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SMART WATCH FOR HEALTH MONITORING

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Abstract

Internet of Things (IoT) finds its major application in the field of healthcare. In particular, with the development of wearable technology typically referred to as smart-watch, such as fit bit, reflex others, one can easily track his/her health and avoid danger chances. A wearable IoT is integrated with different types of sensors using various human behaviors such as movement, walking, pulse rate, burned calories, etc. It is possible to collect information. The Wearable IoT facilitates contact in two ways. A medical record is extracted and examined using the wearable IoT. Data is created from day-to-day operations and collected at regular time intervals. The purpose of this paper is to clarify the IoT, wearable IoT, and its architecture and finally to present the results analyzed.

Keywords: *Smart watch, IoT, Health, Monitoring, Wearable sensor, Information system, Application.*

I. INTRODUCTION

The Internet of things (IoT) is the interconnection of various devices, sensors, applications, & network connectivity which improve these various devices to collect & transfer information. The determining features of the IoT in healthcare systems is the continuous observation of patients by checking different parameters & providing better results of patient history such as continuous monitoring. Many smart watch devices are equipped with various medical sensors that are present in the ICUs these days [1]. There will be some moment where the doctor couldn't be notified on the right time when there is an emergency, instead of monitoring 24 hours. In sharing the information there might be some difficulty with the doctors related to that specific disease & the problems with relatives & family members. The technology that improves these characteristics is already available. It is not reachable to every person in developing countries such as India due to it not being cost efficient and accessible.

A smart watch is an electronics device which appears as a wristwatch and is attached like a band around the wrist. In the last decade, pocket watches replaced the wristwatch as a more suitable device to get at real time information quickly. Thus, smart watches are the most popular wearable devices; there are various models which are cost efficient already easily available in the market. To display time generally people use wrist watches, people used to wear wrist watches on their wrist which can do more things. Nowadays People can use multiple functions of their smart phones without taking their mobile out of their purses or pockets, which includes tracking and communicating their health status with other people. Instead of all these functions smart watches have been exhibited to be practical & helpful in promoting disease management, wellness , biomedical conditions & behaviors monitoring, in today's society all benefits are important where they have to maintain good health & cutting down costs of healthcare which are in the mind of people.
The application of smart watch has the following unique characteristics and advantages:

1. The smart watch application sensor collects various information from various sensors which are embedded in smart watches such as accelerometers to measure acceleration of forces, gyroscope is used for measure orientation and angular velocity, GPS for accurate location coordinate & also measure heart rate at specified frequencies & transmit all collected data to the web server. Further, all collected data is transferred to the address to which registered smart watches are connected wirelessly [2].

2. Information is uploaded to the web server over a GSM connection. The use of GSM connection for transmission of information allows for having the collected information available on the web server in real-time for further analysis.

3. This proposed system collects data with the help of various sensors as well as it sends collected information to the web server with the help of GSM modules connected to the system. The web server can customize the smart watch's various functions with the help of configuration parameters, which include the list of sensors for data collection, their sampling rates, the definition of feature vectors and PROs.

4. The application of smart watches is flexible enough to accommodate various types of studies with different target variables & outcomes. Output results can be analyzed from the raw data which is collected with the help of various sensors instantly on the display of a smart watch. By combining all the collected data and construction steps variables, the proposed system application reduces the cleaning time of data. Further, transmitting variables instead of raw data results in a significant decrease in the size of the data sent to the remote server; which reduces the transmission cost.

5. Power computation of smart watches as well as available various sensors are enough for capturing non-wear time accurately & instantly. The time when a user not worn watch on the wrist that particular time is defined as non-wear times, such as during showering and times

when the device needs to be charged. Proposed system Identifying non-wear periods which helps to improve the analysis.

II. SMART WATCH DESIGN AND IMPLEMENTATION

Problems related to the heart have a large impact on the life quality of any person who suffers from heart related problems. There is advancement in new technologies, there is a potential for advanced healthcare systems. The design of smart watch wearable devices based on IoT for health analysis brings revolution in everyone's lives. Services related to medicine have made many improvements in recent years. Communication & Computing technologies have the capability to provide a wide variety of services for patients. Due to this advancement in smart watch a patient's quality of life will improve and provide a benefit to a large portion of the population. Compactness, IP connectivity, low power consumption and patient data protection are important when developing and implementing IoT-based mobile healthcare services. The essential features of mobile health devices are presented by the authors. In the IoT, the necessary infrastructure required is defined [3]. The authors argue that mobile health technology can provide real-time data and facilitate rapid diagnosis, remote monitoring and recovery, offering additional benefits, such as lowering healthcare costs and preventable hospitalizations. The authors report on the necessary concepts and IoT components required in healthcare systems. Smart devices, sensors and high-speed Internet with high-performance computing are addressed to provide larger populations around the world with the need for decentralization of healthcare services. They identify different features and their IoT, middleware, and e-health creation and the associativeness between these components. The authors compare current technologies that offer incentives for innovative and alternative tools that can deliver better health services [4].

As technology continues to grow, with sensors and networking, more and more physical devices are being integrated. This growing network of devices capable of linking and sharing data has been called the Internet of Things, and will eventually contribute to the collection of high-fidelity data on a range of population-level health-based results. Currently, such connected computers, in the absence of direct physical interaction with the device or participant, give researchers the immediate advantage of free-living data collection. Modern mobile devices actually have a convenient platform that includes power computing, high-speed networking, ample storage, and a wide range of sensors.

Smart devices combine power and versatility with a range of sensors that provide the foundation required for a more comprehensive approach to remote monitoring of personal health. In addition, this approach often provides many major advantages over conventional approaches, including the ability to configure apps through the Application Program Interface (API), a screen interface to view and communicate with participants, a physical input alternative (e.g. switch dial bezel), a large range of sensors, and the ability to provide remote access and control There have been many smartphone-based systems introduced to track health

problems in the atmosphere of free living. These cell phones, in order to collect critical information from patients in real time, healthcare or mHealth systems rely on communication means to provide alerts and advice remotely when data deviates from the expected value. There are some holes in phone-based ascertainment, though such systems carry merit.

Smartphones are typically carried in a pocket or in hand-held pockets, which is not an appropriate place for behavior detection. Therefore, sensor data obtained from these devices do not provide the requisite information for the identification of operation [5]. As they have the same sensors and networking and are attached to the body, smart watches offer a more rational option. Despite the advantages, after their initial market release, the development of smart watch applications for data collection has not progressed. In short, the purpose of this study is to build the architecture for a novel remote monitoring system by combining a remotely connected server and a smart watch-based application. This framework would pave the way for additional applications that collect data simultaneously in the target areas of physical activity, mobility, and EMA, results reported by patients, and health incidents that intervene. To achieve this objective, we present the system of Real-time Online Assessment and Mobility Monitoring that offers: (1) a convenient online assessment and mobility monitoring framework. Long-term assessment strategy in the sense of varying health (2) The ability to synchronize sensor knowledge with health incident reports and Symptoms; and (3) real-time digital communication, providing an active forum for the findings received by patients, health events, and potential delivery of intervention.

III. CONCLUSION & DISCUSSION

The ROAMM infrastructure for real time monitoring of personal health. For physical activity tracking and evaluation and patient-reported performance, queried at random time points during the day, for recording EMAs, this system relies on continuous sensor data collection at high frequency. Two key components make up the infrastructure. The first part is an application that collects sensor and user-reported data, processes them into variables and transmits them to a remote server for Samsung Gear S2 and Gear S3 smart watches. The second part is the server, which collects and stores the data from several watches in a database. Instead of all these functions smart watches have been exhibited to be practical & helpful in promoting disease management, wellness , biomedical conditions & behaviors monitoring, in today's society all benefits are important where they have to maintain good health & cutting down costs of healthcare which are in the mind of people. Privacy and security are important challenges which can be resolved; benefits and efficiency from the device still outweigh the concerns, as long as people use them.

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