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SURVEY OF REAL-TIME HEALTHCARE

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ABSTRACT

The fast development of Internet of Things (IoT) technology makes it possible for connecting different smart objects together through the use of Internet and providing more data interoperability methods for application purpose. Recent research shows more potential applications of IoT in information intensive industrial sectors such as health care services. Nowadays health care industry is to provide better health care to people anytime and anywhere in the world in a more economic and patient friendly manner. IoT based health care technologies allow the users to perform biometric and medical applications where body monitoring is needed by using different sensors. This information can be used to monitor in real time the state of a patient from anywhere around the world using Arduino Board. The Arduino analyses the data in real time and determines whether the person needs external help. When anomalies are detected or a threshold is reached, the monitoring system automatically transmits the information to the doctor's workstation. Thus we are proposing a survey system which will perform these tasks by means of IoT, microcontrollers and semiconductors, sensors by means of Cloud platform.

KEYWORDS: Internet Of Things , Healthcare , Arduino, Micro-controller , Sensor, Cloud.

INTRODUCTION

The survey on India, due to vast population and geographical diversities it is difficult for doctors to reach the remote locations to monitor the patients and it is even a problem for the patients to reach the hospital for the treatment on time. In many rural areas around the country proper equipments and functionalities are not sufficient for the treatment and observation of patients. To solve this problem the system is being proposed to access real-time data that is being fetched from various portable sensors and transmitted to the cloud through the Arduino board. This data can be then accessed by the doctor to monitor the patients from remote locations and in a cost effective manner.

Many technical communities are vigorously pursuing research topics that contribute to the Internet of Things (IoT). Sensing, actuation, microcontrollers, communication is become more advance and ubiquitous no a days. The vision of Smart devices, Smartphones, Smart cars, Smart homes, Smart cities—A smart world—have been espoused for many years. Achieving this goal became possible by many research communities like Internet of Things (IoT), mobile computing (MC), pervasive computing (PC), wireless sensor networks (WSNs) and most Recently, cyber-physical systems (CPS). Further, research in IoT, PC, MC, WSN, and CPS often relies on underlying technologies such as real-time computing, machine learning, security, privacy, signal processing, big data, and others. Consequently,the smart vision of the world involves much of computer science, computer engineering, and electrical engineering.

Many people [6] think that actuators and sensors are the new phase of smart city [9],[10]and smart world but these are nothing as compared to rapid development changes these devices adapting. There will be a point when the degree of development will be triple or quadruple than what we are today. For example, nowadays, many buildings already have sensors for attempting to save energy [5], [11]; home automation is occurring [3]; cars, taxis, and traffic lights have devices to try and improve safety and transportation [7]; people have smartphones with sensors for running many useful apps [2]; industrial plants are connecting to the Internet [1]; and healthcare services are relying on increased home sensing to support remote medicine and wellness [8]. However, all of these are just the tip of the iceberg. They are all still at early stages of development. The steady increasing density of sensing and the sophistication of the associated processing will make for a significant qualitative change in how we work and live. We will truly have systems-of-systems that synergistically interact to form totally new and unpredictable services.

MOTIVATIONS

The main reason for the motivation of the proposed system is to improve the quality of healthcare services during emergency medical services, by delivering biomedical readings information of patient at the point-of-care to doctors/ physicians is critical. Doctors need to keep track on the condition of the patient from time-to-time under such circumstances. This proposed system includes a healthcare monitoring system implemented by low cost hardware component as well as GUI platform. This proposed system covers a live monitoring system for hospital or nursing home for patients under critical conditions. This system support live transmission of patients' sensor readings to the doctor which can be accessed any-time from anywhere using a workstation/ Android device. We are motivated to use this system to improve the doctor-patient interaction.With this system we overcome the drawbacks that exist in delivering the emergency services to the patients. We developed this multi-purpose system with low cost hardware.

PLATFORM ORIENTED MOBILE HEALTH

Mobile Healthcare Management using Cloud Computing and Android OS

Mobile health's core objective is to bring access dramatically to health services through mobile phones and advance health care quality in poorer countries.While the use of Cloud brings the on time availability resources and management of distributed data. Mobile health applications effective in many ways like telemedicine, patient monitoring, location-based medical services, emergency response and management, personalized monitoring and pervasive access to healthcare information, providing great benefits to both patients and medical personnel .

Although mobile health have many challenging tasks like data storage and Management interoperability and availability of heterogeneous resources, security and privacy etc. The solution for above mentioned challenge is Cloud Computing. The cloud provides many effective services for mobile health care like accessing of shared resources and common infrastructure in ubiquitous and pervasive manner, demand over network etc.

The pervasive and ubiquitous access to patient's health care data is useful for proper diagnosis and treatment and giving a centralized platform. The several studies have showed that limited access to patient's data may bring harm and error in the diagnosis. Thus Cloud gives on demand network access so that one can easily share resources, data and meet the needs of the particular minimizing the efforts. The major characteristics of clouds are on-demand network access, resource pooling, and broad network access rapid elasticity. These characteristics help in many ways.

There are many free Cloud Computing platforms are available like iCloud [13], Dropbox [14] Amazon as but within developer access. Amazon S3 cloud i.e. Simple Storage Service [15] is well known for many commercial applications [16].

The main functionality of application is to provide interface between medical experts and patients and also storing, retrieving, querying patient health records and patient-related medical data like Biosignals. The data may reside at a distributed Cloud Storage facility, initially uploaded/stored by medical personnel through a Hospital Information System (HIS). In order to operate on wide variety of Cloud Computing infrastructures the communication and data exchange has to be performed through non-proprietary, open and interoperable communication standards. The Health Cloud provides following functionalities:

1. Seamless connection to Cloud Computing storage
2. Patients Health record management
3. Image viewing support (for e.g. Diacom image has JPEG2000 standard)
4. Proper user authentication and data encryption

The cloud platforms also provide service of handling and queuing user's request, managing account and billing issues. The health cloud application developed Google's Android mobile Operating System (OS) [12] using the appropriate software development kit (sdk). The platform is adaptable to larger and traditional Smartphone layouts and supports a variety of connectivity technologies (CDMA, EV-DO, UMTS, Bluetooth, and Wi-Fi). It supports a great variety of audio, video and still image format, making it suitable for displaying medical content. Finally, it supports native multi-touch technology, which allows better manipulation of medical images and generally increases the application's usability.

Advantages

1. Health happens when you're on the move whether it's for a physician, clinician or a patient.
2. Can improve patients' health condition by enabling the physicians to frequently keep track of their patients and improving the quality of healthcare.
3. MHealth has dramatically reduced the cost of visiting a nurse or a doctor with its services.
4. Helping in boosting social network availability for doctors to reach out and connect to people in different locations.

Disadvantages

1. Not all people use Smartphones or even a computer for contacting through Emails.
2. Another big disadvantage is the privacy of the patient's health information. Not all healthcare service providers can be trustworthy.
3. Security is also a bigger issue when there's a potential for anyone to tap the information of a mobile phone.
4. Perception towards mHealth may vary with doctors and patients with its cost effective use.

4G Health—The key in m-Health

The mobile phone has many advantages when deployed as a healthcare tool. First, even the simplest models can become powerful pieces of equipment: text messages and phone calls can deliver real-time, critical information quickly and easily, which means those living in remote areas can reduce unnecessary travel to health centers to consult with doctors and nurses. However, as mobile devices become increasingly sophisticated, they can be used to do more than simply transmit information and advice. Smartphone and broadband-enabled devices can become medical devices, used for monitoring vital signs and body functions or as videoconferencing equipment, facilitating remote consultations.

In addition, as people use their mobile and Smartphone to access an increasingly wide range of services—from interactive maps to weather forecasts—wellness and diet programs and exercise regimes can be added to the growing number of apps available at the touch of a button.

Meanwhile, healthcare communications requirements are increasing exponentially as more patients have their health data electronically recorded (facilitating the sharing of information between patients and healthcare providers), and as remote monitoring systems make it easier to manage conditions such as heart disease and diabetes.

In the process, the healthcare system is undergoing a cultural shift—from the traditional paternalistic approach, in which doctors talked and patients listened, to a more patient-centered approach in which individuals equipped with knowledge and information can play a much more active role in prevention and care.4G health brings many technological aspects and health care together by means of latest trends. The important technologies are IoT (Internet of Things) BAN (Body Area Network), 4G LTE (Long Term Evolution), wearable computers, Telemedicine, WiMAX and many more. The concept f mhealth was introduced in year 2004, since then it became very important in Telemedicine and ehealth bringing research and industry together worldwide. The main importance of mhealth is telemedicine i.e. practicing medicine at longer distance and bringing ehealth globally. M-health solutions must be suitably flexible to be integrating with current hospital technologies. This widespread and unprecedented evolution of m-health systems and services in recent years has been reflected in a 2010 study by McKinsey estimated that the opportunities in the global mobile healthcare market are worth between $50 billion and $60 billion in 2010[17].

Furthermore the introduction 4G brought one of the important breakthroughs for mhealth which brought new ideas and technologies to be compatible with latest hospital technologies. The 4G LTE has targeted on sensors, BAN, wearable computers which constitute the building blocks o f mhealth.4G mhealth is useful in future for curing from Largest killer diseases - malaria and AIDS. Other important key services of 4G mhealth identified are:

1) Education and awareness
2) Data Collection
3) Remote monitoring

4) Peer to Peer communication
5) Disease and epidemic outbreak tracking.
6) Diagnostic and treatment support

The building blocks f 4G mhealth further constitute about introduction of wireless networks and cellular systems, the developments of short-range communication with medical sensors, and Internet-of-Things (IoT) connectivity in addition to the future computing systems such as cloud computing

The 4G LTE will provide enhanced background for faster data access and retrieval, enhanced roaming capabilities, unified messaging, and broadband multimedia services will be built. The coexistence of the LTE with high-speed packet access, enhanced data rates for global evolution will provide more service choices for mobile healthcare services and applications. The other key mobile network technology that constitutes part of the 4G evolution is the World Wide Interoperability for Microwave Access (WiMAX) networks [18]. WiMAX aims, in general, to provide wireless broadband services on the scale of the metropolitan area network and is the commercialization of the IEEE 802.16 standard.

IoT is another key networking advances that links the internet with everyday sensors and working devices for an all IPV6 based architecture. Internet of Things (IoT) and Internet of Services (IoS) will have major impact on future implementation issues of 4G health systems. To reflect on this, a new concept that matches the functionalities of m-health and IoT for new and innovative future (4G health) applications has been recently proposed.

Advantages:
1. Low network maintenance
2. Remote monitoring in rural areas
3. Phones are always on, computers are not
4.Carrying a Phone/Tablet is part of a modern lifestyle 5.Using a small portable multi-communication computing device is convenient, economical, practical and personal

Disadvantages:
1) The development of the best applicable 4G health ecosystem.
2) Social medicine challenges.
3) Privacy and security issues.
4) Compatibility issues of future technologies beyond 4G. For e.g. 5G

Ubiquitous Healthcare Services using an Efficient Cloud Platform
The ubiquitous computing is the attempt to break away from the traditional desktop computing paradigm and move computational power into the environment that surrounds the user. Ubiquitous computing, or ubicomp, is the term given to the third era of modern computing. It is the method of enhancing computing use by Making many devices (services) available throughout the physical environment, but making them effectively invisible to the user.

Although Ubiquitous computing in health care services are getting more and more attention especially under the urgent demand of the global aging issue. Cloud computing holds the pervasive and on-demand service-oriented natures, which can fit the characteristics of healthcare services very well. However the capabilities in dealing with multimodal, heterogeneous, and nonstationary physiological signals to provide persistent personalized services, meanwhile keeping high concurrent online analysis for public, are challenges to the general Cloud. This paper describes about the private cloud architecture which involves six layers according to the specific requirements. The architecture utilized by message queue as a cloud engine and each layer thereby achieves relative independence by this loosely coupled means of communications with publish/subscribe architecture. Furthermore, a plug-in algorithm framework is also presented, and massive semi structure or unstructured medical data are accessed adaptively by this cloud architecture. As the testing results showing, this proposed cloud platform, with robust, stable, and efficient features, can satisfy high concurrent requests from ubiquitous healthcare services.

From the report of World Health Organization (WHO) the incidence of the suboptimal health status (SHS), which is also called “the third state” (between health and disease), accounts for 75% of the world population. Moreover, with the aging population growing,, we also have to take measures of elderly and/or chronically ill people in their home environment, information technology is regarded as an essential resource that can be deployed to improve the quality of life and enrich everyday life in old age. Therefore, to satisfy the demands of "SHS" groups and aging population, the healthcare system is proposed and becoming more and more popular, which can provide self-monitoring of healthy status, early warning of disease, and even an instant report of the physiological signal analysis for individuals. Till now such health monitoring systems are implemented with traditional management information system (MIS) mode, which could no longer meet all the requirements of the healthcare system. For instance, Leel et al. [19] propose a service-oriented architecture (SOA)-based system to integrate the data from a personal health device and customize services for users, but somewhat lack concurrency and persistent service capabilities; Kulkarni and Ozturk [20] developed a system named mPHASiS, which claims an end-to-end solution. However, it relies on the particular programming language, Java, which will result in less efficient of system due to the performance of Java virtual machine (JVM). Now a days , an emerging technology cloud computing can provide pervasive, economical, and on-demand services for customers. It can fulfill the flexibility and scalability of service-orientated systems, just like the healthcare system infrastructure should have, which is very different from the transaction-oriented MIS mode.

Cloud computing extended the many features of high-performance parallel computing, distributed computing, and grid computing, as well as the further development of these techniques to achieve location transparency to enhance the user experiences over the Internet. More and more applications are moved in cloud so that to service various application scenarios. Eventually the challenge is how to design a model with optional components to meet the needs of flexibility and scalability is one of the critical issue when constructing a cloud platform. For solution of such system this paper represented 6 layer deployment architecture and proposed a message queue (MQ) as cloud engine as well as fundamental cloud storage based on the open-source components, which can be obtained freely and timely from Internet communities. Also, a plug-in algorithm framework was developed with publish/ subscribe mechanism to implement this healthcare system for the community people. The detail feature of the publish/subscribe communication model can fulfill the needs of a health cloud platform in high concurrent performance.

The system is designed for hundreds of families residing in the city for health monitoring via Internet, and will support thousands of potential customers including physicians and whoever care about health of themselves in the near future. To achieve these higher concurrent transactions and shorter response time are the requirements of the system. The multimodal and nonstationary characteristics of special medical signals, such as electrocardiogram (ECG), photoplethysmograph (PPG), and electroencephalograph (EEG), are very trivial for storage and may lead to a synchronous problem on GlusterFS [21].So to store such semistructured or structured data and also non trivial health records are all adapted to NoSQL [22] databases instead of traditional relational ones.

The system will perform two main activities of users: upload the raw data and browse the results of diagnosis. Upload activities are divided into two steps: the first is to transmit physiological data, which are collected by sensors, to the gateway through short distance transmission by a wired USB or a wireless Bluetooth. The second is to deliver the data from the gateway to the cloud servers through IP networks. Set-top box (for USB) and mobile phone (for Bluetooth) play the important role of gateway to relay data, respectively. For this we have developed three type of interfaces to users including TV cable, Wi-Fi/Ethernet, and cellular networks (2G/3G). All of these forms are interacted with cloud servers via Internet at the end. Browsing the results on a TV or a mobile phone is very straightforward. As aforementioned, all of the physiological data should be collected in a distributed database cluster as the reservoir for data mining. Although the data may possibly be lost by accident (e.g., power failure) during operation, it must be restored from the databases in cloud. Therefore, to avoid a single point of failure, we utilize a primary/secondary scheme provided by a database to maintain enough replicas of data. Keep-alive mechanism is also adopted in this scheme and switch back and forth if the heart-beat signal is missing between primary ones and secondary ones.

Considering the application requirements and the data of the inconsistent format, we improved our previous work [23] and proposed a hybrid model which simplified the one derived from the National Institute of Standards and Technology (NIST) [24] and Jericho models [25]. Being everything can be treated as a service (XaaS) [26], we can also choose component as a service to take very efficient way to develop this specific private cloud architecture. The philosophy of this private healthcare cloud inherited the software as a service (SaaS) of the NIST model and introduced the insource/outsource concept into our cloud platform development. Outsource products include opensource components and commercial software, whereas the core data mining models are developed by ourselves as an insource product. The whole cloud platform comprised of several building blocks according to functionality requirements. The six-layer architecture of the healthcare cloud platform while each layer's content and function are interpreted as follows:

1) Service interaction is a top layer where users can interoperate with the terminals such as 3G mobile phone and set-top box, and browser on a computer, etc., to collect and upload original physiological data, as well as download the analysis results from the cloud servers.

2) Service presentation can be regarded as an interface with various kinds of services such as wireless application protocol (WAP), Web, image provider, etc. In addition, the node balancer also works on this layer, which can provide high concurrency capability. Some run-time information is also reserved at this level.

3) Session cache stores the user sessions on one hand, which maintains the authentication and certification status at the first time when the user accesses the services, i.e., service interaction through the presentation layer. On the other hand, memory cache is adopted to expedite the result data access. In fact, this session's architecture is a big hashed key/value table.

4) Cloud engine is a dispatcher to cooperate the components with each other to make the cloud running by using message-driven mode via MQ. The functionalities of the management for the queue are provided by this layer, which is regarded as a critical core for scheduling tasks.

5) Medical data mining is clusters of algorithms, including data preprocessing, data analysis, mining algorithms, and visualization processing. This layer can handle the data transmitted from the front end and generate the results back to database. Other algorithms can also be easily plugged in if needed.

6) Cloud storage provides data resources for the entire health cloud platform, including user information, vital signs, health records, and graphic data for processing. Physiological data collected from body area networks and massive graphic data for distributed processing of such data-intensive tasks are the primary contents. Using the *distributed file storage* system, like Hadoop Distributed File System [27] with semi structural database, can provide more extensible and efficient access. Moreover, sharding [22] is another major characteristic of this distributed database to gain higher availability. Redundancy among these pieces of shards and different views of the same data provide the consistency to a large extent. This mechanism can guarantee the integration of global data and transparency to users. There are two key components addressed here: the first one is MQ, which is a kind of component that provides asynchronous communication protocol to achieve the independence between message sender and receiver. The second one is the plug-in algorithm framework developed with respect to the extendibility of various services, which is based on the publish/subscribe mechanism to provide customized functions conveniently, not only for healthcare but also for other services.

Choosing IoT for Mobile Healthcare

IoT will not be seen as individual systems, but as a critical, integrated infrastructure upon which many applications and services can run. Some applications will be personalized such as digitizing daily life activities, others will be city-wide such as efficient, delay-free transportation, and others will be worldwide such as global delivery systems. In cities, perhaps there will be no traffic lights and even 3-D transportation vehicles. Smart buildings will not only control energy or security, but integrate personal comfort, energy savings, security, and health and wellness aspects into convenient and effective spaces. Individuals may have patches of bionic skin with sensing of physiological parameters being transmitted to the cloud which houses his/her digital health, and to the surrounding smart spaces for improved comfort, health, efficiency, and safety. In fact, smart watches, phones, body nodes, and clothes will act as personalized input to optimize city-wide services benefiting both the individual and society. Consequently, we will often (perhaps 24/7) be implicitly linked into the new utility. Some examples of new services include immediate and continuous access to the right information for the task at hand, be it, traveling to work or a meeting, exercising, shopping, socializing, or visiting a doctor. Sometimes these activities will be virtual activities, or even include the use of avatars or robots. Many outputs and displays for users may be holographic. Credit cards should disappear and biometrics such as voice or retinas will provide safe access to buildings, ATMs, and transportation systems.

To achieve the above envisioned scale in IoT requires many spectrum of research. There are total 8 significant research along many directions. The following are the 8 research directions:

1. Massive Scaling:

The current trajectory of the numbers of smart devices being deployed implies that eventually trillions of things will be on the Internet. How to name, authenticate access, maintain, protect, use, and support such a large scale of things

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are major problems. Will IPv6 suffice? Will protocols such as 6LowPAN play a role? Will entirely new standards and protocols emerge? Since many of the things on the Internet will require their own energy source, will energy scavenging and enormously low-power circuits eliminate the need for batteries? How will the massive amounts of data be collected, used, and stored? What longitudinal studies will be performed? How will the real-time and reliability aspects be supported [9], [34]? How will devices including mobile devices be discovered? Will the emergence of a utility model, if it occurs, mean entirely new standards? How will such a utility be achieved? It is unlikely that any solution immediately becomes the norm. Many protocols and variations will coexist. What will be the architectural model that can support the expected heterogeneity of devices and applications?

2. Architecture and Dependencies

As trillions of things (objects) are connected to the Internet, it is necessary to have an adequate architecture that permits easy connectivity, control, communications, and useful applications.

3. Creating Knowledge and Big Data

In an IoT world, there exists a vast amount of raw data being continuously collected. It will be necessary to develop techniques that convert this raw data into usable knowledge.

4. Robustness

If our vision is correct, many IoT applications will be based on a deployed sensing, actuation, and communication platform (connecting a network of things). In these deployments, it is common for the devices to know their locations, have synchronized clocks, know their neighbor devices when cooperating, and have a Coherent set of parameter settings such as consistent sleep/ wake-up schedules, appropriate power levels for communication, and pair-wise security keys.

5. Openness

Traditionally, the majority of sensor-based systems have been closed systems. For example, cars, airplanes, and ships have had networked sensor systems that operate largely within that vehicle. However, these systems' capabilities are expanding rapidly. Cars are automatically transmitting maintenance information and airplanes are sending real-time jet engine information to manufacturers. There is or will be even greater cooperation and 2-way control on a wide scale: cars (and aircraft) talking to each other and controlling each other to avoid collisions, humans exchanging data automatically when they meet and this possibly affecting their next actions, and physiological data uploaded to Doctors in real-time with real-time feedback from the doctor. These systems require openness to achieve these benefits.

6. Security:

A fundamental problem that is pervasive in the Internet nowadays that must be solved is dealing with security attacks [33], [35]. Security attacks are problematic for the IoT because of the minimal capacity "things" (devices) being used, the physical accessibility to sensors, actuators, and objects, and the openness of the systems, including the fact that most devices will communicate wirelessly. The security problem is further exacerbated because transient and permanent random failures are commonplace and failures are vulnerabilities that can be exploited by attackers

7. Privacy

The ubiquity and interactions involved in IoT will provide many conveniences and useful services for individuals, but also create many opportunities to violate privacy. To solve the privacy problem created by IoT applications of the future, the privacy policies for each (system) domain must be specified.

8. Humans in the Loop

As IoT applications proliferate, they will become more sophisticated. Many of these new applications will intimately involve humans, i.e., humans and things will operate synergistically. Human in-the-loop systems offer exciting opportunities to a broad range of applications including energy management [32], health care [30], and automobile systems [7], [31]. For example, it is hypothesized that explicitly incorporating human-in-the loop models for driving can improve safety, and using models of activities of daily living in home health care can improve medical conditions of the elderly and keep them safe.

RFID Technology IoT and Healthcare in Smart Spaces

The survey on the state-of the-art of RFID for application to body centric systems and for gathering information (temperature, humidity, and other gases) about the user's living environment. The current evolution of health care can be boosted by Internet of Things(IoT) which involves sensors and actuators, wearable computers, microcontrollers(environmental and implanted) spread inside domestic environments with the purpose to monitor the user's health and activate remote assistance. RF identification (RFID) technology is no grown enough to provide part of the IoT physical layer for the personal healthcare in smart environments through low-cost, energy-autonomous, and disposable sensors.

The rapid growth in population and development in technology, with a prevalence of chronic diseases, trigger a careful thinking on the role and modes of providing care to people in order to ensure a decent quality of life, without imposing traumatic changes of habits and domestic environment. Thus remote monitoring is become essential tool to implement social policies over the long term. In this way the ability to pervasively, discreetly, and generally uncooperatively diagnosis the health conditions and the human interactions with the environment is the first step to provide all the information required to adapt . potential to put in place personal Smart-Health systems hosting new interconnections between the natural habitat of the person, his body, and the Internet at the purpose to produce and manage "participatory "medical knowledge. By displacing wireless sensors inside the home, on clothes and personal items, it becomes possible to monitor, in a way that preserves the privacy, the macroscopic behavior of the *person as well as to* compile statistics, to identify precursors of dangerous behavioral anomalies, and finally to activate alarms or prompt for remote actions by appropriate assistance procedures. Amongst the various technologies the RF identification (RFID) systems may represent a strategic enabling component with battery less tags and their low cost is compatible with a widespread distribution and disposable applications. A Passive RFID system is made up *o*f a digital device called tag, embedding an antenna and an IC-chip with unique identification code (ID), and a radio scanner device, called reader. Despite the RFID technology is currently mostly applied to logistics of goods, the very recent research is exploring other paths with the common goal of extracting physical information about tagged objects and nearby environment through low-level processing of electromagnetic signals received and backscattered by the tags. RFID systems could, therefore, permit to implement, in a simple and efficient way, the last few meters of the IoT concerning the pervasive quantification of the person's interaction with the environment.

CONCLUSION

The sharing of medical information resources (electronic health data and corresponding processing applications) is a key factor playing an important role towards the successful adoption of pervasive or mobile healthcare systems. The goal is to provide a survey that will reflect the spectrum of the recent advances in m-health technologies and the role of the emerging mobile and network technologies in m-health systems and applications. one vision of the future is that IoT becomes a utility with increased sophistication in sensing, actuation, communications, control, and in creating knowledge from vast amounts of data. This will result in qualitatively different lifestyles from today.

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