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Survey on Health Care Monitoring System using Internet of Things (IoT)

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Abstract: ***In every country the most important and fundamental aspects of any society are Health Care System. However, there is a rapid increase in advancement of medical sector even then most developing countries fall back to provide proper facilities to the people. Also people neglecting their health due to their busy schedule and irregular lifestyle. Hence the concept Internet of Things (IoT) is raised and it is currently ruling the world by providing real time health monitoring of patients from hospital as well as home. IoT in health monitoring provides a great awareness and decision making support which is important for saving one's life by getting real time values. IoT connects to various commercial gadgets which consists of many sensors, these sensors are used to collect data of various vital parameters of patient's health and store them and also notify via message to the doctor or caretaker or to their family. The efficient use of sensors will reduce the human loopholes and it also smaller in size which occupies less space on any devices.***

Keywords: Internet of Things (IoT), Vital patients, Sensors, commercial gadgets, Health Care Monitoring System.

I. INTRODUCTION

This is the internet age where every object is connected to all other objects for the purpose of sharing information. There are many enhanced wireless technologies like Wi-Fi, Bluetooth, 6LoWPAN, ZigBee and many more which have capacity to exchange information automatically. E-health is one applications that have great popularity now a days. To the IOT capable sensors many available wireless sensors can be augmented in the healthcare sector which provide feasible, continuous and real time monitoring. E-health system which can use both wired and wireless sensors for sensing vital parameters of patient's or elderly people by continuous monitoring and generating alerts.

Another new era of application development for IOT based network is Body Sensors Networks (BSN) where its human interaction less nature and efficiency of the data retrieval of moveable smart objects has been a booming communication technology. But most of the smart objects are usually prone to malicious attack. This on the grounds that traditional security protection instruments may not be reasonable for smart objects. Mobile healthcare or m-healthcare is a key part of improvement in the front line of this insurgency. The m-healthcare system services framework which is essentially intentional to impact the capability of mobile devices what's more wearable body sensors.

These devices are continuously executed for the observing of individual healthcare and prosperity. In this study a keen m-healthcare services framework dependent on IOT innovation is introduced to give unavoidable human activity are solidified is foreseen as precarious and an empowering master of unlimited conditions. It incorporates the web related devices we use to play out the methods and organizations that help our wat of life.

II. LITERATURE SURVEY

Kulkarni and Bakal [1], the purpose of this paper is to create system that is capable of monitoring individuals in real time for sensitive health information like pulse, orientation, breath flow and sweat analysis etc while identifying a mass disaster event and participate in planning and mitigation. The system has 3 categories: monitor which includes emergency respond, service provided by emergency respond team like doctor, nurse etc, an agent where cloud connect personnel for co-ordination.

Sandeep Pirbhulal et al [2], in this paper Internet of Medical Things (IoMT) is a means to organize, monitor and manage the healthcare application. In this paper they have proposed 2 things: (1) Energy efficient ON-OFF algorithm(EEOOA) which is used for medical data transmission which is used for medical data transmission between the source and destination nodes in medical system. (2) IoMT based framework consist os 3 layers: (1) medical device data collection unit. (2) integration of those devices with specific protocols of IoMT by sensing and transferring data. (3) contains remote health care monitoring with efficient medical tools and practice. The purpose of this paper is to reduce energy consumption from different sensor devices and provide energy efficient data transmission in the IoMT.

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Ananth et al [3], the aim of this paper is to provide an extensive research in capturing the sensor data's analyzing the data and providing a feedback to patients based on different health parameters. The components used here is smart watch which constantly screens our body with accurate heart rate through ECG and PPG signal. Another component is smart phone, in this paper smart phone acts as a gateway between smart watch and cloud. An android application is created and is connected to smart watch through BLE (Bluetooth low energy) for acquiring real time data.

Jayeeta saha et al, [4] this paper has proposed an alarm generation to provide prescribed medicine to the patient in time. Advantageous factor of this system is the way of sending the notification through email and SMS alert when health parameters exceeds its threshold value. Another factor is to create effective surrounding for patient's health condition as required.

Naveen et al [5], the aim of this paper is designed provide the quality of life of patients. They are using bio-sensors to periodically sense the physiological data from patient's body. Pre-processing techniques are used when there is a problems like missing values, outliners, inconsistency etc., from sensory data. After solving these problems, they used raspberry pi 3 board to send the data and there they run the algorithm code in python language.

KUO-HUI YEH [6], in this paper, they have introduced underlying communication architecture of their proposed IOT-based healthcare system. Then they have introduced trust boundary and the desired objectives of the proposed IOT-based healthcare scheme. After that they have presented the complete communication procedures of system initialization phase and the authentication phase.

Maryem Neyja et al [7], in this paper they have proposed an architecture consists of heterogenous devices like sensors, user equipment(UE), peripheral devices etc., which connects to the close Base Station(BSs) and access points(APs) to exchange input and output information in real time. They also proposed framework that consists of 4 basic components: patient path estimator, ECG signal sensors, patient table manager and hospital alert system database controller.

Mohommed Elhoseny et al [8], in this paper, proposes security model for healthcare by providing securing medical data transmission in IOT environment. They have also proposed a model which consists of 4 continues processes: (1) they have proposed hybrid encryption scheme to encrypt confidential patient's data, (2) the data which is encrypted has been concealed in a cover image using either 2D-DWT-1L (or) 2D-DWT-2L and produces a stegoimage, (3) they have extracted embedded data, (4) the extracted data is decrypted to retrieve original data.

III. COMPARISION

Sl. No	Title	Methodology	Advantages	Disadvantages
1	A secure IoT - Based Healthcare System With Body Sensor Network.	Two Authentication processes are proposed to satisfy major security requirements which is developed under the platform Raspberry Pi II.	The proposed schemes are suitable to be implemented on common intelligent mobile objects with robust security density.	The System efficiency should be improved in future once adopted to hash modules are substituted by the traditional SHA-2 technology.
2	IoT Based Mobile Health care System for Human Activity Recognition.	SAOA is proposed to make a node access allocation policy according to the types of healthcare information.	User response will be fastest. EMA can effectively help patients find faster way to communicate with professional medical unit.	It only considers off loading the traffic to reduce delay time in healthcare environment. But, patient's privacy is a big challenge to be resolved.
3	IoT - Based Secure Healthcare Monitoring System.	Data pre-Processing techniques are used to clean data collected from different sensors where these sensors may carry noisy data, Outliners and missing values. AES algorithm is used.	To diminish healthcare overheads and offers a system which detects abnormality in seconds.	A lot of data captured from sensors and is very difficult to handle and manage the huge data in database.
4	A Medical - IoT Based Framework for eHealthCare.	They have proposed IoMT based frame work which comprises of medical device data collection, integration of those devices with specific protocols IoMT by sensing and transferring the data, the remote health care monitoring with efficient medical tools practices. They have also used energy efficient ON-OFF algorithm for medical data transmission.	EEOOA is used to save the energy for the betterment of entire society.	There is only simulation results are analysed. But, it requires some actual live results.

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5	Three Tier Architecture for IoT driven Health Monitoring System using Raspberry Pi.	The system has 3 tier architecture, Tier one consist of wired sensor network, Tier Two consist of local processing unit and third tier consist of web page for remote access for patient condition and hardware prototype.	The system is robust and is possible to develop at a very low cost.	The system considers and analyse only for few health parameters and analyzation is not so accurate.
6	Design and Implementation of An Interoperable Messaging system for IoT Healthcare Services.	The system implements a prototype of the interoperable messaging system that uses CoAP for IoT health care services.	CoAP based message is light weight and reliability provision and CoAP RTT at any point is shorter than MQTT.	Last rate of packet are assumed to be neglected. Hence, there is no much accuracy in the result.
7	Adaptive and Fault - tolerant Data Processing in Healthcare IoT Based on Fog Computing	Developed a framework for fog computing health care IoT System. They have proposed fault tolerance mechanism by combining advantage of directed diffusion and limited flooding to enhance reliability. They have also proposed RUNS queue to process filtered data.	Both fault-tolerance and self-adaptation module can improve the successfully delivered ratio as well as optimize the resource allocation.	RUNS based computing and analysing (RCA) stops, it caches are relatively large risk factors. Restarting whole system means discarding the large factor and using a smaller one, which further increases the processing time.
8	An Energy efficient IoT Based Healthcare system Based in Clustering Technique.	Clustering technique is introduced to effectively make use of the available energy. Where, an extra IoT device in the patient's body with high processing capability to act as cluster.	Inclusion of clustering technique reduces the energy consumption.	If one cluster head stop working then, there is huge loss in the data transmission.
9	Fog - Assisted secured Healthcare Data aggregation Scheme in IoT- Enabled WSN.	Manipulating fog assisted EHDA scheme to ensure secure data exchange from peer devices to AN (Aggregated Node). It uses MRA algorithm receive data and prepare an aggregated message.	By using EHDA the communication cost has been reduced and compared to any other scheme. It also, have reduced byte compression compared to other schemes.	It lacks in mobility where mobility scenarios of the sensing devices where fog server should change as per mobility in different regions.
10	eHeart- BP, Prototype of the Internet of Things to Monitor Blood Pressure	Design and develop prototype supported by IoT and using EEPROM storage memory with 12C connectivity.	The data storage from the monitor to fire base and then the visualization by memory of application happens almost immediately.	As in case of prediction accuracy, it has been obtained results to be improved, some of them could be parameterized through the model hyper-parameters, others by implementing linear regression algorithm which will be able to predict the desired future values of user data.
11	A Conceptual Framework for IoT-Based healthcare system using Cloud Computing.	Proposed a cloud -IoT framework in which medical information can be safely transferred with the consent of the patient and the other health actors.	Health care which leads to improvement in communication and collaboration among these entities providing better care and services to the patients.	Privacy and security are the major issues which is to be resolved.
12	An IoT Based Robust Healthcare Model for continuous Health Monitoring.	Robust health care model is proposed in which it ensures the collection of data from IoT sensors and send it to the server. It takes the advantage of 6LoWPAN to make a network of IoT sensors and connect it to the internet through smartphone with the help of 6LBR which connects two different network.	The performance of the system remains same when load of two users are transferred from two smart phones to one smartphone.	The testing of this model to be conducted on simulation which need to be conducted on real devices.

IV. CONCLUSION

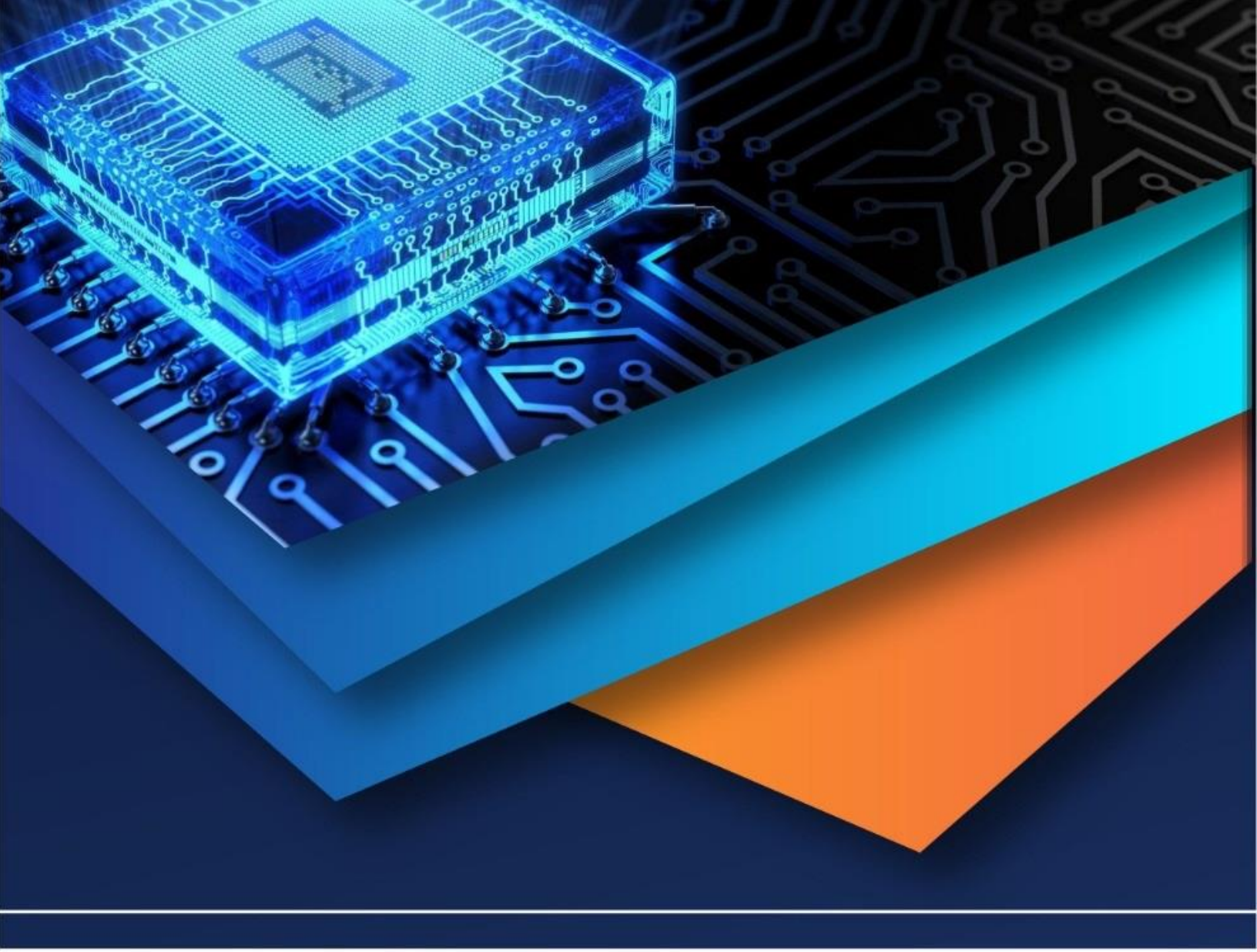
The idea of wellbeing has bit by bit changed for the priority of the individuals. This has been practiced through the assistance of presenting smart phones, smart IOT, health checking gadgets and individual computerized collaborators in the healthcare sector. They present fat information at a low price that gives the users to keep them fit. The internet of Things offers an adaptable, adaptable answer for not just reduce the present strain on medical system suppliers by moving daily practice, non-basic consideration into the comfort of a patient’s home, yet it permits patient's the opportunity to recuperate in the comfort and recognition of their own home. There are as yet numerous difficulties in the fields of IOT, brilliant structure and the advancement of telehealth. No withstanding the common issues of patient's innovation selection, medical IOT runs the danger of having sensors not exclusively be unused, yet utilized inaccurately. This health monitoring system observing framework can be handily presented in emergency clinics, facilities, houses. With the assistance of IOT immense information can be put away at cloud database. This system diminishes the patient's visit to clinic for reliable general checkups.

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