Virtual Companion Health Minder with Secured Wearable Networks [VCHM]

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Abstract

The Wearable Networks is the greatest boon of computer science tends to create wonders in health care application industries for the prominence of life. The purpose of this paper is to provide wide knowledge about the wearable networks and its efficient applications in various industries with its remarkable researches in medical and health care. This paper gives the importance of wearable systems for quality care of the patients in medical history. It also discusses about the wearable technology used in health care benefits like a headband used for brain injury detection, and the blood oxygen monitored by a wristband, smart kits for distant monitoring and home diagnosis. APlastic patch in the form of Tattoo that can observe the vital signs and a smart contact lens that can monitor the user's blood sugar levels. One of the current challenges is performing rehabilitation exercises during monitoring patients to provide them with an objective feedback. This paper describes about the importance of wearable multi-sensor system for monitoring human motions, that has been developed and used in rehabilitation[1]. In orderto transmit the information related to the body motion to an acquisition device, these wearables areself-possessedwitha few small modules that embed with high-precision accelerometers and wireless devices.The significant benefits about the field of wearable and implantable body sensor networks challenges and research problems and drawbacks of these systems are discussed in this paper.

Keywords: *wearable networks, remote monitoring, home diagnosis, monitor vital signs.*

I.   Introduction

In today's Digital world, the Technology directs the incredible changes in the day-to day activities in the form of remarkable changes and challenges that moves us in to a faster and connected world of intelligence. The younger consumers lead the rapid growth in wearable technology products and prompted them for its high reach and success.

The tracking information in health and fitness got from the consumer through Wearable tools are very useful for the consumers in their day to day activities. These wearable tech gadgets contain small motion sensors to take photos and sync with your mobile devices for their further processing. These wearablesare used for convenient tracking of data, health and habits.

The health carearea has already perceived solutions for wearable technology. The sensors are familiar in health care is most useful in enabling home diagnostics, virtual health and remote monitoring. This paper is organized as overview of Wireless and Wearable Technology in first part and demand for basic wearables and wearables in

health care as second part,Smart Caretaker andPresent &Future of WT in health care as final part.

Wireless and Wearable Technology:

Wireless networking is an innovative and useful method of communication to avoid guided media of cables for connection between various equipment locations.[2]This WT technology is administered in the method of radio communication. The wireless networks used for variety of applications for both audio and video.One of the most successful applications of wireless technology is wearable tools. Wearable technologiesare working with the six different wireless networks like Near Field Communication (NFC), BLE, ANT, Bluetooth Classic, Wi-Fi and Cellular [3]. The short-range wireless applications are covered by Bluetooth wireless technology which can operate in the 2.4 GHz frequency band. It is advisable to use for health monitoring devices with some improvements in its features.

Demand for basic wearables:

The devices which are designed to get unique data from each person is called as Wearable devices. There is lots of people who lives in their life with the condition of seeking others help due to their sickness and ill health. The WTdevices can be used to improve the human life by improving their hearing with a modest hearing aid. It can also use to measure their heartbeat to monitor exertion or reminding someone via smartwatch to seek their attention. The Summary of the international wearable devices of the market was givenin terms of market segmentation. This segmentation is divided by product, by function, by application and by region and this is given in report titled "Smart Wearable Device Market: Global Demand Analysis & Opportunity Outlook 2024". The BPS analysis and Porter's five force modelgivesthe report that encompasses about the industry growth drivers,

restraints, supply and demand risk in market attractiveness of these wearables.[4]There was a huge demand for wearables in recent days. Some 198.5 million units are expected to be shipped by the end of 2019, with smart watches and other wrist trackers leading the charge, and adoption accelerating in the healthcare industry. Leading device manufacturers, such as Apple and Fitbit, have recently begun focusing on healthcare. [5]

Ubiquitous computing & Wearables in Healthcare

It is one of the concepts in Computer science which creates the computing everywhere. It can use any device in any location. The network of various technologies like Internet, Advanced Middleware, Operating System, mobile code, sensors, microprocessors, user interfaces, networks, mobile protocols, location and positioningproduced this Ubi and WT.This ubiquitous and wearable technologies making path to intersect the public and private life, health and illness and work routines. The digitized medical devices well used to monitor the patients in their work, and it provide the data to the clinicians to access the clinical information which leads them to provide treatment of the patient outside clinical organizations. It is very effectively used to empower the patient particularly elderly and disabled people[6]. Smart wearable devices such as heart rate monitor and glucose monitor are some of the very highly used wearable technologies in healthcare & medical sector. Further, the demand of continuous monitoring of patient's health in hospitals and home generates the awareness and demands for this smart wearable device in health care for near future.

II. Need of Virtual Monitoring

The records of diabetes patients are in need to take measure their blood pressure, blood glucose and weight in continuous way is

essential.Heart diseases are widely spread in this fast lifestyle. Lots of people are suffering from heart diseases. To detect and reduce the sudden risk of heart failure, this technology provides continuous monitoring toindicate the emergency period to safeguard the victims. The Old age people are heavy risk of dementia and falls which needs a continuous patient caretaker for their safe. Many of the peoples could not afford for paid attenders.

This type of Remote patient monitoring service productsisnow used for Infertility treatment also to avoid the duration of stay in hospitals.

Smart Caretaker:

Now a day's elderly people are mostly affected by different health issues like chronic conditions and major disorders. So, they need care takers to their day to day activities. In these situations, the advanced technologies that they need to help them for monitoring their daily activities and to send messages and even prevent falls. For such patients and old age peoples these technologies are boon for their life span. The **IT** market produce the **remote patient monitoring devices** for health care industry. It is greatly useful to decrease the burden of patients with its high quality of care with lower risk. Further than the patient interface, the equipment is being enhanced in every corner and solve all medical related problems of the patient at remote locations.The remote sensing helps the clinical people to monitor their patient's improvement continuously in the way to get rid of their illness. These technologies will help the elderly people to get help from their families in their need. It helps the diabetics to update their glucose level to enhance their good health in order to avoid major drawbacks. This enhanced technology leads for Virtual health and remote monitoring to collect and analyses the patient's health status. For example, these activities are nicely given in Virtual Eye (VI) remote patient monitoring system that utilizes the World Wide Web infrastructure. Itis established to send SMS messages to the mobile of the allocated health personnel through the public GSM network, in risky situation. [7]
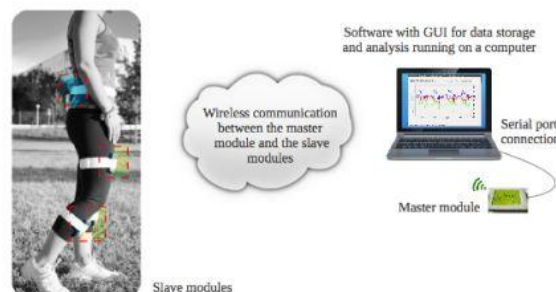
III. Applications of Remote Patient Monitoring System:

The most well-known and hopefulapplication of **patient monitoring devices** are:

(i) Maintain diabetes:

This system helps to monitor the real time delivery of blood pressure, blood glucose level for the continuous processing of medications to avoid sudden risks.

(ii) Reduces Risk of Heart failures:

This technology provides systems like cardiac resynchronization therapy, pacemakers in the market to indicate the premedication if needed in worst conditions a person.

(iii) HinderDementia:

To overcome therisks of patient, remote monitoring technology leads to preventfrom harmand promote safety through continuous surveillance. Several sensors are attached with the different abilities people's mobility devices like walkers and sticksto indicate alert in case of their

fall & lost. In the same way to find or track elderly patients, GPS or Wi-Fi or radio frequency technologies are used.

Virtual Companion or Remote Patient Monitoring Benefits:

It is a myth that all older people are struggling with the **fast-paced** world that leads by the evolution of information technology.Patience is important for continuous monitoring of a patient system which can be possible by a machine than human source. Hence this creates the increasing demand and so most of the countries adopt this technology and use devices to provide quality of care to patients.

The benefits of remote **patient monitoring** for both Patients& providers are:

Patients:

- It provides appropriate treatment on right time at an early stage.
- Reports can be evaluated by multiple doctors from the remote locations.
- Closeness to home and community.
- Outpatient's Travel time and waiting time is reduced.
- It creates the speedy diagnosis & fast mediationof the doctor.

Doctors:

- It provides the Real-time vision of patient health and medical parameters.
- Increases the operational efficiency, planning & compliance.
- It helps to go through the live streaming of patient data even in 2G network.
- Reduces the workload of clinical productivity solution.
- The Time & Resources are saved.

IV. Algorithms used in WT:

Several algorithms are used in WT technology device. Novel Algorithm is used in smart watches

to detect the glucose level in diabetic patients[9].For consumersafety they are using encryption algorithms like RSA encryption, Two fish encryption, AES and DES algorithms.[10]

V. Conclusion:

By this paper we are applauding the Internet of things (IoT) and ubiquitous sensing (US), for their vital rolein smart healthcare in which they have entirely changed the landscape of the conservative traits and observes with self-organizing, distributed, low-power, and economical features. We are satisfying in this regard by creating an awareness to the elder and younger generation people about the rapid technological revolution that makes the wearable devices as Nano size and its wild mathematical tools have motivated every corner of the medical domain.The combination of these aides with wearables unlocksthe new use cases, from allowing these devices to tie into the smart home to making the devices more proactive byinfluencing users to live healthier and more productive lives. Finally, to accept the other major component of the wearables market is connected in clothing, which is expected to double in size by 2023 but remain a marginal wearable category. The smart clothes segment will be led largely by step-counting shoes and similar devices, buoyed by new investment from major apparel companies, such as Nike and Under Armor.We would like to indicate that this is the right time to understand the environmental changes around us in the form of IoT and connective networks which can lead the world with its superior power.

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