factor, interoperability factor and/or reliability issues are concerned.

This gateway also helps in serving and using some bridges to detect medicinal sensing instruments and/or home/hospital buildings automated appliances to which on networks based on IPs and cloud computing platform perform.

As some of the healthcare services have become very important and vital part of today's society so to automate these services can lessen or reduce a major burden on human beings and can ease this process of measuring. There is also an advantage that the transparency of this system can also help some more patient to trust and rely on it.

After reaching a threshold value alarm system which consists of a buzzer and an LED bulb are used to alert doctors and to act more quickly.

The main and major objectives for developing these kind of systems to monitor is to reduce healthcare cost and price by effectively reducing physician's visit hours during office time, hospital emergency cases and diagnosing as well as testing the procedure.

This technology including GSM is helping the server system to update about the data and information about patient on their website.

There are many such improvements which are made in this new system to make and look better so that it can easily be adapted to add more such advanced sensing devices.

The information from the biometric machine of patient's which are stored, kept and published online are been distributed to many such scientists and fellow researchers who

are working in medical field for analyzing the important values and finding similar patterns for their other research work projects.

For simplification some hardware and wiring can be used in wireless sensors to reduce more effort.

A report which reveals about 44% of the member of the states have less than one physician per thousand population according to the survey conducted in the year 2015. There is more critical situation in rural areas of the world. With the emergence of iot has achieved technology breakthrough through the help of telemedicine.

Improvement for current IoT implementation can still be conducted. Iot based systems only display value or graph instead of diagnosis. Two-way communication is not considered. Iot techniques may be accustomed promote care in a very higher method. Doctors with World Health Organization are in emergency are interacted through health connection established.

## **8. Future Work and its Implementation**

This project can be used to serve as a home healthcare station in which it provides a strong interoperability meaning working on different platforms and systems and also providing connectivity network in IOT. Also for continuously monitoring patient's and user's vital points a flexible system of miniaturized Bio-patch will be developed.

Major concern is security services as well as privacy of patient's medical data and information are very important accept its important role of IOT in healthcare management

Our work has been enhanced thus with security services and authentication protocols in which health care based on IOT is being used in Intelligent E-health gateway.

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