REVIEW ON: IOT BASED HEART DISEASE MONITORING SYSTEM

Mani. A[1], Aruna Devi .K[2] ,DivyaJyothi M. R[3] , Nivedha. E[4],

Associate professor, Dept of CSE, SA Engineering college, Chennai, India[1].

Student of B.E (CSE), Dept of CSE, SA Engineering college, Chennai, India[2,3,4]

ABSTRACT:

These days heart diseases are considered as the major health issue. It includes heart attack and cardiac arrest. Heart attack is the global leading cause of death for both the genders and occurrence is not always know. Sometimes heart attack is often compared with other type of pain and not often dealt with it. Hence, this project is to implement the heart rate monitoring using IOT. The patients are expected to carry or wear a hardware sensor. The sensor with note the heart rate and transmits it through internet. The patient may be expected to set the high and low heart rate individually. On reaching the high rate or going below the expected heart rate, an emergency alert notification is sent to the patient's, guardian, doctor and ambulance(optional) android devices.

KEYWORDS:

IOT, Heart rate sensor, Detect, Health monitoring, Diagnosis.

I INTRODUCTION:

Internet of things (IoT) is the network of devices, vehicles etc that contains electronics, software and connectivity that helps the iot based things to connect to the internet and interact and transfer data. IoT devices can be monitored and controlledremotely.the traditional fields of embedded systems, automation and other devices contribute to the internet of things.

The IOT will be the one of the most important trends in the future and it also plays a vital role in many industries. the advanced connectivity of all devices in mostly every fields is made easy only due to the IOT. Some of the major applications and usage of IOT are :

Consumer applications:

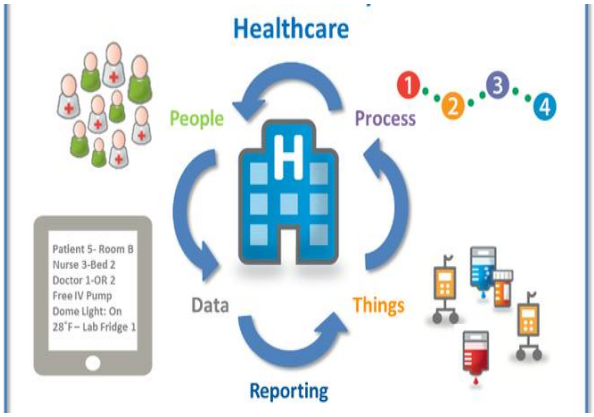
- Vehicles
- Home automation
- Wearable technologies

Commercial applications:

- Medical and health care
- Transportation
- Industrial applications(manufacturing, agriculture)

Infrastructure applications:

- Energy management
- Metropolitan scale development
- Environmental monitoring



Due to the modern world everyone is busy and forgets to take care of their health. By considering this, technology really proves and as an advancement in the technology, many sensor and smart medical instruments are created and it continuously analyse the individual health and also predicts the heart attack before the patient falls sick.

Now a days many sensors are used to constantly monitor the patient's health and transfer the data periodically to the doctors who are preferred by that particular patient. Habitual disease have powerful impact on the individual. Elderly people have to make regular visit to their doctor for checking their health vital signs and results.

Heart attack occurs when there is a reduced or blockage of blood flow to coronary artery for a period of time. Our project is to monitor the blood pressure and heart beat. Most the people consider the pain as other physical pain like gastric. Scientist have developed many algorithms, devices and sensors to detect the heart attacks early. The four vital signs used to detect heart attack are

- Pulse rate
- Respiratory rate
- Blood rate
- Temperature

In this project, proposing a Tele-monitoring of the human body which consists of pulse,blood and respiratory rate. It is sensed through a wireless device and stored in the database regularly and will be used to inform and alert the patient to any problem and undergo possible diagnosis.

IIRELATED WORKS:

[1] The development of a wireless heartbeat and temperature monitoring system based on a microcontroller. The system is designed in such a way that patient can be monitored remotely in real time. the microcontroller controls the sensors which measures heartbeat and body temperature of a patient and they are displayed in the LCD monitor.The heartbeat sensor counts the heart beat and the temperature sensor senses the temperature of the patient and both the data are send to the microcontroller and displayed in the LCD at receiving end.

[2] IoT based smart wearable devices made have made heath care and health monitoring easy for hospital management to monitor the patients. It Improves the quality of health care.Convenient for patients and improving the management level of hospital.

[3] Reliable oneM2M-based IoT system for health care device. This process Does not cause performance degradation.This project proposes fault tolerance algorithm to manage and handle the faults. Its Store

information on daisy chain for fault tolerance and backup copies.

[4] In recent days the role of e-health applications has taken a major lead in terms of services,encouraging millions of people with higher motivation and confidence to achieve a healthier lifestyle. Induction of smart gadgetries, people lifestyle equipped with wearable, and development of IoT has revitalized the feature scale of these applications. cloud access security broker (CASB) has been introduced for the enhanced and flexible control of data privacy and security.

[5] Smart healthcare is indispensable in a smart city to make citizen's life easy and comfortable. Smart healthcare enables citizens to be equipped with an easy, affordable and technology enabled real time solution to lead a quality life. Quality healthcare monitoring and services can be availed irrespective of remoteness of people in rural areas from speciality healthcare establishment generally in urban areas. IoT enabled biophysical sensors, monitor biological data with precision and at appropriate interval to send to medical cloud server through heterogeneous communication of wireless links

[6] Internet of Things, plays an important role in healthcare applications, from managing chronic diseases at one end of the spectrum to preventing disease at the other. There is an increasing interest in Internet of Things due to population explosion and an increase in number of patients with illness are expected to boost IoT-based health care services. E-healthcare system is moving into U-healthcare system by a fusion of sensors and mixed networks. Ubiquitous healthcare (U-healthcare) is a technology that provides efficiency, accuracy and availability of medical treatment. People can monitor their health without visiting the hospital or clinic.

[7] Communication and information access defines the basis to reach a personalized health end-to-end framework. It makes continuous and remote vital sign monitoring feasible and introduces technological innovations for empowering health monitors and patient devices with Internet capabilities. It has been concluded that secure continuous monitoring is feasible with the use of the proposed aggregation mechanisms and the capabilities from the proposed interconnection framework. It helps the hospital authorities to have continuous monitoring on the patients as well as it reminds the patient to have the medicines on time. Data must be confidential and can only be accessed by the patient and the medical specialist.

[8] Health IoT is a combination of communication technologies, interconnected apps, Things (devices and sensors), and people that would function together as one smart system to monitor, track, and store patients' healthcare information for on going care. User-centric privacy access control in opportunistic computing, we present an efficient attribute based access control and a novel non-homomorphic encryption based privacy preserving scalar product computation (PPSPC) protocol.

[9] Fault tolerance algorithm for the reliable IOT system in which gateway on the same layer in the system are linked to

form a daisy chain for fault tolerance at the level. the gateway stores a backup copy of the previous gateway positioned immediately ahead on the gateway in the daisy chain. It may system get suffer a serious performance degradation from conversion process.

[10] Breathing signal monitoring is used for providing important clues for health problems. It requires the wearable devices and other special equipment. Compared to the existing system,providing a contact free and long term breathing rate monitoring by making full use of wireless signals is considered to be the more desirable approach. The tensor beat can achieve high accuracy under different environments. person breathing rate monitoring data's are not secured, if multiple users can use single WIFI it leads to slow in speed. An adversary can always alter the data by adding some fragments or by manipulating the data with in a packet. This altered data can be forwarded to the coordinator,so that the doctor/caregiver can get an alert.

[11] The smart phone based system for real time tele-monitoring of Physical activity impatience with chronic heart failure. The proposed system monitoring in the real world that examines its requirements, privacy implications, usability and other challenges .Enquanted by the participants and health care providers.Although the system was designed for tele-monitoring individuals with CHF,the challenges, privacy considerations. Other such type of chronic diseases can also be monitored by using this method.

[12] Heart rate along with the oxygen rate is monitored in the project. Light is passed through the skin to measure the heart beat rate. By Measuring the intensity change of light transmitted through tissue, heart rate is measured.It is real time method to provide information regarding health.

[13] Techniques of measuring heart rate as termed from the above work are *Averagecalculation* :Average calculation is defined as counting the number of pulses in given time. *Beat to beat calculation*:Beat-to-beat calculation is done by measuring the time in seconds between two consecutive pulses and converting the time into beats/mins. *Heart rate calculations*:Heart rate calculation is done by calculating the number of pulses for the given period .then the calculated number of pulse is converted to bpm.

[14] Measure body movements like eye blink movements, hand movement by using wearable motion sensor system for continuously analysing the health condition the patient.If the recorded signals are out of range, it will alert the doctor and results are displayed in the Liquid crystal display(LCD).

[15] Wireless interface selection algorithm is used to yields low cost. Cost delay trade-off leveraging free short range phone to phone. It is the Cost effective mobile health care which build a proof-of-concept testbed, coined CellChek.

[16] Apart from RHM system, they developed a framework to identify classification schemes and analysed both contextual baseline features from the first month of intervention such as blood pressure and the data is transmitted through the smartphone.

[17] Wearable medical sensors and wireless communication and machine learning. The patient's health status is continuously monitored by sensors and transmitted through a wireless communication medium to guardian or doctor. The device constantly learns about the change in the patient's health status through various health samples by machine learning. It yields Low cost solution for continuous monitoring of health and enables proactive protection and remote detection of health issues.

[18] The heart rate (HR)is estimated from the photoplethysmographic(PPG)signal, during prolong and hard physical exercises, is discussed in this paper. an offline version of the HR estimation algorithm that uses Viterbi decoding is designed for situations when online monitoring of heart rate cannot be performed. Offline version of HR estimation algorithm is used that does not require the user to be connected to internet.

[19] Detects the heart beat from the reflection of human skin. The measurements are taken at the distance of 72 cm and beam focused on patient's palm. The result exactly correlates with the results gained from the ECG. Use of aluminium foil to isolate reflection is a crude technique and it doesnot any data.

PAPER	TELE-MONITORING	FAULT TOLERANCE AND PRIVACY	DAISY CHAIN	CASB	BREATHING SIGNAL MONITORING	NON-HOMOMORPHIC ENCRYPTION	WIRELESS INTERFACE SELECTION ALGORITHM	MACHINE LEARNING	HR ESTIMATION ALGORITHM	VITERBI DECODING	CRUDE TECHNIQUE
[1]	✓										
[2]											
[3]		✓	✓								
[4]		✓		✓							
[5]	✓			✓							
[6]		✓									
[7]	✓	✓									
[8]						✓					
[9]		✓	✓								
[10]					✓						
[11]	✓	✓									
[12]					✓						
[15]							✓				
[17]								✓			
[18]									✓	✓	
[19]											✓

III CONCLUSION:

we introduced fog layer at a gateway for augmenting health monitoring system that requires quick processing with minimal delay.Event triggering mechanism is used to transfer patients 'health-related vital signal to cloudInorder to compute the urgency of the patient, temperature healthindex is usedInformation delivery plays a vital role and different data arecorrelated to form effective analysisReal time alert enhances the utility of the proposed system.

IV FUTURE WORKS:

The proposed system makes use of a wearable hardware device to continuously monitor the patientWeb application is being developed with cloud for storing and retrieving of information.RSA encryption algorithm is introduced to encrypt the data

sent from the hardware device.5G tele-monitoring system is introduced for fast and securetransfer of information between objects.GSM and GPRS modules are used for tracking and notify the seriousness of the patient.Smart notification system is implemented to alert the patient in case of emergency.

V REFERENCES:

[1] C.K Das, M.W Alam and M.I Hoque, "a wireless heartbeat and temperature for remote patients"International Conference on Mechanical Engineering and Renewable Energy 2013 (ICMERE2013) 1-3 May 2014, Chittagong, Bangladesh.

[2] Haibin Zhang, Jianpeng Li, Bo Wen ,YijieXun, Jiajia Liu "connecting intelligent things in smarthospital using nb-iot"

[3]Mahmood Ahmad,
Muhammad Bilal Amin , Shujaat Hussain , Byeong Ho Kang ,Taechoong Cheong, Sungyoung Lee "Health Fog: a novel framework for health and wellness applications" The Journal of SupercomputingOctober 2016, Volume 72, Issue 10, pp 3677–3695.

[4]Yael Kurzweil-Segev, Moshe Brodsky, AlikPolsman, Eli Safrai, Yuri Feldman, Sharon Einav, and Paul Ben Ishai "Remote Monitoring of Phasic Heart Rate ChangesFrom the Palm"ieee transactions on terahertz science and technology, vol. 4, no. 5, september 2014.

[5]Daniel Aranki, Student Member, IEEE, GregorijKurillo, PosuYan,David M. Liebovitz, and RuzenaBajcsy, Life Fellow, IEEE "Real-Time Tele-Monitoring of Patients withChronic Heart-Failure Using a Smartphone:Lessons Learned" ieeetransactions on affective computing, vol. 7, no. 3, july-september 2016

[6]AndriyTemko, Senior Member, IEEE "Accurate Heart Rate Monitoring During PhysicalExercises Using PPG" IEEE transactions on biomedical engineering, vol. 64, no. 9, september 2017.

[7]ArsalanMosenia, Susmita Sur-kolay, AnandRaghunathan And Niraj K. Jha "Wearable Medical Sensor-Based System Design" IEEE transactions on multi-scale computing systems, vol. 3, no. 2, april-june 2017.

[8]Youssef Khazbak, MostafaIzz, Tamer Eibatt, AbdulrahmanFahim, ArsanyGuiguis And Mosutafa Youssef "Cost-Effective Data Transfer for Mobile Health CareIEEE systems journal, vol. 11, no. 4, december 2017.

[9] T. H. Luan, L. Gao, Z. Li, Y. Xiang, G. We, L. Sun, M. Burwood, I. Engineering, and Z. Gongshang, "Fogcomputing: focusing on mobile users at the edge," International Conference on Networking and InternetArchitecture, pp. 1-11, 2016.

[10] F. Bonomi, R. Milito, J. Zhu, and S. Addepalli, "Fog computing and its role in the Internet of Things:characterization of fog computing," Proceedings of the First Edition of the MCC Workshop on Mobile CloudComputing, pp. 13-15, 2012.

[11] V. Stantchev, A. Barnawi, S. Ghulam, J. Schubert and G. Tamm, "Smart items, Fog and cloud computing asenabler of servitization in healthcare," Sensor and Transducers Journal, vol. 185, no.2, pp. 121- 128, 2015.

[12] M. Ahmad, M. Bilal, S. Hussain, B. Ho, T. Cheong, and S. Lee, "Health Fog: a novel framework for healthand wellness applications," Journal of Supercomputing, vol.72, no. 10, pp. 3677-3695, 2016.

[13] C. S. Nandyala and H. Kim, "From cloud to fog and IoT-based realtimeu-Healthcaremonitoringforsmarthomesandhospitals," International Journal of Smart Home, vol. 10, no. 2, pp. 187-196, 2016.

[14] T. N. Gia, M. J. A. Rahmani, T. Westerlund, P. Liljeberg, and H. Tenhunen, "Fog computing in healthcareInternet-of-Things: A case study on ECG feature extraction," IEEE International Conference on Computer andInformation Technology, pp. 1-8, 2015.

[15] B. Negash, A. Anzanpour, I. Azimi, M.Jiang, T. Westerland, A.M. Rahmani, P. Liljeberg, and H. Tenhunen,"Leveraging fog computing for healthcare IoT," in Fog computing in the Internet of Things Intelligence at them edge, Springer, 2017, pp. 145-169.

[16] A. M. Rahmani, T. N. Gia, B. Negash, A. Anzanpour, I. Azimi, M. Jiang, and P. Liliberg, "Exploiting Smarte-Health gateways at the edge of healthcare Internet of Things: a fog computing approach," Future GenerationComputer Systems, vol. 78, pp. 641-658, 2017.

[17] M. K. Suh, C. A. Chen, J. Woodbridge, M. K. Tu, J. I. Kim, A. Nahapetian, L.V. Evangelista, and M.Sarrafzadeh, "A remote patient monitoring system for congestive heart failure," Journal of Medical System, vol.35, no. 5, pp. 1165-1179, 2011.

[18] J. Jara, M. Zamora-Izquierdo, and F. Skarmeta, "Interconnection framework for m-Health and remotemonitoring based on the Internet of Things," IEEE Journal of Selected Areas Communication, vol. 31, no. 9, pp.47-65, 2013.

[19] H. Banaee, M. U. Ahmed, and A. Loutfi, "Data mining for wearable sensors in health monitoring systems: Areview of recent trends and challenges," Sensors, vol. 13, no. 12, pp. 17472-17500, 2013.