

Applications of Internet of Things in Health Care: A Survey Study

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Abstract— This paper focuses on the applications of Internet of Things (IoTs) in medical field followed by health care. Health care is sector in medical science where various specialized doctors care patients. As technology updates day by day, health care is to be managed by internet-based technology and patients are loved to take advantages by those doctors at anywhere and at any time. By this IoT technology, surviving life of patients will be increased and now a days cloud becomes an important part of life for anybody. Therefore, cloud plays a role to deal with sharing details immediately on the moments. The work is also described with architecture and services of IoT in terms of health care. Conclusive work is carried out by the application-oriented tasks.

Keywords- IoT; Health Care; Medical; Patient; Services

I. INTRODUCTION

The web of things has various applications in medicinal services, from remote checking to brilliant sensors and therapeutic gadget coordination. It can possibly keep patients protected and solid, as well as to enhance how doctors convey mind too. Human services IoT can likewise support tolerant engagement and fulfillment by enabling patients to invest more energy collaborating with their specialists. The Internet of Things (IoT) makes keen protests a definitive building hinders in the improvement of digital physical shrewd inescapable systems. The IoT has an assortment of use areas, including medicinal services. The IoT insurgency is overhauling current medicinal services with promising mechanical, financial, and social prospects [1].

The IoT can possibly offer ascent to numerous restorative applications, for example, remote wellbeing observing, work out schedules, unending sicknesses, and elderly care. Consistence with treatment and prescription at home and by social insurance suppliers is another imperative potential application. In this way, different therapeutic gadgets, sensors, and analytic and imaging gadgets can be seen as well informed gadgets or articles constituting a centerpiece of the IoT. IoT-based social insurance administrations are relied upon to lessen costs, increment the personal satisfaction, and enhance the client's involvement. From the point of view of medicinal services suppliers, the IoT can possibly lessen gadget downtime through remote arrangement. What's more, the IoT can effectively recognize ideal circumstances for recharging supplies for different gadgets for their smooth and constant task. Further, the IoT accommodates the productive booking of constrained assets by guaranteeing their best utilize and administration of more patients. [2]

II. LITERATURE SURVEY

The paper [2] studies progresses in IoT-based medicinal services advances and surveys the best in class organize structures/stages, applications, and modern patterns in IoT-based human services arrangements. What's more, this paper investigates particular IoT security and protection highlights, including security prerequisites, danger models, and assault

scientific categorizations from the medicinal services point of view. Further, this paper proposes a shrewd collective security model to limit security chance; talks about how unique advancements, for example, huge information, surrounding knowledge, and wearables can be utilized in a medicinal services setting; addresses different IoT and eHealth arrangements and directions over the world to decide how they can encourage economies and social orders as far as feasible improvement; and gives a few roads to future research on IoT-construct human services situated in light of an arrangement of open issues and difficulties.

Author [3] proposed that energizing new uses of Internet of Things (IoT) innovation are emerging, especially in human services, where the utilizing impacts can altogether enhance patients' prosperity while easing the issue of rare assets. Nevertheless, the buildup around these applications far outpaces the truth. Besides, there is a genuine hazard that these utilizing innovations will disassociate parental figures from patients, conceivably bringing about lost minding. In this article, the writers survey probably the most encouraging applications for IoT in social insurance and the huge difficulties ahead.

This work [4] outlines the plan and execution of a shrewd wellbeing-checking framework. Here, a patient can be checked utilizing an accumulation of lightweight wearable sensor hubs for ongoing detecting and examination of different key parameters of patients. The gadgets consistently accumulate and share the data with each other and store the data, making it conceivable to gather record and break down information. Accordingly, patients will have top-notch administrations in light of the fact that the framework bolsters medicinal staff by giving the continuous information gathering, by wiping out the manual information accumulation and by empowering the checking of tremendous quantities of patients.

III. VARIOUS APPLICATIONS OF IOT IN HEALTHCARE

A. Remote health monitoring and telehealth

It involves costs, it involves recovering the patient to his 'typical condition' and it is restricted to lessen the workload of

social insurance laborers who in numerous nations and numerous periods just cannot adapt. In a few nations the absence of subsidizing and, therefore, lack of social insurance laborers, particularly in and after seasons where more sicknesses strike, is a repeating yearly calamity. Remote wellbeing observing, which is clearly extremely conceivable on account of the Internet of Things, additionally in part tackles the ascent of perpetual sicknesses, among others because of a maturing populace (however not only that). Remote wellbeing observing is additionally perfect when patients live in remote territories. There is a wide scope of (specific) wearables and biosensors, alongside other restorative gadgets, accessible today that empowers remote wellbeing observing. Remote wellbeing checking additionally offers medicinal services collaborates the likelihood to recognize designs, utilizing the information originating from these wearables and different gadgets. This empowers new bits of knowledge and perceptions of examples as the blend of (huge) information, investigation, IoT et cetera has a tendency to do. It is one motivation behind why the ranges of abilities of, for instance, healing center staff, are evolving. By and by, as spending plans in social insurance are confining, this could prompt worries from a human care point of view

B. The Internet of Healthcare Things and the dual role of wearables

Envision the potential outcomes of a genuine Internet of Healthcare Things (a few people talk about the Internet of Medical Things or IoMT to portray this reality of the association of wellbeing related gadgets and gear; others call it the restorative Internet of Things or mIoT). Notwithstanding how you call it, it has clear that associating all gadgets, applications; et cetera opens up another universe of chances, as the Internet of Things when all is said in done does. The Internet of Healthcare Things incorporates the gadgets and associated resources (and their utilization cases) which we specified before, for example, everything that is required for remote wellbeing checking, X-beams and imaging gadgets, the rundown goes on. One might say, the Internet of Medical Things is now here – and has been for quite a while. In any case, in the event that you truly need to take a gander at it from a comprehensive point of view, it is a long way from here and abundant difficulties should be handled: wellbeing gadget interoperability, coordinated frameworks associating patients and medicinal services laborers, secure guidelines, RTHS incorporation et cetera.

C. Internet of Things meets robotics in healthcare

Among the numerous robots that are as of now being used today there are notable cases of therapeutic robots in surgery (accuracy surgery or separation surgery), robots that are utilized for restoration and doctor's facility robots, for example, Panasonic's HOSPI that, among others, deals with conveyances (solution, drinks, and so on.). By 2019, there will be a 50 percent expansion in the utilization of such robots who do assignments, for example, prescription conveyance, sustenance conveyance and conveyance of provisions mostly. At the end of the day: dealing with rather routine assignments, arranging for (human) assets.

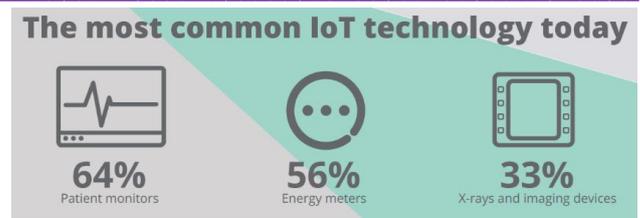


Figure 1. The most Common IoT Technology today

A few firms have made records, in view of freely accessible client examples of overcoming adversity and different sources, and offer these rundowns so you can investigate the cases, for example, IoT Analytics (venture IoT ventures). Examiner firms and think tanks likewise regularly specify cases of genuine Internet of Things applications. There are a couple of locales that empower you to peruse and download cases upon enlistment, for example, this one we discovered (it isn't IoT crosswise over ventures however; it is just about the Industrial Internet with M2M and a few different advancements).

IV. BENEFITS OF IOT IN HEALTHCARE

Across a range of use cases, there is a number of benefits to using IoT in healthcare, such as:

A. Higher patient engagement

The IoT makes it easier for patients to play an active role in their healthcare journey. Not only are the devices evolving to better meet the needs of remote monitoring (smaller form factors, lighter weight, etc.), but the way patients access data is changing as well. Patients can now use apps and software to access their own health data and see their progress and the impact of the healthcare program on their well-being.

B. Better patient outcomes

With the IoT, caregivers have access to real-time patient information that enables them to make informed decisions and therefore deliver better outcomes. When a healthcare provider can make diagnosis based on evidence — in real time — everyone wins. The bonus: Patients that can be monitored remotely can avoid doctors' visits, hospital stays and re-admissions.

C. A decrease in errors

When data is collected and transmitted automatically via automated workflows, error rates drop compared with manual collection and reporting.

D. An enhanced patient experience

Healthcare is all about the patient, so the needs of the patient should always come first. The IoT helps improve that experience by providing timely intervention and diagnosis, improved accuracy, proactive treatments, and better treatment outcomes.

Yet, the IoT can be complicated, especially in healthcare, where security and privacy concerns are right up there with the

desire to create better patient outcomes. The types of remote monitoring scenarios described earlier put a spotlight on the security of the data being collected and transmitted. Security needs to be an end-to-end priority, from the device, across the network and to the receiving end. Many healthcare organizations choose to focus on their core competencies — patient care — and look to third-party managed IoT services providers to deliver optimal IoT experiences that are the right fit and at the right cost for healthcare practitioners and patients.

A managed IoT services provider can look holistically at a healthcare organization and determine the best path forward, from device management to connectivity to network management to deployment and logistics. Through this end-to-end approach, security is a priority across devices and networks. The result: Not only are patients seeing better outcomes, but also the healthcare organizations are seeing improvement in business agility, reduced cost and risk, and increased security.

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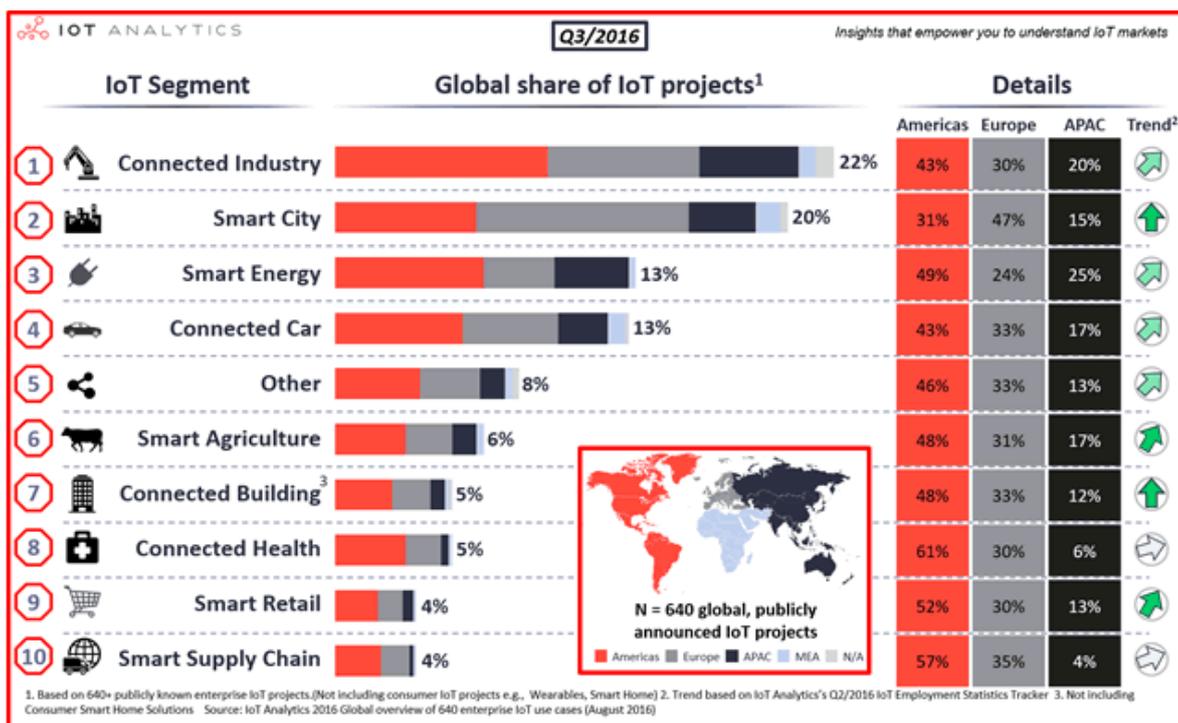


Figure 2. Global Share of IoT projects