

# Various Communication Techniques Used While Implementing Healthcare Patient Monitoring System

Mr. Monal Shinde, Miss. Jahanvi Gupta, Prof. Sushopti Gawade

**Abstract-** Day by day there is rapid research going in healthcare industry to improve or maintain health of people who are busy to earn money as well as who are already suffering from any chronic disease. This will include e-Health and m-Health patient monitoring systems more. We can say that monitoring can be taken either by e-Health monitoring devices or by Smart m-Health applications. This different patient monitoring systems will help patient or any common people to monitor himself without doctor's intervention. So they are free to do checkup or monitoring at anytime, anywhere. This will also helps to achieve the principle goal/concept of ubiquitous computing (pervasive computing). Today everyone is moving towards ubiquitous computing with the help of nano/micro technology. Examples of UC are laptop, Smart phones, etc. that means technology is coming reaching towards user rather than human come to technology. So healthcare industry now a day's serving their technology to users by considering goal of Ubiquitous Computing (UC).

**Keywords:** healthcare, communication techniques in healthcare, patient monitoring, Bluetooth, Zigbee, GPRS, SMS, GPS, chronic disease

## I. INTRODUCTION

Healthcare Patient Monitoring System is upcoming methodology to monitor the patient without doctor intervention. In this systems patient don't need to go to doctor & patient can monitor their chronic diseases at any environment like Home, Office, Hospital, etc [1].

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Even we can monitor mobile patients also. This system basically first need to sense patient's various body parameters like Temperature, Heart Rate, ECG, etc. After sensing various parameters system has to process that data for comparing against normal parameters or to display. This process either done at user side or at server side. For this we need to first transfer the sensed parameters. So to transfer these data/parameters there are various communication techniques. These various communication techniques are as follows:

- A. Through Monitoring device to Bluetooth Modem to Mobile's Bluetooth
- B. Through Monitoring device to Zigbee(Xb) Device to another Xb to PC
- C. Through Monitoring device to Bluetooth Modem to another Bluetooth Modem to PC
- D. Through Monitoring device to Bluetooth Modem to mobile's Bluetooth to mobile's GPRS to Website via GPRS Link
- E. Through Monitoring device to GPRS Modem to Mobile

Now we will discuss this above communication techniques one by one with their block diagram.

- A. Through Monitoring device to Bluetooth Modem to Mobile's Bluetooth. Figure 1 shows the first type of communication in healthcare systems.

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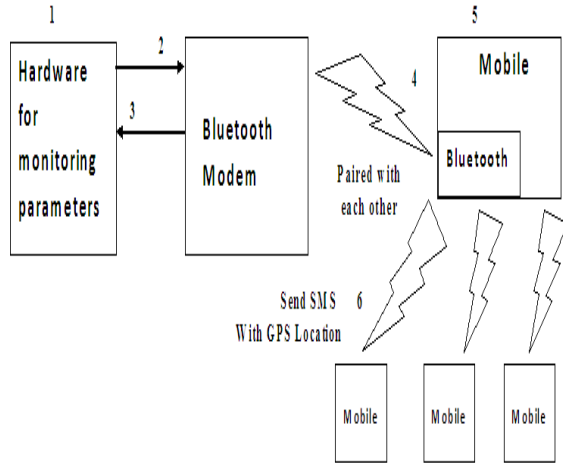


Fig. 1. Communication type 1

Working:

1. Hardware will sense parameter with the help of various sensors.
2. That sensed parameters then send to bluetooth modem
3. Alert will be generate when sensed parameters received to bluetooth modem
4. Bluetooth modem then send that data to the mobile
5. Processing is done on mobile by verifying sensed parameters with normal parameters
6. If there is any fatal error or emergency then SMS (with the help of AT Commands) will be send to the pre-defined numbers.[6]

B. Through Monitoring device to Zigbee (Xb) Device to another Xb to PC. Figure 2 shows the second type of communication in healthcare systems.

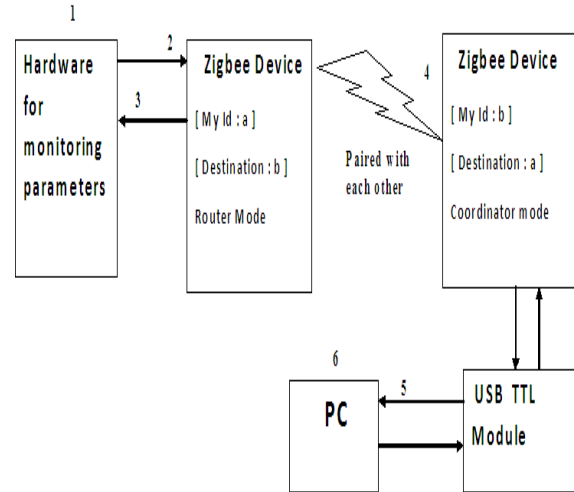


Fig. 2. Communication type 2

Working:

1. Hardware will sense parameter with the help of various sensors.
2. That sensed parameters then send to Zigbee device (a) which is attached to hardware
3. Alert will be generate when sensed parameters received to Zigbee device (a)
4. Zigbee device (a) then send that data to the other paired Zigbee device (b)
5. That Zigbee device (b) then sends data to the PC or Laptop with the help of USB TTL Module attached to PC.
6. Now processing of sensed parameters done on PC and shows you if any emergency.

C. Through Monitoring device to Bluetooth Modem to another Bluetooth Modem to PC. Figure 3 shows the third type of communication in healthcare systems.

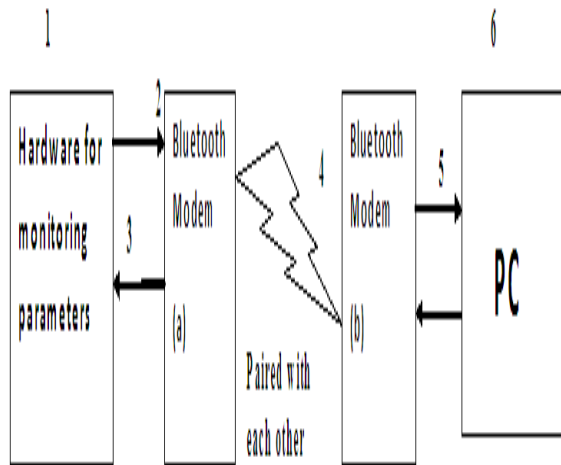


Fig. 3: Communication type 3

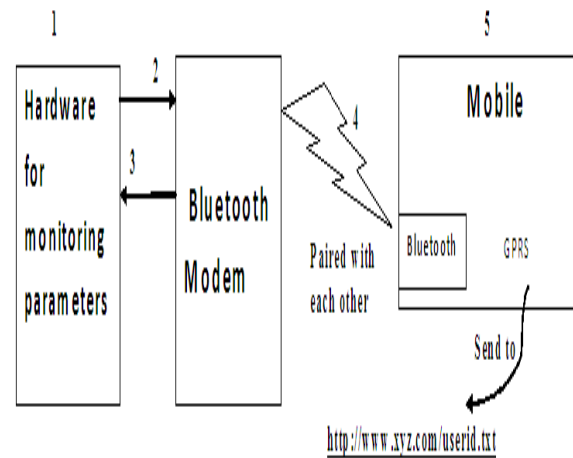


Fig. 4: Communication type 4

Working:

1. Hardware will sense parameter with the help of various sensors.
2. That sensed parameters then send to bluetooth modem (a) which is attached to hardware
3. Alert will be generate when sensed parameters received to bluetooth modem (a)
4. Bluetooth modem (a) then send that data to the other paired Bluetooth Modem (b)
5. That bluetooth modem (b) then sends data to the PC or Laptop
6. Now processing of sensed parameters done on PC and shows you if any emergency.

D. Through Monitoring device to Bluetooth Modem to mobile's Bluetooth to mobile's GPRS to Website via GPRS Link. Figure 4 shows the fourth type of communication in healthcare systems.

Working:

1. Hardware will sense parameter with the help of various sensors.
2. That sensed parameters then send to bluetooth modem
3. Alert will be generate when sensed parameters received to bluetooth modem
4. Bluetooth modem then send that data to the Mobile.
5. At mobile side first creating GPRS Packet then with the help of inbuilt GPRS (but for that GPRS settings should be proper & GPRS should be Activated) in mobile that packet is sent to pre-defined website so that record will be stored globally and user can access his data at anytime, anywhere.

E. Through Monitoring device to GPRS Modem to Mobile. Figure 5 shows the fifth type of communication in healthcare systems.

F.

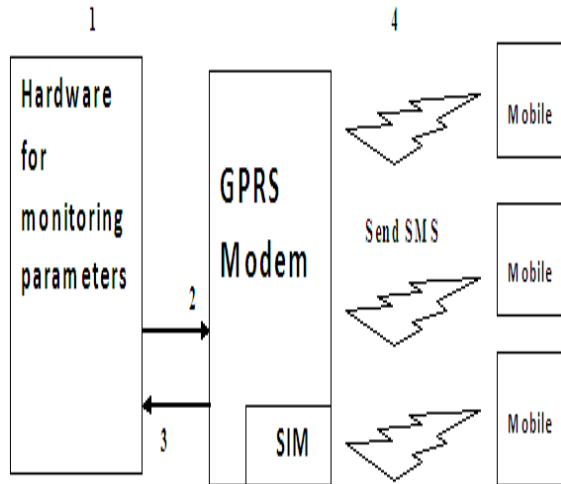


Fig. 5: communication type 5

Working:

1. Hardware will sense parameter with the help of various sensors.
2. That sensed parameters then send to GPRS Modem (GPRS Modem contain SIM which should be GPRS Activated)
3. Alert will be generate when sensed parameters received to GPRS modem
4. At GPRS modem side first Serial communication done with the help of AT Commands, second GPRS initialization done, third conversion of serial packet to GPRS packet generation, finally send that data to the mobile via SMS(Note : each SMS will be charged).[6]

## II. CONCLUSION

Sensors play an important role in health care systems to sense various parameter of body. So that with the help of sensors we can design hardware that will help to monitor various parameters of human body. We can use different sensors in different health care applications. Diseases can be easily detected at early stage to avoid serious circumstances. In this paper we have successfully studied various ways to implement healthcare systems and how sensed data is get transferred to various locations.

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