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Patient Monitoring System Based on Internet of Things

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Abstract

The increased use of mobile technologies and smart devices in the area of health has caused great impact on the world. Health experts are increasingly taking advantage of the benefits these technologies bring, thus generating a significant improvement in health care in clinical settings and out of them. Likewise, countless ordinary users are being served from the advantages of the M-Health (Mobile Health) applications and E-Health (health care supported by ICT) to improve, help and assist their health. Applications that have had a major refuge for these users, so intuitive environment. The Internet of things is increasingly allowing to integrate devices capable of connecting to the Internet and provide information on the state of health of patients and provide information in real time to doctors who assist. It is clear that chronic diseases such as diabetes, heart and pressure among others, are remarkable in the world economic and social level problem. The aim of this article is to develop an architecture based on an ontology capable of monitoring the health and workout routine recommendations to patients with chronic diseases.

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1. Introduction

Today increasingly growing number of people with chronic diseases, this is due to different risk factors such as dietary habits, physical inactivity, alcohol consumption, among others. According to figures from the World Health Organization, 4.9 million people die from lung cancer from the consumption of snuff, overweight 2.6 million, 4.4 million for elevated cholesterol and 7.1 million for high blood pressure. It is said that in the next 10 years, deaths from chronic diseases will increase by 17%, which means in figures of about 64 million people¹. Chronic diseases are highly variable in their symptoms as well as their evolution and treatment. Some if not monitored and treated early, they can end the patient's life. Among the most common chronic diseases that can be treated and monitored are diabetes, blood pressure, cardiac arrhythmia¹. Patients with these diseases besides having limitations in their physical condition, also often have economic, emotional and social relations problems, among others².

Patients often take time to adapt and accept the reality of disease long-term because disability. Reason whereby this group of people with these diseases must have constant monitoring by your doctor to discuss the state of it and set the appropriate treatments. For many years the standard way of measuring glucose levels, blood pressure levels and heart was with traditional exams in a specialized health center. Thanks to technological advances in today there is great variety running sensor reading vital signs such as blood pressure cuff, glucometer, heart rate monitor, including electrocardiograms³, which allow patients to take their vital signs daily.

Although the main objective of these readers is that patients know their vital signs daily, there is reason to be second on the list of priorities when taken daily shows, and is to be stored consistently results which shed daily tests so they can be the subject of medical studies. Similarly also the readings that do permanently to patients reports, doctors recommend you also workout routines that allow them to improve the quality of life and overcome such diseases⁴. The internet of things applied to the care and monitoring of patients is increasingly common in the health sector, seeking to improve the quality of life of people.

The concept of Internet of things is recent and is defined as the integration of all devices that connect to the network, which can be managed from the web and in turn provide information in real time, to allow interaction with people they use it⁵. Another concept of IoT "is the general idea of things, especially everyday objects, which are readable, recognizable, locatable, addressable and controllable via the Internet - either through RFID, wireless LAN, wide area network, or by other means"⁶. IoT The term itself was first mentioned by Kevin Ashton in 1998 and aims at the exchange of information⁷. On the other hand⁸, the Internet of things can be seen from three paradigms, which are Internet-oriented middleware, things sensors oriented and knowledge-oriented semantics. Therefore, it is appropriate, such delimitation because the interdisciplinary nature of the subject. However the usefulness of the IoT is reflected when crossing between the three paradigms in the development of applications⁹. The Internet of Things has a number challenges that are still working. As in the hardware layer, whose purpose is to allow the interconnection of physical objects using sensors and related technologies. The challenges associated with this layer are related to miniaturization, while today there are devices with storage, processing, internal parts should be smaller and to improve efficiency. In the case of the sensors used to measure diabetes, EKG, blood pressure, among others, are not very precise and its size is very large and consume a lot of power. Another challenge is found in the communications layer, which is tasked billion devices connected to the network, which involves improving bandwidth and the electromagnetic spectrum. Faced with the above from the application layer and services are presented countless possibilities that allow to obtain, process and recommend valuable information for patients to treatment of diseases and improve their lifestyles.

According to the above, it is necessary to take advantage of the benefits that come with advances in technology such as the Internet of Things, as they have become an important medium for the transfer of data from any hardware platform, allowing full communication Person to Person¹⁰ (P2P) and machine to machine¹¹ (M2M), to improve health care for chronic patients.

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