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# Role of IoT in Health Care System

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## ABSTRACT

Most notable technical emergence in Computer Science and Electronic engineering have been merged, and has resulted in IoT ie. Internet of Things. It is about the network made by the physical objects which have sensors, software, hardware, and other technologies for exchanging data with other systems and devices over the internet. In last few years the impact of IOT in healthcare has been significantly increased. In healthcare domain to increase reliability, accuracy and productivity IOT is playing a crucial role. With the population increament health issues are also rising and the necessity of technological solution is demanded. IOT is a new era technology giving hope in the medical health care system. IOT plays a major role in monitoring health.

**KEYWORDS:** Internet of Things, Healthcare, issues, applications, computer science

## I. INTRODUCTION

Internet of things is used for protection and security in various fields. To improve remote sensing of the conditions of patients, for anticipating conditions of patients, and for other patient related purposes a powerful IoT therapeutic administrations system is used [1-3]. Traditional technologies for providing security cannot be directly used in IoT, therefore various models and stacks are required [4]. As a characteristics of health care data that guarantee security, protection, safety, efficiency, authentication IoT is used [5]. It helps to save patients life and to improve the health of patients. It uses data and communication technologies for protecting patients' data. Pandemics and other major diseases are spreading rapidly in the world and is of greater concern in the current scenario [6-9]. There is a necessity to create a strong healthcare-related systems and different methods using information and communication technology. They can be used to develop applications for health related issues [10].

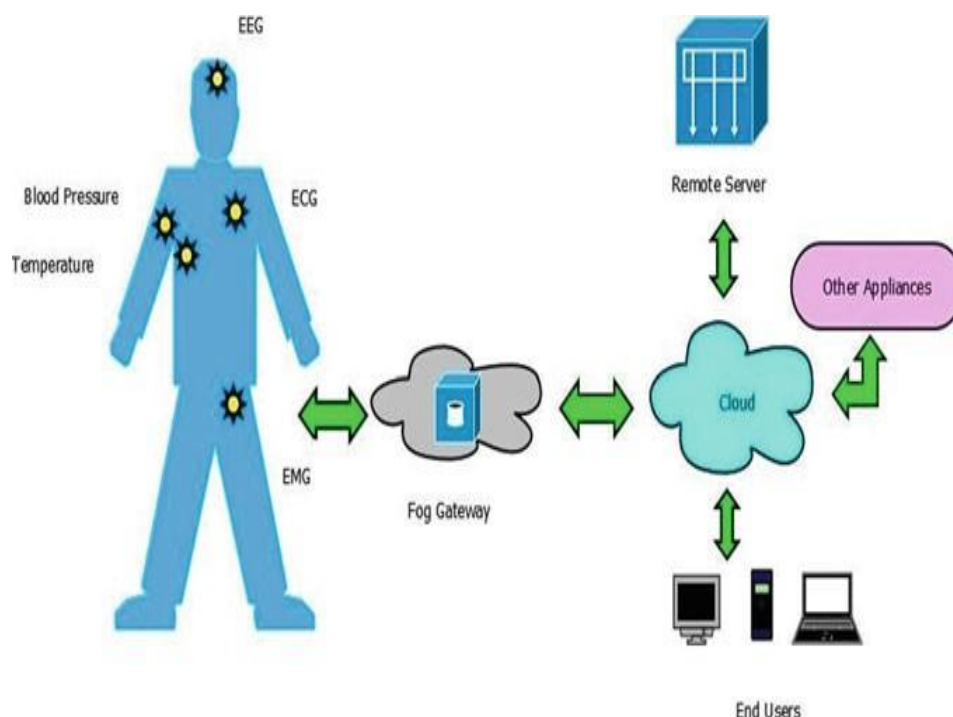
In this paper effort is put to consider (1) the various issues patients undergo (2) technologies available for solving their problems [11-12]. It gives the glimpse of various IoT solutions for protecting patients' data and IoT solutions for these issues [13]. According to one survey more than

25% of the adults do not take their medicines on time [14]. To alert them and to help them take their medications on time, various IoT applications are developed to monitor the patients medicine intake. IoT is the current and future hope of patients as some of the technologies failed to help patients efficiently [15-18].

Various devices are developed by using actuators, sensors, other devices, etc. to implement health care related devices. These devices are very helpful in the medical field and healthcare system. They have helped doctors and patients to coordinate well [19-21]. IoT enhances the usage of internet in our day-to-day activities. They connect patients and hospitals [22]. They are bringing major changes in the way the medical field is viewed. This paper focuses on the cutting edge technologies for the healthcare system through devices which use Internet of things [23-24].

## II. EXISTING TECHNIQUES

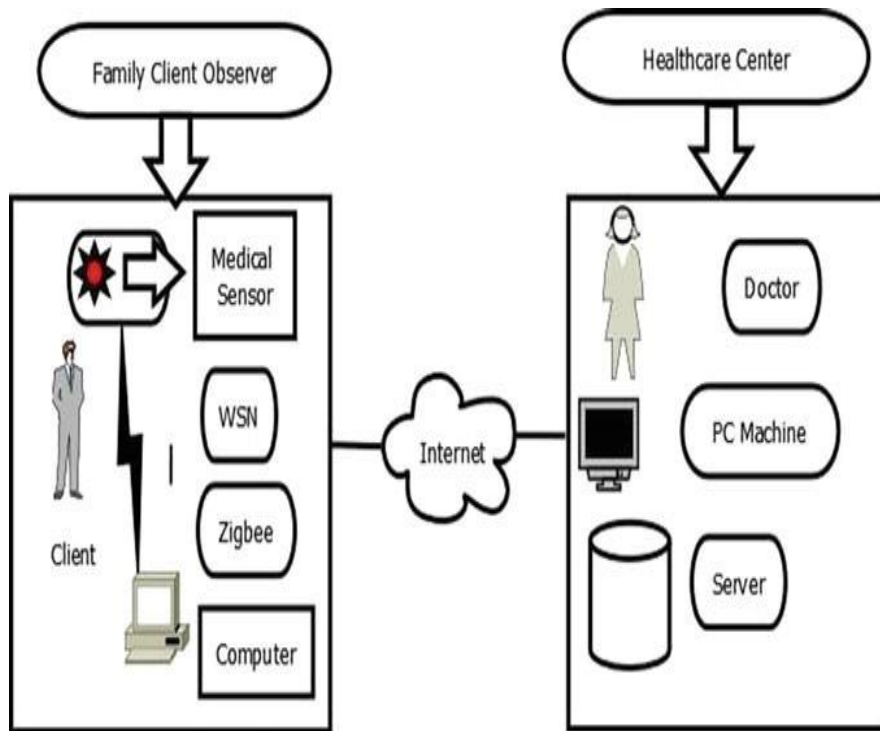
In Figure 1, human services are totally depicted by the biographer which depicts total structure. It identifies a condition where patient's health details are collected. Critical data like BP, sugar level in blood, ECG, etc. are checked by devices which are convenient to use.



**Figure 1: Remote monitoring personal healthcare system**

Data collected by the above method is used and verified for various medical procedures [25]. This information is obtained from different sensors [26]. Using these facilities patients can convey

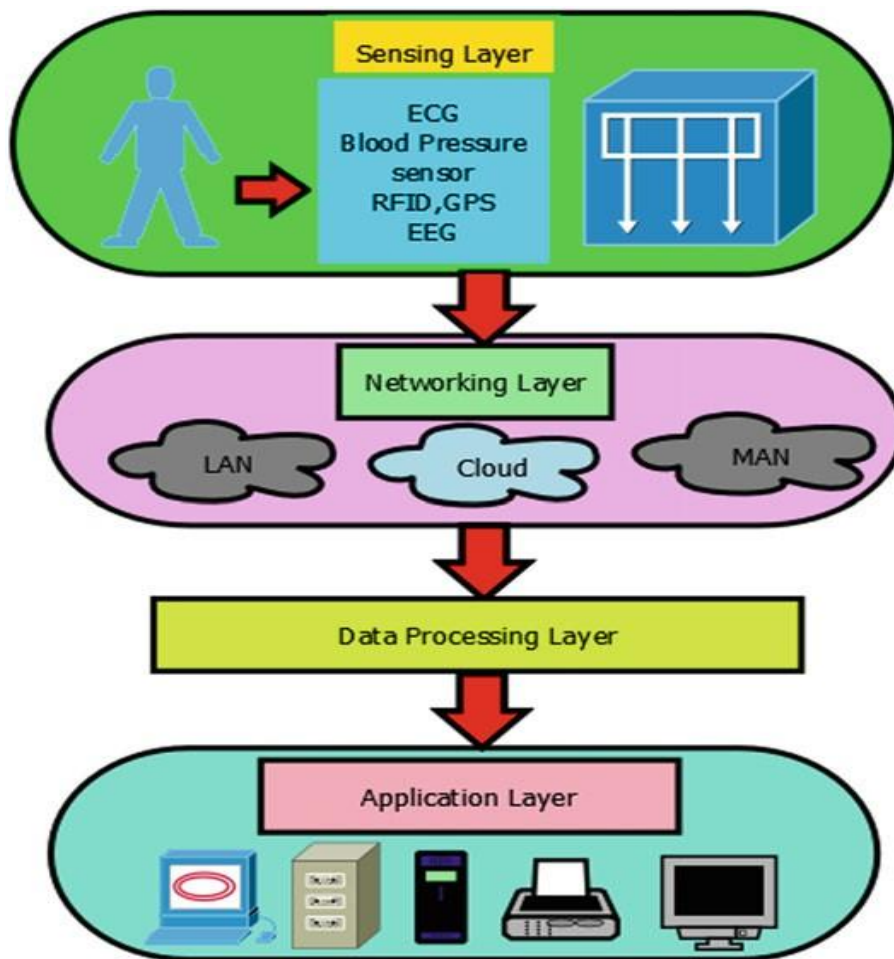
their problems and current status to doctors by using web based technique like WiMAX. Using Internet various patient health care systems can be connected and administered [27-30].



**Figure 2: IoT Healthcare Architecture**

In Figure 2, IoT healthcare architecture is shown. It tells about the various factors that are used in WBAN and RFID tags. Different types of sensors are connected to the patient's body with the help of WBAN device. These sensors collect various parameters from the patient's body like BP, blood sugar level, sensitivity of the patient and so on [38-44]. These data about the patient is recorded in a system. This does not work well if the server fails to work properly.

The deployed restorative device again must obtain the parameter readings from the sensors attached to the patient. This may lead to side effects. If the server works efficiently then the correct data recorded can be used without much side effects. Patient's health can be monitored in a better way. Using available collected data, doctor can give suggestions and medications to the patient. Even experts can review the patient's data if the patient's condition is severe. Gathered data by various sensors are stored in the course server. It can be stored in cloud and used by the doctors according to their requirements.



**Figure3:LayersofIoThealthcaresystem**

This innovative idea has led to the virtualization of the health care system. Figure 3 depicts different layers of architecture to show case the activities or steps done in the field of health care. In every layer performs its dedicated activity. Different activities are data collection, transfer of data, storing data in the database etc.

### III. RESULTS AND DISCUSSION

Based on the various IoT-based techniques there is improvement in the healthcare. Based on these techniques, new IoT-based devices are being developed by many researchers. Data collection is the critical phase for developing a technique in the IoT-based systems.

Table 1 depicts the Comparison of IoT techniques used for health care system. Various data collection methods, work done so far by various researchers and the limitations of their work are shown.

**Table1: Comparison IoT techniques used for health care system**

<b>Year of publication</b>	<b>Work done</b>	<b>Limitations</b>
<b>Tekiehand Rashe mi, 2015 [32]</b>	<b>It is based on accuracy by using electronic health record optimal method can be selected based on merits of different methods</b>	<b>It just uses combination of existing techniques</b>
<b>Shahinetal, 2014 [33]</b>	<b>Electronic health record based on error rate accuracy is there as it is developed for practical usage</b>	<b>Accurate data cannot be obtained</b>
<b>Yangetal, 2016 [34]</b>	<b>Rule-based approach is used for Accuracy check. It uses fast way of data collection</b>	<b>Improvement of accuracy is required</b>
<b>Mdaghriet al. 2016 [35]</b>	<b>Clinical decision support system using Accuracy for data gathering</b>	<b>Poor handling of missing data</b>
<b>Royetal, 2016 [36]</b>	<b>Correlation based and ratio analysis using Correlation and accuracy is achieved for collecting health care data</b>	<b>Omitted or missing data will not be taken into account</b>
<b>Rao and Clarke, 2016 [37]</b>	<b>Prediction accuracy using an open dataset for obtaining better visualization using GUI</b>	<b>Values must not be missing to get accurate data</b>

#### IV. CONCLUSION

The discussion about the various existing techniques in the field of medical science and health system shows the role of IoT. In spite of the existing devices made by using IoT technologies better solution is required for health care system. IoT as opened up various areas for research so that IoT technology can be used to interconnect patients with doctors and surgeons in different parts of the world. In coming future researches in this direction may ease the life of patients and their care takers.

This paper discusses the various opportunities created by the nascent IoT technology in the health care system [45-48]. It has given hope to many patients and doctors who monitor them. Thus, acting as a ray of hope in the medical field.

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