HEALTH MONITORING SYSTEM

Submitted by

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PROJECT

DEPARTMENT OF BIOTECHNOLOGY

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BONAFIDE CERTIFICATE

This is to certify that the project report entitled **"Project Title"**submitted by" T.A.S.HEMANTH and 192110537." to Saveetha School of Engineering, Saveetha Institute of Medical and Technical Sciences, Chennai, is a record of bonafide work carried out by him/her under my guidance. The project fulfills the requirements as per the regulations of this institution and in my appraisal meets the required standards for submission.

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ABSTRACT

The increased use of mobile technologies and smart devices in the health zone has brought on extraordinary effect on the world's critical care. Health specialists and doctors are using these technologies to create critical change in medicinal services during clinical settings. Likewise, many users are being served from the upsides of the M-Health (Mobile Health) applications and E-Health (social insurance upheld by ICT) to enhance, help and assist their well-being. The Internet of things is progressively permitting to coordinate gadgets fit for associating with the Internet and give data on the condition of health of patients and give data continuously to specialists who help. The main aim of this 'Patient Monitoring System' is to build up a system fit for observing vital body signs, for example, body temperature, heart rate, pulse oximetry. The System is additionally equipped for fall detection and sleep pattern analysis. To accomplish this, the system involves many sensors to screen fundamental signs that can be interfaced to the doctor's mobile or the web. The gadget will exchange the readings from the sensor to cloud remotely and the information gathered will be accessible for analysis progressively. It has the capacity of reading and transmitting emergency signs to the cloud and then to doctor's web portal or to Doctor's Smartphone. These readings can be utilized to recognize the health state of the patient and as an alert system against the emergency health condition. Keywords: IOT, Raspberry pi, AWT cloud, Patient Monitoring

INTRODUCTION

Patient Monitoring System can be characterized as the system utilized for observing physiological signs that incorporate the parameters like the electrocardiogram (ECG), respiratory signs, intrusive and noninvasive blood pressure body temperature, gases related parameters, and so forth. Understanding and checking monitoring system is a piece of M-health innovation. It can be named as m-health or mobile health. These systems are utilized for the practice of medicinal and general health with the assistance of cell phones. These frameworks observation can be utilized nearby or remotely. Patient monitoring is relevant in various circumstances when a patient is in the accompanying conditions: z In unstable physiological regulatory systems – for instance, in the case of overdose of anesthesia. z In a life-threatening condition – for instance, when there is an indication of heart attack in a patient. z In a situation leading to the developing of a risky life-threatening condition. z In a critical physiological state. Patient monitoring is not another new framework in medicinal services as it was first begun in the year 1625 for checking the body temperature and pulse of patients. Subsequently, this framework has started to discover its utilization and acknowledgement for checking diverse sorts of physiological parameters and healthrelated angles that are being performed [1] as of not long ago. These days' patient monitoring frameworks are accessible in two structures: z Single-parameter monitoring system: This system is utilized for measuring the blood pressure of a human body, observing ECG, checking SPO2 (oxygen level in the blood), etc. z Multi parameter monitoring system: This system is utilized for checking different crucial physiological indications of patients by transmitting the fundamental data like ECG, breath rate and blood pressure, and so on. Because of these reasons, multi-parameter observing system holds a huge part in the field of medicinal devices. These days, the health care sensors are playing a fundamental part in hospitals. The patient checking monitoring is one of the significant improvements as a result of its creative innovation. A programmed remote health observing system is utilized to quantify patient's body temperature, pulse by utilizing implanted innovation. The proposed system utilizes sensors like pulse sensor, oximeter, temperature sensor, accelerometer and gyroscope. These sensors mostly include in observing the health condition, fall detection and sleep pattern of the patient.

LITERATURE SURVEY

S. J. Jung and W. Y. Chung (2019)studied the Flexible and scalable patient's health monitoring system in 6LoWPAN . The main advantage of this enabling factor is the combination of some technologies and communications solution. The results of Internet of Things are synergetic activities gathered in various fields of knowledge like telecommunications, informatics and electronics.

K. S. Shin and M. J. Mao Kaiverstudied(2020) a cell phone based health monitoring system with self analysis which incorporates IoT [13] a new paradigm that uses smart objects which are not only capable of collecting the information from the environment and interacting the physical world, but also to be interconnected with each other through internet to exchange data as well as information.

Gennaro tartarisco and TabiloPaniclo had studied a Maintaining sensing coverage and connectivity in large sensor networks mainly includes the information about how to build or develop a new computational technology based on clinical decision support systems, information processing, wireless communication and also data mining kept in new premises in the field of personal health care.

Cristina Elena Turcua (2019)studied Health care applications a solution based on the Internet of Things survey aims to present a detailed information about how radio frequency identification, multi-agent and Internet of Things technologies can be used to develop and improve people's access to quality and health care services and to optimize the health care process.

Gubbi, Jayavardhana, Buyya, Rajkumar, Marusic, Slaven, Palaniswami, Marimuth studied the Internet of Things (IoT)(2021): A vision, architectural elements, and future direction which International Journal of Pure and Applied Mathematics Special Issue 60 proposes on demand positioning and tracking system. It is based on Global Positioning enabled devices and suitable for large environments. Smart phones between two terminals are used for making initial communication. The initial communication is performed by synchronization phase.

J.L. Kalju developed a system, which is capable of measuring different physiological parameters and are used to design a system for heart rate reconstruction for rate adaptive pacing .

Loren Schwiebert, Sandeep K.S. Gupta and Jennifer Weinmann(2019) studied the strength of smart sensors which are developed.

BACKGROUND

A large portion of the developing nations have extremely poor healthcare foundation there are not very many clinics in contrast with blasting population. Few of doctor's facilities are deficiently prepared where very less number of specialists is available. The basic diagnostic equipment for the diagnosis of lifethreatening diseases is absent. In the event that this paper could fabricate an ease compact health detecting gadget, involving a few sensors, equipped for measuring the vital attributes of a human body, and can speak with the doctor's facility database, it could furnish with quality therapeutic guidance. The restorative administration is given after one of the authority specialists from a group of particular specialists display everywhere throughout the globe assesses those health parameters on the clinic's database. In today's social protection system for patients who remains in home amid post operational days checking is done either by means ofadministrator/medicinal guardian. Endless watching may not be expected by this system, in light of the fact that anything can change in prosperity parameter within some fraction of seconds and in the midst of that time if the specialist is not in the premises causes more important damage. So with this advancement made period where the web directs the world gives an idea to add to doctors from a group of specialized doctors present all over the globe [3] where time to time consistent checking of the patient is refined. Also, if the health detecting gadget is made to speak with a compact system like a tab or a cell phone which has the default capacity of speaking with Cloud (hospital or clinic database), then the entire system would be considerably more financially effective. This is on the grounds that these days a great many people have entry to versatile specialized devices and these devices have turned out to be very shabby. The system can likewise be made IoT (Internet of Things) empowered and M2M (Machine To Machine) is good. This system, usage of such a healthcare checking system is displayed. Thus, this will possibly profit an extensive population. For the healthcare checking

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system to be solid, every sensor should timely measure the information taking the recommended examining rate of the parameter, and the information should be sent to the data processor.


## Monitoring System Description

This paper proposes a model of Patient Health Monitoring System, with different components like fall detection and sleep pattern analysis. The sensors utilized as a part of this project are Accelerometer and Gyroscope (MPU6050), Heart beat sensor, Body temperature sensor, and blood oxygen level (MAX30100), and Proximity sensor (KY032). These sensors work autonomously of each other. The measured reading from the sensor is broke down for the patient and is made accessible to the specialist or to any concerned individual in the type of the web or smart phones. This web interface and additionally versatile application serves as the user interface for this model. The other element added to this application is examination of the information in past to caution visualizing the latest and the current reading of the exposure of the patients monitored, along with the display of graph. Another element added to this application is investigation of the information in past to caution the specialist and patient about huge changes event, or make an alarm to specialist or any concerned individual related with the patient when it sees any probability of therapeutic crisis.

GRAPH

GLUCOSE LEVELS OF AVERAGE PERSON
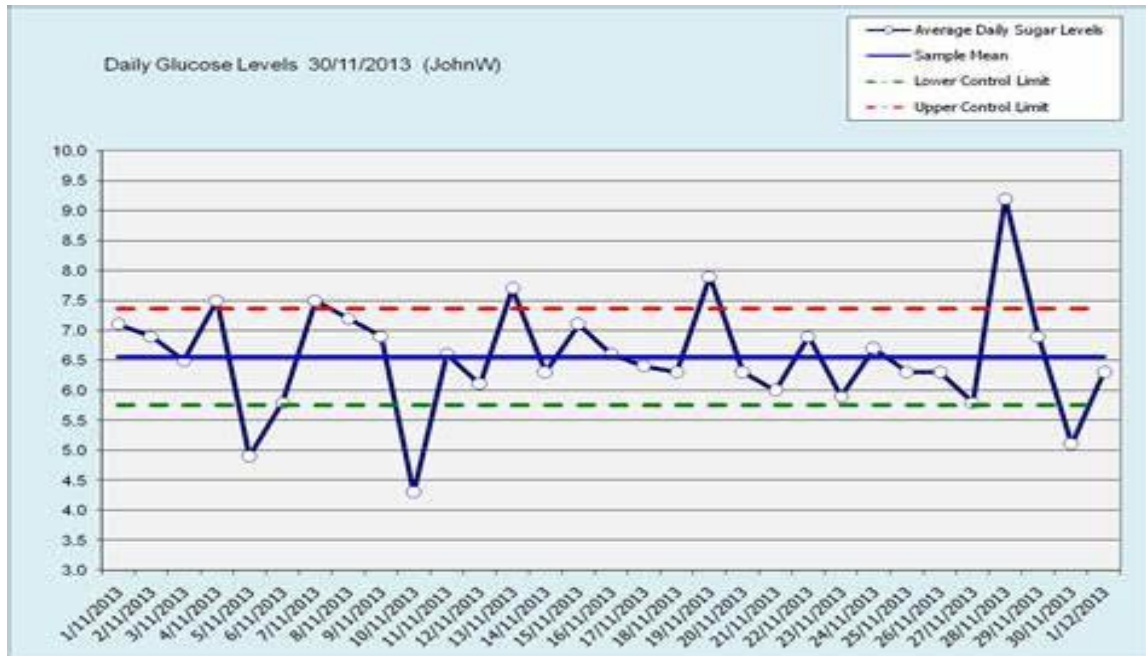
BIRTH BABY WEIGHT FROM YEAR 1996 TO 2017
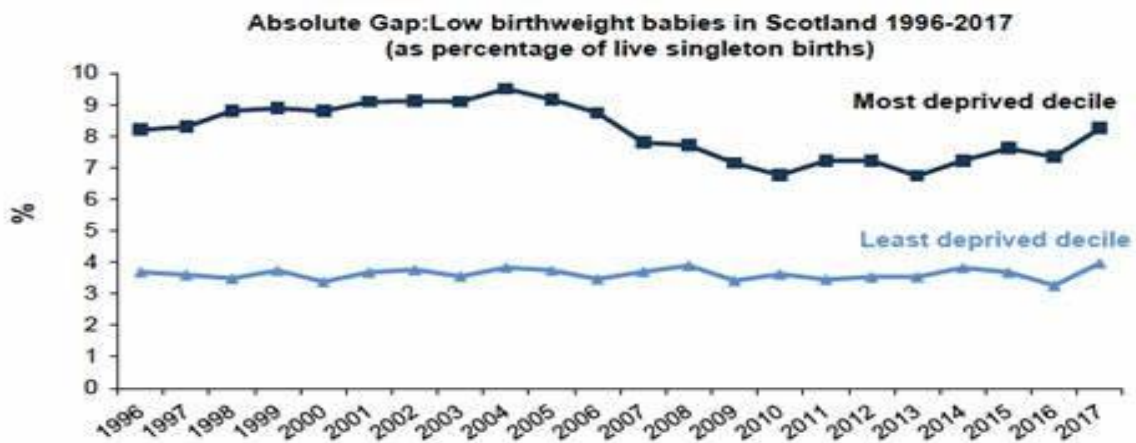
ADVANTAGES AND DISADVANTAGES

Advantages

1. Data By making use of more inserted data, we can treat patients more efficiently. Doctors can take the right decisions for patients. Also, data can help patients, doctors, hospitals, companies for their future.

2. Tracking and monitoring Through the use of IoT, we can keep track of data more efficiently. It will also improve the safety of patients. We can get the required information within seconds through the database. Through tracking and monitoring, we can reduce risks for patients in critical times.

3. Connectivity of devices. Monitoring gets easier through better connectivity of different devices. It also saves time and money.

Disadvantages

1.Privacy

Privacy is the biggest challenge with IoT, as all the connected devices transfer data in real-time. Personal data can be hacked if this end to end connection is not secure.

2.Accuracy

Accuracy issues may come due to handling such massive data in real-time.

3.Cost

IoT may reduce the cost for diagnosis and treatment for patients, But the cost of installing all the devices and their maintenance is quite high.
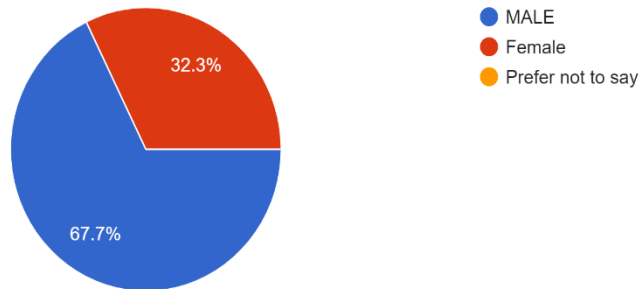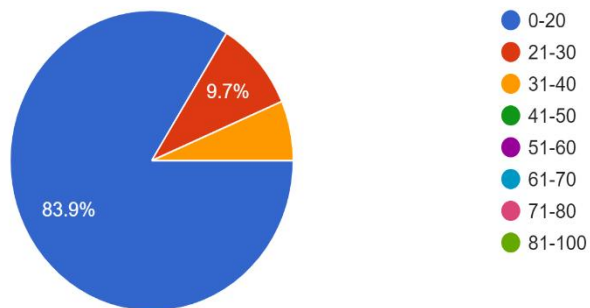
SURVEY

NUMBER OF RESPONSES

31 responses

Accepting responses

Summary   Question   Individual

PERSON INFORMATION: In this pie chart it is about the personal information of the person like age , gender and name
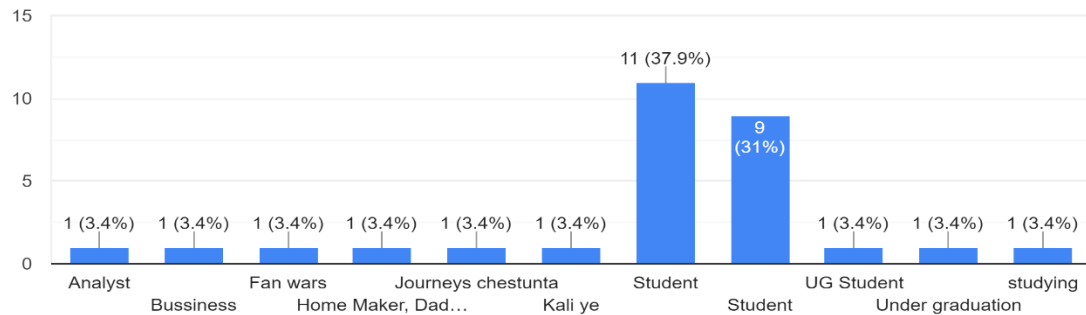
GENDER
31 responses

- MALE
- Female
- Prefer not to say

32.3%

67.7%

AGE
31 responses

- 0-20
- 21-30
- 31-40
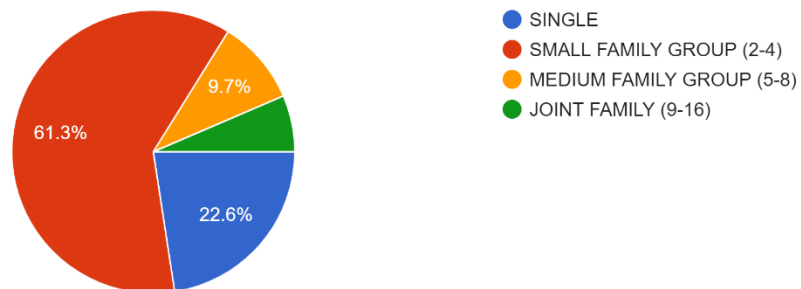- 41-50
- 51-60
- 61-70
- 71-80
- 81-100

9.7%

83.9%

OCCUPATION : This graph explains about the person occupation (work)

OCCUPATION

29 responses
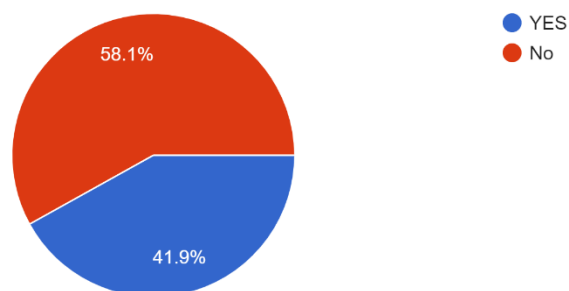

FAMILY TYPE: The family group .It is about how many people live in their living hood
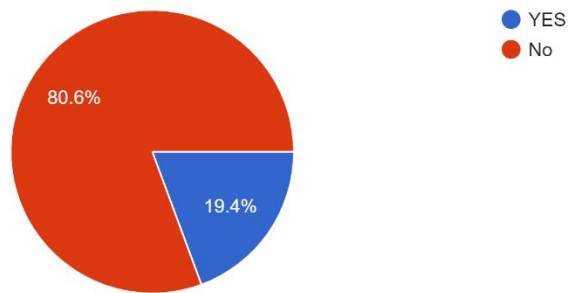
FAMILY TYPE

31 responses

- SINGLE
- SMALL FAMILY GROUP (2-4)
- MEDIUM FAMILY GROUP (5-8)
- JOINT FAMILY (9-16)

AGED BELOW 18: How many members in a family group are below 18.

PERSONS BELOW 18

31 responses

- YES
- No

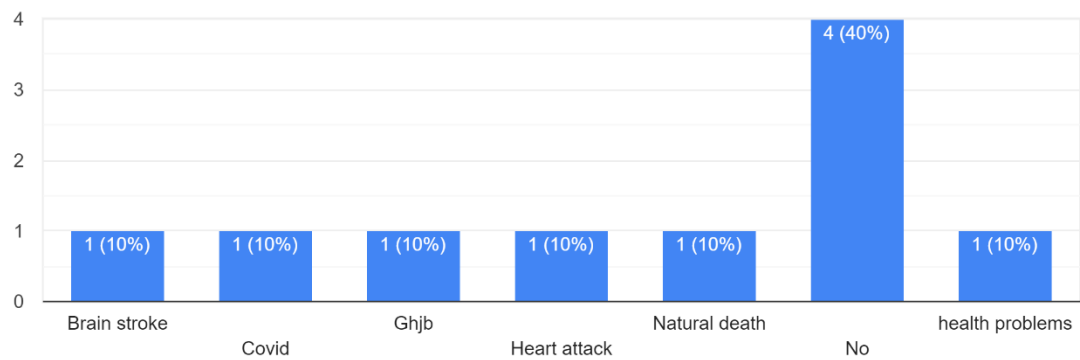## ANY RECENT DEATHS IN FAMILY
31 responses

- YES
- No

80.6%

19.4%

CAUSE OF DEATH : Why the death is caused which is based on natural or heart attack or any complications are their from begining
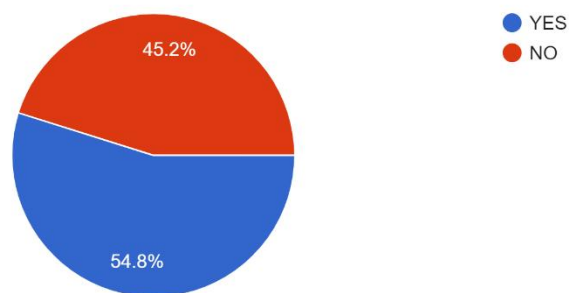
CAUSE OF DEATH
10 responses

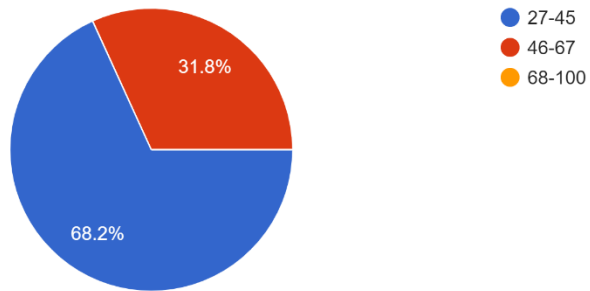|						
1 (10%)	1 (10%)	1 (10%)	1 (10%)	1 (10%)	4 (40%)	1 (10%)
Brain stroke	Covid	Ghjb	Heart attack	Natural death	No	health problems

ANY ONE SUFFERED FROM COVID-19
31 responses

- YES
- NO

45.2%

54.8%

AGE
22 responses

- 27-45
- 46-67
- 68-100

31.8%

68.2%

ANY HEALTH ISSUES OTHER THAN ABOVE
31 responses

- YES
- NO

80.6%

19.4%
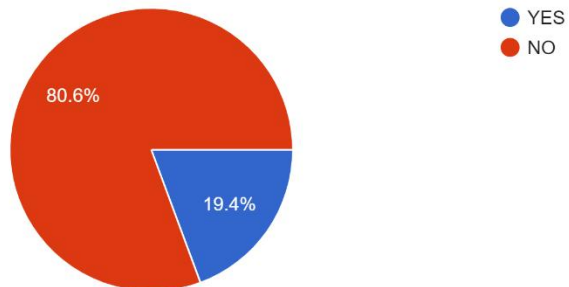
FUTURE ENHANCEMENT

Although previous studies have proved the practicality of CPBMI use, its actual medical effectiveness has not yet been established, and clinical evidence of its effectiveness is limited. Appropriate application of CPBMI to medical fields requires collection of large-scale, research-based evidence of its clinical effectiveness. Substantial reviews need to be focused on investigating the effectiveness of CPBMI. A potential confounding factor in this finding is that due to the nature of chronic diseases, simply providing encouragement to patients with these diseases may itself provide beneficial effects for CPBMI users. In other words, the beneficial effects of CPBMI may be attributable to its use to provide reminders to patients, rather than the actual use of CPBMI by these patients. However, using CPBMI for providing reminders and motivating patients was found to have similar beneficial effects, a finding that will assist in the formulation of public health strategies for improving chronic disease management and healthcare

Commercialization of CPBMI requires analysis of its cost-effectiveness and assessment of its practicability and clinical benefits. The pricing of devices and applications, which will be one of the most important factors in user motivation, is anticipated to increase with the inclusion of personalized medical feedback systems within CPBMI programs. Because increased costs are a burden to not only patients but also medical teams, a compromise between CPBMI use and other alternative strategies must be sought. If saving time for doctors' feedback and providing guidelines properly inferred through a CDSS or artificial intelligence program[35] can be utilized, it will consequently reduce medical costs, which are a significant factor in CPBMI.

CONCLUSION

The proposed system of patient health monitoring can be highly used in emergency situations as it can be daily monitored, recorded and stored as a database. In future the IOT device can be combined with the cloud computing so that the database can be shared in all the hospitals for the intensive care and treatment

REFERENCES

1. S. J. Jung and W. Y. Chung, "Flexible and scalable patient's health monitoring system in 6LoWPAN," Sensor Lett., vol. 9,no. 2, pp. 778–785, Apr. 2011.

2. W. Y. Chung, C. Yau, K. S. Shin, and R. Myllylä, "A cell phone based health monitoring system with selfanalysis processor using wireless sensor network technology," in Proc. 29th Annu. Int. Conf. Eng. Med. Biol. Soc., Lyon, France, 2007, pp.

3. G. Lawton, "Machine-to-machine technology gears up for growth," Computer, vol. 37, no. 9, pp. 12–15, Sep. 2004.

4. C. Kim, A. Soong, M. Tseng, and X. Zhixian, "Global wireless machineto- machine standardization," IEEE Internet Comput., vol. 15, no. 2, pp. 64–69, Mar.–Apr. 2011.

5. Real time wireless health monitoring application using mobile devices, International Journal of Computer Networks & Communications (IJCNC) Vol.7, No.3, May 2015, Amna Abdullah, Asma Ismael, Aisha Rashid, Ali Abou-ElNour, and Mohammed Tarique.

6. Secured Smart Healthcare Monitoring System Based on Iot, International Journal on Recent and Innovation Trends in Computing and Communication Volume: 3 Issue: 7, Bhoomika.B.K, Dr. K N Muralidhara.

7. Real time wireless health monitoring application using mobile devices, International Journal of Computer Networks & Communications (IJCNC) Vol.7, No.3, May 2015, Amna Abdullah, Asma Ismael, Aisha Rashid, Ali Abou-ElNour, and Mohammed ,Tarique.

8. Secured Smart Healthcare Monitoring System Based on Iot, International Journal on Recent and Innovation Trends in Computing and Communication Volume: 3 Issue: 7, Bhoomika.B.K, Dr. K N Muralidhara.

9. Goutam Motika, AbinashPrusty," Wireless FetalHeartbeat Monitoring System Using ZigBee & IEEE 802.15.4 Standard", 2011 Second International Conference on Emerging Applications of Information Technology, 978-0- 7695-4329-1/11, 2011 IEEE DOI

10. S. M. Mahalle, P. V. Ingole, "Design and Implementation of Wireless Body Area Sensor Network Based Health Monitoring System", International Journal of Engineering Research & Technology, Vol. 2 Issue 6, pp. 105- 113, June 2013.

11. M.Prakash, CJ Kavitha Priya, "An Analysis of Types of Protocol Implemented in Internet of Things Based on Packet Loss Ratio", Proceedings of International Journal of Information and Communication Technology for Competitive Strategies, ISBN: 978-1- 4503-3962-9, DOI: https://doi.org/10.1145/2905055.2905085, 4th – 5 th Mar 2016

12. M. Prakash, U. Gowshika, T. Ravichandran, "A Smart Device Integrated with an Android for Alerting a Person's Health Condition: Internet of Things" Indian Journal of Science and Technology, Vol 9

13. Dr.A.Sabanayagam, G.AnishGirija," DESIGN AND MODELING OF MOBILE HEALTH MONITORING SYSTEM", International Journal of Innovations in Scientific and Engineering Research (IJISER),vol4,no 2,pp.63- 65,2017.

14. "Healthcare Monitoring System Using Wireless Sensor Network", D. Mahesh Kumar, Department of Electronics, PSG College of Arts and Science, Coimbatore - 641 014.Volume 04, Issue 01 Pages:1497-1500 (2012), ISSN:0975-0290. [15] https://www.ibm.com/blogs/internet-of-things/6-benefits-of-iot-for-healthcare.