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Recommendation on online patient supervision Using IoT-Driven healthcare

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Abstract - *Through e-life today, we always need to work with the knowledge that plays an essential role throughout our lives. The web is undoubtedly one of the most significant sources of information. All around us we see stuff that is creative that make people's life wiser and more e-centered. Such devices can function smartly because they are connected to the internet, which is called the "Internet of Things (IoT)". Through IoT, sensors actively capture and share data with each other and cloud allowing quicker and more accurate capturing and review of new data sources. In the area of e-healthcare, IoT is exceptionally optimistic, with its ideas now implemented in order to increase the quality of care, enhance the access to care and above all help reduce costs of care. In applications like e-health systems that provide care to remote people and monitoring systems that provide a continuous stream of accurate information for better care decisions, embedded technologies are used. E-health systems. This paper also includes work on each field of the project, evaluating its advantages, shortcomings and general adequacy for a mobile IoT platform for safety IoT's healthcare challenges, including security, confidentiality, wear and low power operations, are outlined and recommendations for future research directions are made.*

Key Words: **Internet of Things (IoT), Bio-medical, Health Monitoring, Healthcare**

1.INTRODUCTION

Currently there are more and more individuals suffering from chronic illnesses, due to various risk factors including lifestyle, lack of physical activity, heavy drinking, etc. Millions of people each year die from lung cancer, overweight, high cholesterol, high blood pressure and these diseases are expected to increase in the coming years. The effects of chronic diseases, growth and diagnosis are widely diverse. Diabetes, blood pressure, cardiac arrhythmia are the most prevalent disorders which can be controlled and managed. In addition to difficulties in their physical conditions, people with these illnesses also often face economic, emotional and social problems.

Unfortunately, modern healthcare systems are under severe stress from the steadily aging population and the associated rise in chronic illnesses [1], while demand for resources, including hospital beds, physicians and nurses are enormously high [2]. Obviously, a solution is needed to reduce the pressure on healthcare systems whilst still giving vulnerable patients high-quality care. The Internet of things (IoT), is widely described as a potential solution for alleviating the stress on healthcare systems, focuses mainly on patients with specific conditions, including diabetes or Parkinson's disease [3], [4].

Additional research aims to help recovery by continuously tracking the success of a patient [5]. This paper explores a detailed review of the latest technology within the proposed model. Sensors are focused on monitoring various health parameters, standards for short- and long-term communication, and cloud technology. The papers draw attention to every fundamental component of an IoT healthcare system, separately, and as a system. According to this, it is essential to use technological advances like the Internet of Things, as this is a crucial tool for data transfer from all hardware platforms, allowing full communication between persons and machines, to improve patient healthcare [6], [7]. The main focus of this paper is to develop a solution based on an ontology that monitors the health and recommendations of chronic disease architecture workouts. This paper is organized in the following formats, healthcare technologies, critical issues & challenges, and conclusions.

2. IoT TECHNOLOGIES FRO HEALTHCARE

Medical devices, from traditional to wirelessly reprogrammable devices, have undergone a radical change. It involves the design of clinical IoT devices that can even be attached to cell phones. The health IoT platform is an integrated machine that includes a variety of tools and applications, such as the use of medical equipment, smart detectors, network gateways, cloud computing, big data, biomedical information systems. The clinical IoT is actually a device that mainly consists of health monitoring instruments. A back-end system monitors patients ' safety criteria remotely. The back-end system will then analyze the data recorded and provide the clinical personnel with appropriate feedback. The advice allows professionals to assess patients ' current health problems and respond quickly to urgent instances [8]. In addition, attention must be given to the fact that the data set collected by these instruments is of paramount importance since it contains patient health records. Today, contact and sensor tools and their applications for medical IoT systems are becoming versatile [9].

The design for IoT-based healthcare has three primary structures: data processing, network delivery, and application support. The information perception layer consists primarily of sensors used to monitor human health statistics continuously [10]. The data is transferred through the networks and stored in cloud data centers. Information is distributed over the networks utilizing Wireless technology, for instance Wi-Fi, ZigBee, EnOcean etc. The application service layer includes IoT in a medical center that provides remote healthcare [11].

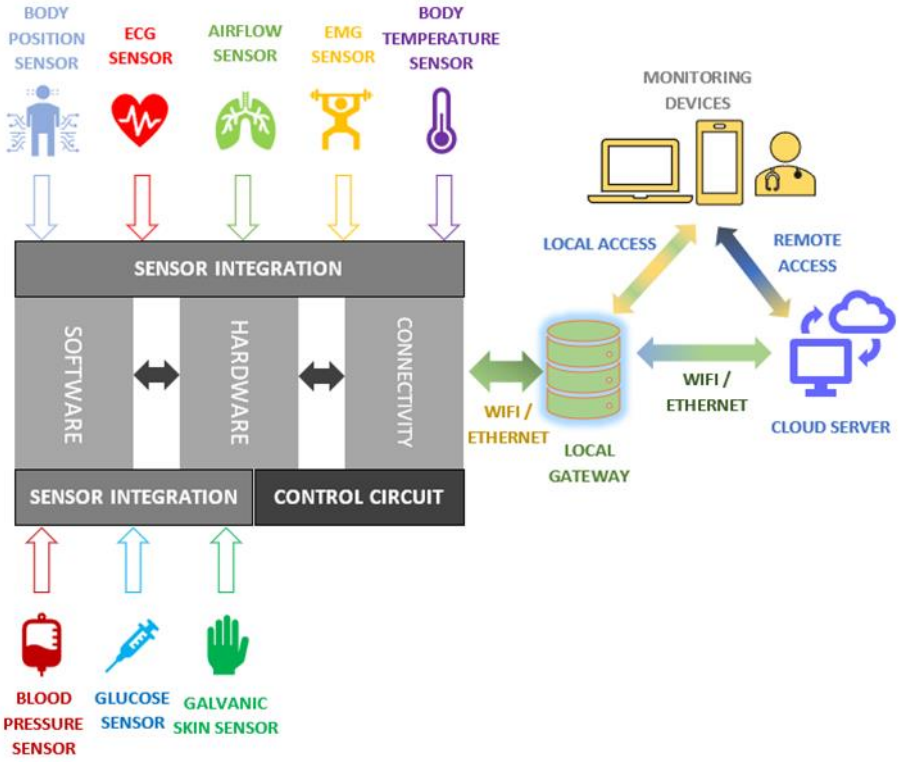

Fig - 1: IoT based Health Monitoring System

3. CRITICAL ISSUES AND IOT IN HEALTHCARE CHALLENGES

The IoT medical industry is growing enormously. In the pharmaceutical sector the use of IoT devices and sensors forms the foundation of the e-health system. People monitor their daily health statistics with these devices. At the same time, apps utilize communication networks for sending / receiving patient health information. This leads to a potential hacker threat. The IoT-based healthcare system must therefore be completely secured. The following significant challenges to health IoT applications are listed below:

3.1 Scalability

Millions of linked IoT devices produce enormous amounts of processing and storage information. The IoT system which operates such equipment should be scalable. By using big data over the cloud, the large amount of data generated by the current system is stored.

Interoperability: Many vendors offer different IoT software products, services and devices. Unfortunately, for the manufacture and use of these products, these companies do not adopt any standard protocol. This is a significant reason for the challenges of interoperability. A wide variety of devices and management of value-added services are currently critical issues in standardization.

3.2. Security

In order to monitor their health statistics, many people are continually wearing medical sensor-based equipment. Safety becomes essential in these scenarios, because any violation of it can prove critical for life [12]. Security is thus indispensable for

the information collected by different sensors and devices in a medical IoT. Proper policies and technological security measures are essential for the exchange of information between authorized users and institutions [13]. The IoT healthcare system is intended to guarantee different characteristics such as confidentiality, integrity and accessibility of personal data. Another critical requirement is adequate resource security. Health systems based on IoT should be equipped with fail-safe mechanisms using minimum resources with maximum safety performance.

Physical Security: devices that are used in a health system based on IoT should be packaged with tamper resistance. An attacker can control a device and modify it to obtain critical data. In addition, the routing algorithms used to protect the transmitted information should be adequately controlled. There are always attack-sensitive network nodes. Secure protocols for data transmission are therefore strongly needed[28]. Medical IoT equipment is equipped with cloud access procedures. In order to easily track and control patient data, the services should be monitored correctly.

3.3. Mobility

An IoT-based healthcare system is essential for allowing patients and devices to move so that the system is always functional regardless of where it is located. This role enables heterogeneous patient populations to be associated [14].

Network type: Selecting the right network sometimes becomes a problem. Three main networks exist: data-centered, service-centered and patient-centered. The data-centered network classifies the medical structure based on the health data collected [15]. The service-centered structure is based on the structures formed by the system's assembly of services.

4. DISCUSSION AND CONCLUSION

The rapid growth of cloud computing, mobile applications and portable devices helps IoT to transform the traditional healthcare approach into intelligent and individual healthcare. Three main areas of the IoT platform can be categorized as follows: monitoring and regulation, the sharing of knowledge and cooperation, and Big Data and Data Analytics [16].

A number of medical parameters, such as BP, glucose levels and body temperature, are monitored by the IoT-enabled systems using intelligent sensors, computer networks, and remote servers. Proper surveillance and control are essential aspects of the broad application of the collaborative network. For example, over a dozen IoT devices from several external users interact with their demands in an IoT-based health care system. Even if the tools for tracking and command work independently, they have to work together to coordinate the feedback they provide.

There is a trend to keep track of the use of intelligent health systems to keep track of patient's‟ medical information with small sensing devices, which collect data over a network in the course of the patients‟ daily routines [17].

Big data and data analysis is other popular area for IoT applications. After a long period of use, IoT systems produce vast quantities of data [18]. This massive amount of data can be maintained in cloud-based processing data centers [19]. A proper cloud analysis may reveal some patterns that medically informed analysts could predict a person with disabilities ' health risks, generate adequate health alerts or fundamental suggestions for treatment that are very helpful, especially in the case of a home or community applications.

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