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Internet of Things on insolent Health Care Monitoring System

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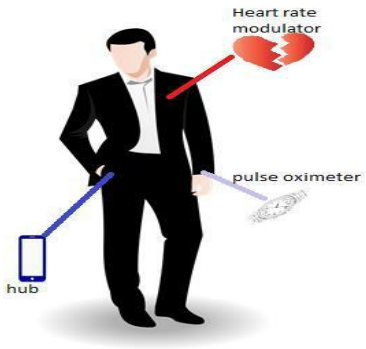
Abstract: **- In today's world, living standard is covered by global sensing techniques using the approach of the wireless sensor network. This is a network that combines physical objects embedding software, sensors and electronics. This provides connectivity that can be used to exchange data with from one device to another device that is based on the universal global standards. By building an IoT and distributing the work of devices in the communicating network. The Internet of Things (IoT) is the network of physical objects—that enables these objects to collect and exchange data. Nowadays everyone is busy with mobiles and are less concerned about their health, So this paper consists a survey of IoT in Healthcare as a heterogeneous computing, the wireless communicating system of apps and devices that connects patients and health providers to diagnose, monitor, track and store vital statistics and medical information. As like the BSN (Body sensor network) or an android app for food distribution or other challenges faced. By this, we can do the delivery of healthcare services (Immediate medical attention especially during times of medical emergency) and clinical information to remote locations all over the world.**

Keywords **- Android, Blood Bank Centre (BBC), BSN (Body Sensor Network), Heterogeneous Internet of Things, Sensors, Vaccine reminders, Wireless Sensor Networks (WSN).**

I. INTRODUCTION

Internet of Things (IoT) is a model of connecting set of anyone, anything, anytime, anyplace, any service, and any network. IoT is the mega trend in generation of technologies that has an impact of whole business field and is to be thought of the interconnection of distinctively recognizable smart objects and other-devices in today's internet setup with extended benefits typically include the advanced connectivity of these devices, systems, and services that goes beyond machine to machine (M2M) scenarios. Medical care and health care represent one of the most attractive application areas for the IoT. The IoT has the potential to give rise to many medical applications such as some remote health monitoring devices. The various medical devices as like the sensors, diagnostic and imaging devices can be viewed as smart devices or objects as the part of the IoT. So, IoT-based health care services are expected to reduce costs, increase the quality of life, and enrich the user's experience. Which is in order to Rahul sharma et al., and Gang-Zhong Yong et al., [1][2] For the healthcare providers, the IoT can play a very important role as it can correctly identify optimal times for replacing supplies for various devices for their smooth and continuous operation.



- TeleMedicine: Providing a professional consultation to a patient in a remote location or assisting a primary care physician in rendering a diagnosis. According to the American Medical

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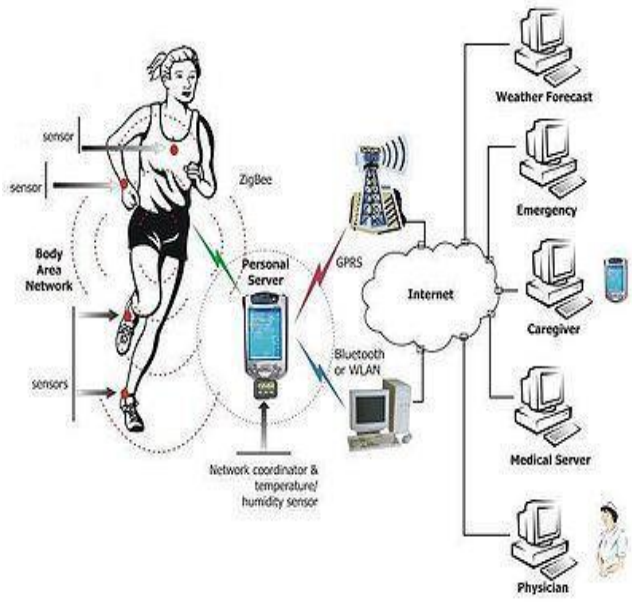
Association (AMA), 78% of emergency care could be handled efficiently using TeleMedicine.

- TeleMonitoring: Collecting patient data using IoT and sending the data to a healthcare monitoring agency for remote testing and diagnosis. TeleMonitoring services also include personalized alerts that inform a patient's healthcare provider in times of physical/mental trauma.

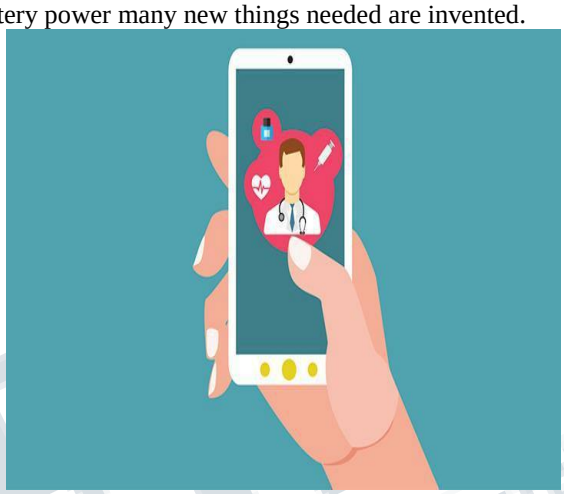
- TeleSurgery: Enabling the surgeon to perform an operation on a patient from a distant location using TeleRobotics technology.

- TeleHealthData Service: Share specialized health information with other Health service providers, the education industry, research firms, and the government etc.



II. RELATED WORK

The work is dedicated to emergent tele-health monitoring system. This work presents a framework to provide healthcare to people anytime and anywhere in the world. The body monitoring is deployed over a region where some phenomenon is to be monitored The physiological parameters such as temperature pulse rate and ECG are obtained on the devices. Bluetooth sensor node for general sensing devices to join the network without much alteration an internet capable phone servers as a centre and manages every activity. With the help of body sensor networks we can monitor activities, movements and vital human body signals from a remote location by means of internet. Demands for the devices is increasing day by day and several aspects like reliability, fault assurance, security and quality of service (QoS) need to be satisfied. Due to changing up gradation and limited resources, memory, battery power many new things needed are invented.



A wireless body sensor network (WBSN) outlines an autonomous system which monitors everyday life activities of a person. It consists of intelligent sensor nodes which do impede the daily life activities and are used in detection of chronic diseases like heart attack, asthma, diabetes etc.: and it also gives cautions to the patient in case of emergency. This network offers constructive services in various fields such as defence, research, industry, business etc. Some patient has heart attack, up to 29% people of them died before reaching to the hospital. This heart attack will happen without any indication. Currently, ECG (Electrocardiogram) Holter monitoring is mostly used technique for providing ambulatory cardiac monitoring for capturing disturbances in the body. This Holter monitor can record up to 24 hours of ECG signals, and the recorded data is subsequently retrieved and analysed by a clinician. They can also detect and signal a warning in real-time if any abnormal changes in the body is captured. Recent research has also focused on the development of wireless sensor networks (WSN) and monitoring systems for cardiac patients. [2]

III. PROPOSED SOLUTION

The system is adept of watching the patient's medical eminence by using different body sensors, even wirelessly communicate the medical data to health care servers. As per the patient condition body sensors network knob

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movements will be veined with the functionalities of mobile IPv6. This proposed system is done to extent and monitor important physiological data of patient to describe the condition of their fitness and health and it can be brought to the notice of physician in case of emergency by sending message to their smart phone. Body Sensor Networks (BSN) contains in-body and on-body sensor networks. The communication process held in the in-body network contains of fixed devices and base station. Obstinately, the communication process in on-body network comprises of wearable devices and a coordinator. With the help of wireless communication medium like 3G/CDMA/GPRS, the LPU behaves like router between nodes and the BSN server, patient blood pressure, pulse oximetry, heart beat rate, ECG data, temperature, muscles, EMG data are observed, put in storage and displayed by the system. Information is sent via IP to health care servers containing patient health condition and clinical data this is shared with physician and emergency services. By this proposed system treatment becomes easier. The action of assessing patient condition to physician is done. Same way the action of helping patient by replaying to him, is done. This is very necessary in case of emergencies. The wireless protocols are considered: ad-hoc network and a Wi-Fi (IEEE802.11), a Bluetooth (IEEE 802.15.1). To do this two systems are designed: sensor system and a display system. The sensor system consists of a wireless transmitter/receiver. The monitoring system has the ability to observe physiological bounds from patient bodies. A coordinator node has attached on patient body to collect all the signals from the wireless sensors. The attached sensors on patient's body form a wireless body sensor network (WBSN) and they sense the pulse rate, blood pressure and others. This system can identify the unusual conditions of patient and issue an alarm to the patient and send a SMS/E-mail to the physician. [2]

IV. MATERIALS AND METHODS

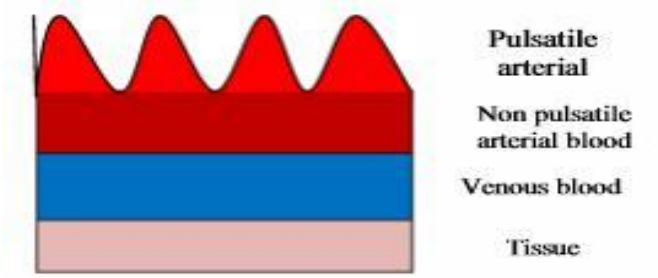
A. Body Temperature Sensor:

The body temperature can be calculated by putting sensor in contact with body. In the arrangement the body temperature sensor is used LM35.The LM35 is meticulousness integrated circuit temperature sensor, whose output voltage is linearly to the Celsius (centigrade) temperature. It can measure the temperature more precisely than the thermistors and it possess low self-heating ability and it does not need any outside calibration or trimming. [3]

B. Pulse Oximetry Sensor:

Pulse Oximetry is fast, non-invasive, easy to use and continuous method for measuring the oxygen saturation (Sp02) and Heart Rate. Oxygen Saturation means how much oxygen dissolved in blood, based on the amount of Haemoglobin and Deoxyhemoglobin and Heart Rate means number of the heart can contracts in a period of one minute. Two different Light Wavelengths 660nm (red light spectrum) and 940 nm (infrared light spectrum) are used to determine the actual dissimilarity in the absorption spectrum of HbOz and Hb. A photo detector in the sensor receives the non-absorbed light from the LEDs. This signal is inverted using an OpAmp and result signal like Fig 2. This signal represents the light that has been absorbed by the finger is separated in a DC and AC component. The DC part represents the light absorption of the venous blood, tissue and non-pulsatile arterial blood. The AC part represents the pulsatile arterial blood. The pulse oximeter analyses the light absorption of two wavelengths from the pulsatile-added volume of oxygenarated arterial blood (ACIDC) and absorption ratio using equation 1.

$$R = \frac{(AC660) / (DC660)}{(AC940) / (AC940)} \qquad (1)$$



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Another way for calculating Sp02 is taking only AC component of only the signal and determines the ratio by equation 2.

$$R = \frac{\log10\ (Iac)\ \lambda1}{\log10\ (Iac)\ \lambda2} \qquad (2)$$

Lac represents light intensity at (660 run) or (940 run), where only the AC level is present. The signal from Pulse Oximeter Sensor is very low current order of JLA. SO there is a need to amplify to required level with the help of Light Source Amplifier. Light Source Amplifier: LM358 Operation Amplifier is used to amplify very minute amount of current depending on the intensity of IR and visible RED light. The IR and RED light sensed by the photo diode to 2V to 3V of analogue voltage which is converted to digital form by built in ADC of Microcontroller MSP430. In order to convert those numbers to SPOs in terms of percentage, the software program is developed in the microcontroller. [3]

C. ECG (electrocardiogram) sensors

Electrocardiogram (ECGS) is used by medical professionals to monitor the heart of a patient. These devices usually operate with up to 12 leads connected to patient's skin in a prescribed pattern. An ECG can be used to detect abnormal cardiovascular symptoms, measure the heart rates, and monitor heart diseases. The most common non-medical application of an ECG is to measure a heart rate during a workout. However, the aim of this project is to prototype a device that could aid remote monitoring and feedback. In addition to hospital based systems, there are also long –term home monitoring systems such as Holter monitors. These systems record 3 to 12 electrodes worth of data onto the device, and are then brought in by the patient for analysis. These monitors are intended to be used over longer periods or to test for off-site conditions such as daily routine or specific generate. [4]

D. EMG (electromyogram) sensor

A working system for mobile analysis of EMG signals (or any other bio signal) consists of three major components the wearable sensor nodes which acquire the raw data, a mobile device receiving and processing the data and the actual analysis algorithm's running on the device. Examples of EMG are wearable EMG recording devices and introduce our mobile sensor framework to connect wireless with android mobile phone. [4]

V. WORKING PRINCIPLE

This working principle section depicts about algorithm and working of proposed system. [5]

A. Algorithm

Step1: Patient registration.

Step2: Login

Step3: Add the basic information into the database for evaluation

Step4: Every 2 seconds update the information from the patient and store database

Step5: Compare the collected information with the basic data

Step6: If any changes found in the information then find patient family doctor, relatives, and friends number

Step7: Send message to patient family doctor, relatives, and friends number

B. WORKING

The body sensor technology is one of the main core technologies of internet of things (IOT) development. In this body sensor network people can be monitored by this small sensor which is low power-driven and light mass WSN. In the paper, we implement safe, physical

monitoring system which has established on IOT tech-health system using body sensor network (BSN).

Following are some of the main mechanisms in body sensor network:

1. Body sensor network care unit

2. Local processing unit (LPU)

3. Body sensor network server

1. Body sensor network care unit:

In BSN scheme, wearable sensors are placed on the body of patient. Each of these sensors checks biological changes of a human body by using the biological sensors like ECG, blood pressure etc. Sensor senses the physical body parameters of all information and sends it to LPU.

2. Local processing unit (LPU):
Local processing unit like PDA, smart phone, personal computer or embedded kit. It acts as a router between BSN node and BSN server. LPU uses the internet through the Ethernet part, or GSM kit or internet-dougal. It constantly checks patient physical activities every 10 seconds and stores it in BSN server.

3. Body sensor network server:
BSN servers receive the data from LPU and store it in the database and then compare it with the basic data. It frequently updates the info to database if any ambiguity is found then it informs the patient Doctor, family members and friends number, and later sends this emergency message through the internet. [5]

V. CONCLUSION

As in today's world due to high pressure and workload people forget to take care of their own health, so by this we can provide an immediate medical attention especially during times of medical emergency and natural disasters. No need for waiting in long queues to see a physician, this task can be achieved by just sitting in home. As this is related to only one time investment this is cost effective. Most of the work can be done though a mobile phone by which intern reduces the documentation and paperwork. Better communication services are provided patients through the primary care doctor and specialist.

REFERENCES

1. Rahul Sharma, Parth Soni, Keyur Shah and BhaveshPanchalM.E. (Information Technology)Assistant Professor: "health care application using android smartphones using IOT" @ 2016 IEEE.

2. Guang-Zhong Yang(Ed.) :"Body Sensor Networks (BSN)" @Springer –Verlag London Ltd 2006.

3. Maradugu Anil Kumar M.Tech, Embedded Systems, Y.Ravi Sekhar. "Android based Healthcare Monitoring System" 2nd international conference @2015 IEEE.

4. Michael Atkinson, Patrick Cousineau, James Hollinger, Chris Rennie, Brian "Android Bluetooth Electrocardiogram" Richter Supervised by Dr. Jens Weber © 2008 Microchip Technology Inc.

5. DeshPande Niranjan R, Vadane Pandurang M, Sangle Sagar D, Professor.dighe M.S :"A IOT Based Modern health care system using BSN" Vol 4,issue11,Nov 2016.

6. Muhammad Wasim Munir, Syed Muhammad Omair , M. Zeeshan Ul Haque. "Android based Application for Determine a Specialized Hospital Nearest to Patient's Location" International Journal of Computer Applications (0975 – 8887) Volume 118 – No. 9, May 2015.

7. Dinesh B. Raut and Pragati Patil proposed "Research on Emergency Call and Location Tracking System with Enhanced Functionality for Android". International Journal of Advance Research in Computer Science and Management Studies Volume 3, Issue 5, May 2015.2016 International

8. Jamil Y Khan And Mehmet R Yuce "Wireless Body AreaNetwork(wban) For Medical Applications".

9. Suhas Kale and C. S. Khandelwal " Design and Implementation of Real Time Embedded Tele-Health Monitoring System" International Conference on Circuits, Power and Computing Technologies, 2013.

10. Tia Gao, Dan Greenspan, Matt Welsh, Radford R. Juang, and Alex Alm, "Vital Signs Monitoring and Patient Tracking Over a Wireless Network" IEEE EMBS 2005.

11. S. M. Riazul Islam, Daehan Kwak, Md. Humaun Kabir, Mahmud Hossain, And Kyung-sup Kwak, "The Internet Of Things For Health Care: A Comprehensive Survey". IEEE Access, June 2015.

12. Luca Catarinucci, Danilo de Donno, Luca Mainetti, Luca Palano, Luigi Patrono, Maria Laura Stefanizzi, and Luciano Tarricone. "An IoTAware Architecture fo Smart Healthcare Systems" IEEE JOURNAL, Dec 2015.

13. Aleksandar Milenkovic´ , Chris Otto, Emil Jovanov, "Wireless sensor networks for personal health monitoring: Issues and an implementation". Elsevier 2006.

14. Bhavin Mehta, Divya Rengarajan, Ankit Prasad, "Real Time Patient Tele-monitoring System Using LabVIEW", International Journal of Scientific & Engineering Research, April 2012.

15. Ashwini Singh, Ajeet Kumar, Pankaj Kumar, M.A Mujeeb. "Body Sensor Network: Monitoring And Analyzing Real Time Body Parameters In Medical Perspect". IJESE May 2013.

16. Enrique Dorronzoro Zubiete, Luis Fernandez Luque Ana, Ver´onica Medina Rodr´ıguez, Isabel G´omez Gonz´alez . "Review Of Wireless Sensors Networks In Health Applications". IEEE Conference Sept 2011.

17. Ning Xu "A Survey Of Sensor Network Applications". IEEE Communications Magazine 2002.

18. Loren Schwiebert, Sandeep K. S. Gupta, Jennifer Weinmann "Research challenges in wireless networks of biomedical sensors". MobiCom '01 conference.

20. Mohammad S. Jassas, Abdullah A. Qasem, Qusay H. Mahmoud "ASmart System Connecting e-Health Sensors and the Cloud". IEEEconference May 2015.

21. Dr. Salah S. Al-Majeed, Dr. Intisar S. Al-Mejibli, Prof. Jalal Karam. "Home Telehealth by Internet of Things (IoT)". IEEE conference May 2015.

22. Rolim, C.O. Koch,f.L. Westphall, C.B. Werner, J. Fracalossi, A. Salvador, G.S. "A Cloud Computing Solution For Patient's Data Collection In Health Care Institutions" IEEE Conference Feb 2010.

23. Purnima, Neetu Rout, Rahul Tiwary, Renuka Bhandari "Zigbee And Gsm Based Patient Health Monitoring System" IJAREEE Jan 2014.

24. Michael R. Neuman, "Measurement of vital signs: Temperature", IEEE Pulse Sept/Oct 2010.

25. Jeffrey Travis and Jim Kring, "LabVIEW for Everyone", Prentice Hall publications, 2006.

26. Dr. M. Armugam, " Biomedical Instrumentation", Anuradha publications, 2002.

27. http://www.ti.com/product/LM35.