

Controlling and Monitoring of Hospital via IoT

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ABSTRACT: *Digital Hospital is a concept contributing to enhancing personal productivity, facilitating hospital operations, improving the process quality and ensuring patient safety by integrating cutting-edge technologies such as medical devices, smart information systems, facility control and automatic conveyor systems, location-based services, sensors and digital communication tools into health processes. Many times, due to inattention of hospital staff, or inattentiveness of relatives it may happen that medication is not observed properly and it may lead to heart attack or other life threatening situations. Thus, this research study presents a proposed system which includes a combination of sensor technology and Internet of Things (IoT). Using this system one can control electricity equipment and monitor level of the medication from a remote place and monitor the entire process.*

KEYWORDS: *Hospital, Patient, IoT, Medical, Heart attack, Internet, Health care, Sensor systems.*

INTRODUCTION

The IOT technology is revolutionary for the healthcare industry. It is changing the healthcare domain by reducing operational cost and helping care takers. Using this technology, it is possible to connect healthcare solutions via internet servers, allowing caregivers the opportunity to access real-time information that helps them to make informed decisions as well as provide evidence-based treatment. Using internet servers, one can continuously track patients from distant places. This device consists of various types of sensors to detect patients' body parameters and transmit these calculated parameters through an internet server so that caregivers can monitor patients' health continuously from a distant location. This means that the provision of health services is timely and that treatment results are increased by using this technology as well.

The risk of failure and the impact of possible life-threatening conditions can be reduced by real-time and frequent structural health monitoring. Computer networking systems and the Internet play an important role. NFC technology immediately obtains full information from the patient when the doctor approaches the patient[1]. The microcontroller-interfaced biosensors can monitor the vital health of the patient. If any of the preset threshold values of the sensor are exceeded below, an SMS will be sent to doctor and the patient's caretaker. The monitoring system comprise of web server part. The sensor network in which the sensor nodes are equipped with different biometric sensors, sensor data will be regularly transferred to hospital database from which it is uploading to hospital's web server continuously. Doctor can monitor the patient condition from any place.

Fast development of IoT technology makes it possible for connecting various advanced objects with each other with the help of the Internet & provides more information by interoperability technique for various application purposes. Present research shows more potential applications of IoT in information intensive industrial sectors such as healthcare services. However, the diversity of the objects in IoT causes the heterogeneity problem of the data format in IoT platform.

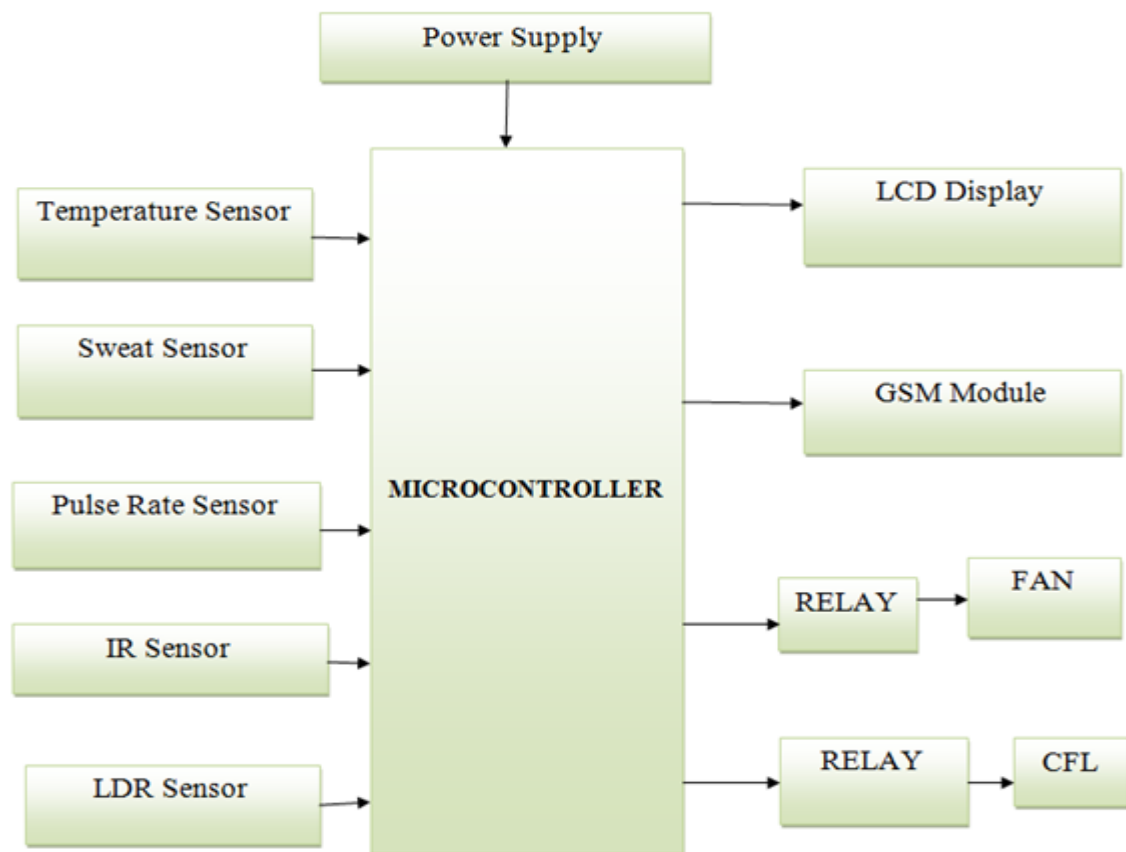


Fig 1: Block diagram of a smart hospital.

The proposed system consists of a microcontroller & GSM Module. Various sensors used in this proposed system are Sweat sensor, Temperature sensor, heart beat sensor, IR sensor & LDR sensor. Health is characterized as a full state of physical, mental, and social well-being and not merely a lack of illness. Health is a fundamental element of people's need for a better life. Unfortunately, the global health problem has created a dilemma because of certain factors, such as poor health services, the presence of large gaps between rural and urban areas, physicians, and nurse's unavailability during the hardest time.

According to the Ministry of Health, from a hospital where the highest amount of information technology is used in administrative, financial and medical processes, to a hospital where all kinds of communication tools and medical devices are integrated with each other and with other information systems, to a hospital where all kinds of communication tools and medical devices can be integrated with each other and with other information systems, and health workers and patients can share information systems. A significant aim of hospital building, which is important for encouraging medical growth and enhancing the quality of healthcare, is the digital hospital.

The two most critical factors for human health are heart rate and body temperature. The heart rate is the number of heart beats per minute, also known as the pulse rate. By measuring the pulses, an increase in the blood flow volume may be used to calculate the pulse rate. Ranges of natural heart rate. For healthy individuals, between 60 and 100 beats per minute. The average restful heart is approximately 70 bpm for adult males and 75 bpm for adult females. In comparison to males, females 12 years of age and above usually have higher heart rates. The temperature of the human body is essentially the heat of the body and scientifically measures the amount of the heat radiated by the body. The average person's body temperature relies on different factors such as ambient temperature, the person's gender, and his eating habits. In healthy adults, it is likely to range between 97.8 °F (36.5 °C) and 99 °F (37.2 °C). Different factors such as flu, low-temperature hypothermia, or any other illness may lead to a change in body temperature. In almost all illnesses, fever is a typical indicator.

Nowadays it has become important to focus on healthcare awareness and also the growth of wireless technologies. IOT has made it possible to wirelessly monitor and manage things in real time through the use of the internet to meet our needs. We are able to reduce wire network problems due to the use of the wireless sensor network in healthcare and we can move healthcare from one location to another preferred spot. The technologies by which IoT is being applied exponentially are Near Field Communication (NFC), Radio Frequency Recognition, Machine-to-Machine Communication & Vehicle-to-Vehicle Communication. By 2020, more than 50 billion IoT devices are projected to be connected through the internet. It will change human life, the style of work, entertaining ways, and many more. There are many fields of IoT applications and the domain of these applications is growing day by day.

There are many deadly diseases in the medical field, such as heart disease, diabetes, breast cancer, liver disorder, etc. The device is designed to track the fundamental signs of all patient types and the room atmosphere of the patient. This paper proposes a personalized healthcare system that, through sensors, measures the pulse and body temperature of patients as well as the level of room humidity, CO and CO₂ gas in the patient's room and transmits the data via Wi-Fi that allows medical staff to obtain data from the server. The developed system also provides a solution for the problem of maintaining a single database of patients in hospitals using a web server, apart from the personalization of critical health-related criteria[2].

CONCLUSION & DISCUSSION

The Internet of Things technology is at its starting point, but it has the potential to have a huge effect on human healthcare and related industries. It is possible to track humans and other objects due to high-speed Internet connectivity and advanced sensor technology. To strengthen the healthcare system, researchers have started to discover many technical solutions. This paper provides deeper insights into the Internet of things-based healthcare applications, enabling technology, existing healthcare issues and problems.

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