

Digital Hospital and Patient Monitoring System

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Abstract— Diagnosis, and monitoring of health is a very important task in healthcare industry. Due to time constraint, people are not visiting hospitals, which might and possibly lead to a lot of health issues in one instant of time. Predominantly most of the healthcare systems have been developed to predict and diagnose the health of the patients by which people who are busy in their schedule can also monitor their health at regular intervals. Many studies show that early prediction is the best way to cure health because early diagnosis will help and alert the patients to know the health status. Healthcare being a global issue more particularly India being a most populated nation where majority of which live in villages deprived of healthcare facilities on real time basis continuously and regularly. With the increasing use of technology, there is an urgent need to have such a smart health monitoring system that can communicate between network devices and application which will help the patients and doctors to monitor, track and record the patient's sensitive data containing medical information. This paper depicts the idea of solving health issues using the latest technology, Internet of Things (IoT). It presents the architectural review of smart healthcare system using Internet of Things(IoT) which is aimed to provide a Better HealthCare to everyone. Using this system architecture, patient's body parameters can be measured in real time.

Index Terms—Internet of Things (IoT); ambient intelligence; monitoring; innovations; leveraged.

I. INTRODUCTION

Now a days, the internet has become a vital part of our daily life. It has changed how people live, work, play and learn. Internet serves for numerous ideas such as education, finance, industries, entertainment, social networking, shopping, ecommerce etc. The next innovative mega trend of Internet is Internet of Things (IoT). The IoT connects smart objects to the Internet. It can facilitate an exchange of data and bring users processed data in a more reliable and secured way. The Internet of Things (IoT) is one of the most vital and transformative technologies ever invented. The Internet of Things (IoT) is a megatrend in next-generation technologies that can culminate the complete business gamut and can be thought of as the interconnection of uniquely identifiable smart devices within today's internet infrastructure with extended benefits. These benefits basically include the advanced concatenation of the devices, systems, and services that go beyond machine-to-machine (M2M) scenarios. Therefore, initiating automation is feasible in nearly every domain. The Internet of Things (IoT) is changing much about the world we live in, the way how we drive, how we do purchases and even in healthcare solutions. Medical care and healthcare represent one of the most attractive application areas of the IoT. The Internet of Things (IoT) has the potential to give rise to many medical applications such as remote health monitoring, fitness programs, incurable diseases, and elderly care. Thus, various medical devices, sensors, diagnostic and imaging devices can be viewed as smart devices or smart objects constituting an interior component of the IoT. IoT-based healthcare services are foreseen to minimize costs, increase and

provide a better quality of life, and enrich the users experience.

In order to continuously make our health care services robust immense and secure, the IoT relies on several enabling technologies. Congregating real-time data from different sources, in this case, an unlimited number of patients for a considerable period of time has become very simple and fast using the potential of IoT. The potential of IoT for health and medical services are tackled by smart sensors which accurately measures, monitors and analyze a variety of health status designators. These include basic crucial health signs such as pulse rate and blood pressure. With the help of IoT's potential, doctors are now able to collect real-time raw data from numerous patients for a continual period of time through smart devices connected to an interconnected network, which ensure them not only with trustable and reliable results but also timesaving which will be of maximum benefits. Internet of Things (IoT) is going to revolutionize healthcare by significantly lowering costs and improving quality.

II. RELATED WORK

Deepika Agrawal et al.[1]proposed an IoT-based healthcare monitoring system that collects all the medically relevant data of patients, including patients heart rate, blood pressure and ECG and sends alerts to the patient's doctor regarding patients full medical information, providing a fast and reliable health care service. Sapna Tyagi et al. [2] defined the role of IoT in healthcare deliverance and its technological aspects that make it a reality and examine the opportunities. This system build's a network among all entities (doctors, patients, Labs, Pharmacists, Nurses)

participating in healthcare that not only limits to the entities under one umbrella but also covers nationwide entities. Tried to implement the concepts of IoT where these entities would be directly communicating to the cloud. Alexandru Archip et al. [3] defined the steps taken to design and build a low-cost monitoring system prototype. The system focuses on remote patient monitoring in hospital wards, following an ICU discharge. The system offers mobile support in order to facilitate faster and better medical in emergency cases and has been developed using low-power dedicated sensor arrays for EKG, SpO₂, temperature and movement. S. Sivagami et al. [4] defined a proposal for smart hospital system (SHS), which relies on different, yet complimentary, technologies, specifically RFID, WSN and smart device such as mobile, inter-operating with one and all through a Constrained Application Protocol (CoAP)/IPv6 over lowpower wireless personal area network (6LoWPAN)/representational state transfer (REST) network infrastructure. In this proposed system, the sensors are built to get the environmental conditions of the hospital for which hospital staff would be responsible and RFID is used for this monitoring. For the patient, a nurse would be responsible for tracking/monitoring the patient health condition (temperature and heart rate), based on which graphical chart is generated which is shared with the doctor.

Nitha K. P. et al. [5] reviewed the concept, applications and various existing technologies in healthcare. The system uses all the potentialities of Internet of Things(IoT) by enabling connection with smart devices to provide them the best health care and also enumerated the key difference between and brief clarification of the scope of IoT in personalized health care, that ranges from wrist-worn devices to health care systems. Alex Page et al. [6] proposed that network sensor either worn on the body or embedded in a living environment that can help in providing rich information captured on a continual basis which is aggregated and effective minded about the patients physical and mental health. They have proposed a system where the data acquisition is performed multiple wearable sensors that measures physiological biomarkers such as ECG, skin temperature, respiratory rate, EMG muscle activity and posture. A ZigBee or Bluetooth is used to transfer sensor data to the concentrator. Often a storage/processing device in a locus of a mobile client referred to as a cloudlet, is used to augment its storage/processing capability whenever the local mobile resources do not fulfill the applications requirements. The cloudlet can be a local processing unit (such as a desktop computer) which is directly accessible by the concentrator through WiFi network. Also addressed about the cloud-based medical data storage and the upfront challenges. Analytics that use the sensor data along with e-Health records are becoming prevalent can help with

diagnoses and prognosis for a number of health conditions and diseases and additionally, the visualization is a key requirement for any such system. This treasure trove of data, when analyzed and presented to physicians in easy-to-assimilate the visualization that have the potential for drastically improving healthcare and reducing costs. Also highlighted several challenges in sensing, analytics, and the visualization that need to be addressed before systems can be designed for seamless integration into clinical practice. S. M. Riazul Islam et al. [7] proposed an intelligent collaborative security model to reduce security risk; discussed how different innovate technologies such as big data, ambient intelligence, and wearables are leveraged in a healthcare context; addressed various IoT and eHealth and regulations around the world. Further, analyzed the distinct IoT security and privacy features, as well as including security requirements, threat models, and attack taxonomies from health care perspectives and defined the advances in IoT-based health care technologies.

III. PROPOSED SYSTEM

The proposed system aims to cover an end-to-end smart, efficient and innovative health application that can be built up with two functional building blocks. However, the main function of the first building block is to gather all sensory data that are related to the monitoring of the patients, whereas the second block function is to store, process and present the resulted information on the server where the doctors can access health reports following the case of the monitored patients. The proposed smart health monitoring system is being deployed and tested over a patient whose personal details are entered into the web portal. The patient is connected to the smart health monitoring system which consists of a heart rate sensor, blood pressure and a temperature sensor. The live graph of the patients heart rate, blood pressure and a temperature is being monitored.

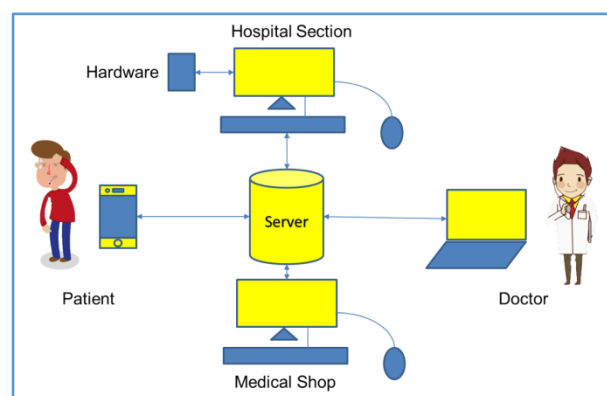


Fig: Proposed System

Experimental Results:

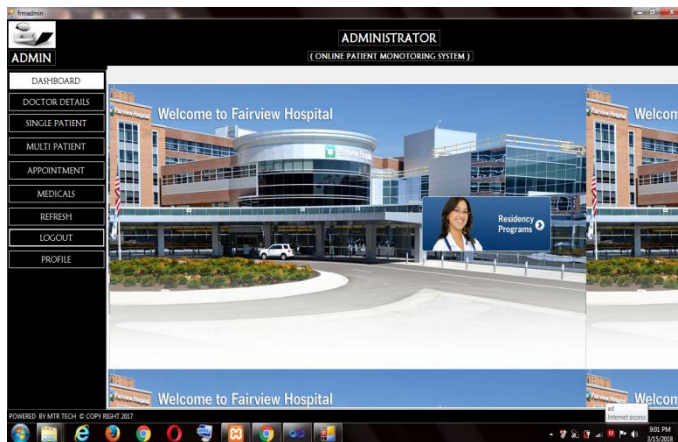


Fig: Admin Homepage

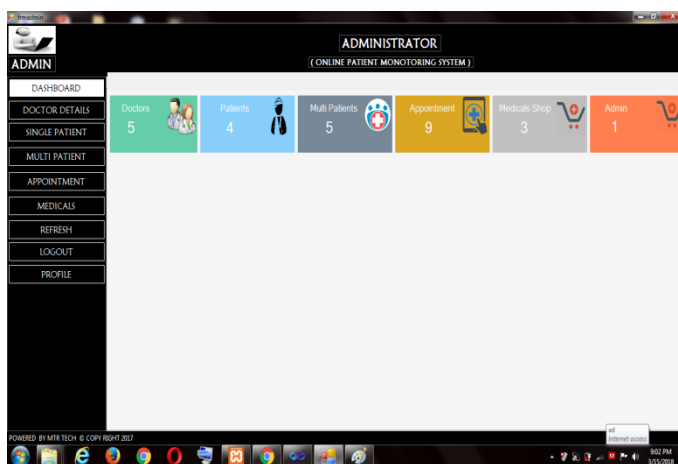


Fig: Dashboard for Monitoring

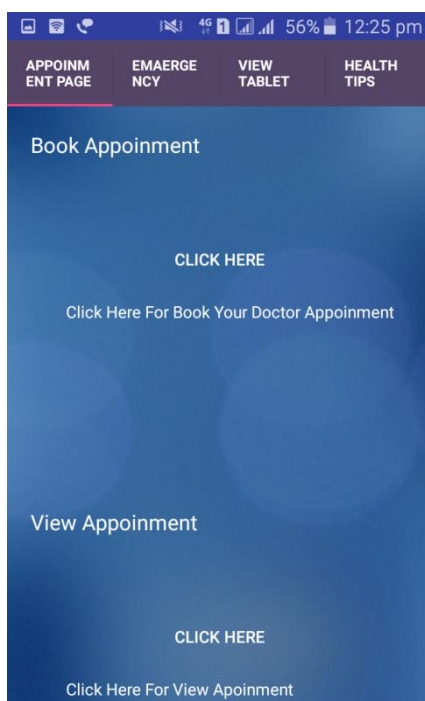


Fig: Mobile Client Page

IV. CONCLUSION:

The internet has immensely changed the way we live, intercommunicating between people at a virtual level in several contexts spanning from professional life to social relationships. The IoT has the potentiality to add a new dimension to this process by establishing communication among smart objects, leading to the vision of anytime, anywhere, any media, anything communication. Ingenious use of IoT technology in healthcare not only bring benefits to doctors and managers to access wide ranges of data sources but also challenges in accessing heterogeneous IoT data, especially in a mobile environment of real-time IoT application systems. Considering the population status and the majority of the people live in villages which are remote places and with the growing technology and more importantly healthcare being the predominant issue of the nation this smart healthcare system using IoT technology plays an important monitoring tool at levels in the larger interest of the global as a whole. The health monitoring system is beneficial to the patients as well as to the society where the implementation of such systems will save hospital bill, waiting time, and also reduce the long queues in the hospitals. This paper tries to emphasize on a healthcare system which is enabled with IoT technology that not only realizes the illustration and traceability of healthcare actors but guarantee the improved health care services. The key motive behind the proposed system is to provide better and efficient health services to the patients by implementing networked information so that experts and doctors can make use this data and could provide fast and efficient solution.

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