**Abstract**

The Internet of Things (IoT) is a hot issue with significant technical, social, and economic implications especially as the world's population is growing , the number of health-related issues is on it’s peak .This has lead to necessitating the integration of our healthcare system, which is much more faster than the human way of doing things. It can meet the needs of today's massive population. In this study, we will explore methods of speeding up our healthcare system by modifying the healthcare industry's system and connecting it with the internet using network connectivity methods and various components of notworking. Integration of the healthcare industries improves the accuracy of reports, saves time, is more reliable, and improves communication among all levels of the healthcare system. It can makes a contribution by outlining ways to enable worldwide connectivity between the Internet of Things (IoT) and medical contexts. The necessity to integrate everyone in a global environment presents a serious challenge to everyone. From the smallest sensor to the massive amounts of data collected, this transformation is redefining the way we think about healthcare.

**Chapter 1: Introduction**

Life now would be impossible without technology. Modern technology makes life easier. The vast majority of people, particularly those working in the healthcare industry, make extensive use of current technologies to improve healthcare.

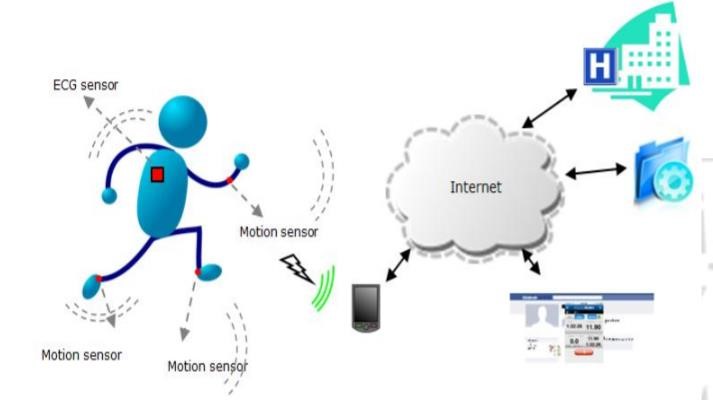
In recent years, the growth of the Internet of Things (IoT) has led in a paradigm change in all aspects of human-machine interaction. IoT has found wide acceptance in a variety of industries, including manufacturing, healthcare, governance, and infrastructure management, as well as consumer services and defence. The adoption of IoT in the manufacturing and consumer products industries has ushered in the fourth industrial revolution, also known as Industry 4.0. Medicine 4.0, also known as Health 2.0, refers to the integration of IoT in the healthcare sector. Health 2.0 is a continuation of the era that saw an exponential uptake of diagnostic tools in the healthcare industries. Health 2.0 marks a change toward continuous patient monitoring, which aids in the early detection of illnesses and the execution of a proactive treatment strategy. The Internet of Things for medical applications is also known as the Healthcare Internet of Things (H IoT)

The Internet of Things has the potential to change healthcare from cure to prevention and give people more influence over decisions that affect their well-being. As a result, these technologies have the potential to integrate care delivery, enhance clinical outcomes, and result in significant cost savings for patients. Telehealth — the delivery of remote health-related services – is becoming more possible as connected smart devices increase.

**1.1 statement of the problem.**

**1.1.1. Internet of things (IoT) and smart healthcare:**

The current revolution in internet, mobile, and machine-to-machine (M2M) technologies is the first wave of the Internet of Things (IoT). The Internet of Things (IoT) is expected to bridge varied technologies in the next years to enable new applications by connecting physical items in support of intelligent decision making. Smart healthcare plays an important role in healthcare applications by embedding sensors and actuators in patients and their medicines for monitoring and tracking. The Internet of Things (IoT) is utilized in clinical care to monitor patients' physiological conditions via sensors by obtaining and evaluating their data and then remotely sending processed patient data to processing centers to take appropriate measures. Not only are wearable devices with sensors important for patients, but they are also valuable for ordinary people to monitor their health status. [Fernandez, F., & Pallis, G. ,2014].



**Figure 1. integration of IOT in healthcare B.[ Sobhan Babu.et al,2016]**

Smart healthcare plays an important role in healthcare applications by embedding sensors and actuators in patients and their medications for monitoring and tracking. The Internet of Things (IoT) is utilized in clinical care to monitor patients' physiological statuses through sensors by collecting and analysing their data and then remotely sending processed patient data to processing centres to take appropriate measures. [Fernandez, F., & Pallis, G. ,2014].

**1.1.1.1 Internet of things (IoT):**

The Internet of Things (IoT) is an excellent new technology that has the potential to influence the internet and communication technologies. Simply said, the Internet of Things connects living and nonliving things over the internet. Traditionally, under the object-oriented paradigm, everything in the world is considered an object; however, in the IoT paradigm, everything in the world is considered a smart object, allowing them to communicate with one another physically or virtually via internet technologies. . IoT allows people and things to be connected Anytime, Anyplace, with anything and anyone, by using ideally in any path/network and any service. Every day modern people expect new devices and new technology to simplify their day to day life. The innovators and researchers are always trying to find new things to satisfy the people, but the process is still infinite.

Today, organizations, and consumers are using IoT and Big Data to create new business models, improve service delivery, increase manufacturing efficiency, and promote wellbeing and human welfare. As with many other technologies, suppliers, implementers, operators, policymakers, and regulators strive to maximize deployment benefits while limiting potential security and privacy issues. There are many different meanings of the Internet of Things. The International Telecommunication Union (ITU) defines the Internet of Items (IoT) as a global infrastructure for the information society that enables improved services by interconnecting (physical and virtual) things using existing and evolving communication technologies.

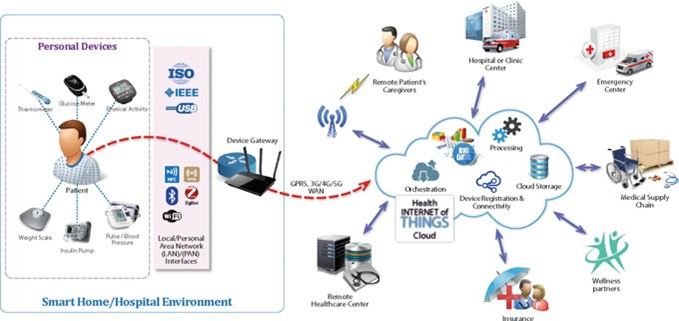
**1.1.1.2 features of generic IoT and Healthcare-IoT**

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| --- | --- | --- |
|  | **Generic IoT** | **H-IoT** |
| 1 | It is generally spread across a wide region and serves a specific purpose. | Generally used in a restricted or tiny geographical region, such as inside and around the human body or in a healthcare facility. |
| 2 | Solar and wind energy are examples of energy sources. In the case of stationary nodes, the nodes may be continually powered. | Heat, stress, and motion can all be used by H-IoT nodes to capture energy from the human body. |
| 3 | Environment monitoring, utilised in defence applications, and industrial monitoring | Used to keep track of the vital signs of the human body. |
| 4 | Smaller nodes are preferred, although node sizes vary depending on the environment and application. | The nodes have been shrunk in order to be unnoticeable. |
| 5 | These are typically stationary. | Essentially mobile in terms of the human body. |
| 6 | Sensor deployment is rather simple. | Deployment is tough, especially when it comes to implants, which almost always necessitate surgery. |
| 7 | The integrity of the data is attempted to be maintained. Errors are accounted for by redundancy. | The data must be kept and sent with the highest care. |

**Table 1 generic IOT and characteristic features h-IOT**

**1.1.1.3 Smart healthcare:**

E-health, because of the Internet's growth, has become an integral term that represents a means of enhancing health services access, efficiency, and quality through the application of ICTs to health. Nowadays, e-health as a means of achieving healthcare reform is one of the primary needs of many academic institutions, professional organizations, and funding agencies. There are numerous types of e-health that are now in use. . [ Maksimović et al,2017]



**Figure 2 depicts the architecture of an IoT-based e-health system. [ Maksimović et al,2017]**

**1.1.1.4 There are different types of e-health that are now in use.**

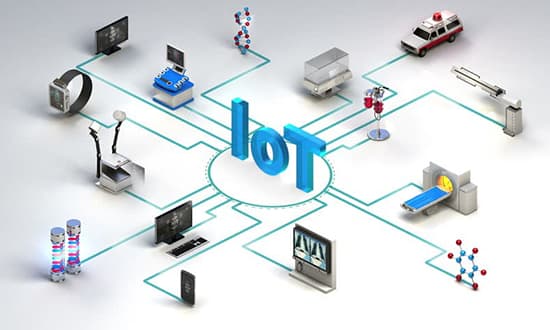
1. Electronic Health Record (EHR)—an electronic version of a full report on the patient's general health that makes all information available to authorized users instantaneously and securely.
2. Electronic Medical Record (EMR)—a digital report containing all of a patient's medical history from a single procedure.
3. Personal Health Record (PHR)—a health record in which the patient stores his health-related information in a private, secure, and confidential setting.
4. e-appointments—an online service that makes arranging an appointment with any health institution quick and straightforward, while also lowering wait time
5. m-health (mobile health)—a broad term that refers to health practices made possible by mobile devices and other wireless technology.
6. Telemedicine—the remote delivery of healthcare information and services via ICT.
7. Telehealth—the delivery of health-related services and information using ICTs
8. Internet-based technology and services
9. e-prescribing—a technological framework that enables for the electronic and direct transmission of prescriptions from the healthcare institution to the pharmacy.

[ Maksimović et al,2017]

**1.2 importance of the study.**

**1.2.1 Importance of Smart healthcare:**

An IoT healthcare facility can be considered as a collection of ubiquitous computing devices that mostly deal with external operations. IoT-based healthcare systems collect a range of patient data and receive input from doctors and medical professionals in the field of healthcare. The best example is continuous glucose monitoring for insulin pens.[ https://www.intellectsoft.net/blog/iot-in-healthcare/]



**Figure 3 .Uses of IOT in healthcare. [http://www.vervetronics.com/wp-content/uploads/2019/02/medical\_intro.jpg]**

All of these devices are capable of communicating with one another and taking critical actions that could save someone's life. After collecting the information, an IoT healthcare device would send it to the cloud so that clinicians could act on it.

Examples of IoT in Healthcare

How can the Internet of Things be used effectively in healthcare? Let's take a look at three real-world Internet of Things healthcare cases.

1. In emergency situations, such as from the ambulance or even at home, sensing and uploading up-to-date patient information to the cloud.
2. Medical gadgets that can self-maintain themselves. IoT healthcare devices will be able to detect low thresholds, sense their own components, and interact with physicians and manufacturers.
3. IoT and wearables can allow home - based care patients and the elderly communicate with healthcare providers directly.

As a result, we may conclude that the prospective application of IoT in healthcare can improve not only a patient's health but also the productivity of health-care workers and hospital procedures.[ https://www.intellectsoft.net/blog/iot-in-healthcare/]

**1.3 objective of the study :**

**1.3.1 Role of IoT in Healthcare**

Healthcare problems have led to additional standards for healthcare providers in order to properly deliver high-quality care. IoT meets the new standards by enabling real-time monitoring, giving a more mature and effective solution for collecting medical data, and tracking the actions of patients and employees .such as ,

1. Improve your awareness of the patient's medical state through a number of "phases" and complex treatment requirements.
2. Modern effective treatments and healthcare delivery system design are at the heart of an advanced health system.
3. A clinical information system is being developed to aid in decision making.
4. A multidisciplinary team creates a well-structured continuous care programme.

IoT in healthcare is beneficial at several stages of the patient-healthcare-system relationship. The first phase begins when the patient calls the hospital to schedule an appointment or goes directly to the hospital in case of an emergency. [ https://www.finoit.com/blog/the-role-of-iot-in-healthcare-space/]

**1.3.2 Benefits of IoT in the healthcare sector:**



**Figure 4.Overview of Fitness Tracking Figure 5. Broad Categories of H-IoT**

**[a. f. santamaría, p. Raimondo ,et al,2016 ] [a. f. santamaría, p. Raimondo , et al,2016 ]**

**1.3.2.1. Health Monitoring:**

Smart devices can monitor a person's health. If a patient suffers an asthma attack, heart failure, or another medical concern, IoT apps for healthcare can transmit an emergency signal. Apple Watch, for example, includes a Fall Detection System. If the user falls, it recognizes this and displays an alert. For one minute, the person must tap "I'm OK." In another instance, the Apple Watch contacts emergency agencies. They also notify those who have been designated as emergency contacts. [ <https://www.cleveroad.com/blog/iot-in-healthcare>,]

**1.3.2.2 Better Patient Experience:**

IoT in hospitals enhances the healthcare system by providing patients with a more pleasant way to communicate with doctors. It leads to a better patient experience and increased client loyalty. [https://www.cleveroad.com/blog/iot-in-healthcare,]

**1.3.2.3 Better drug management:**

it is one of the Internet of Things healthcare benefits. Controlling the amount of medicine taken is possible thanks to IoT technology. Doctors can keep track of the dose and the efficiency of the medication. In addition, the Internet of Things enables patients to receive reminders when it is time to take their medications. When a patient fails to take a medication on time, it is possible in some situations to notify a family member. [ https://www.cleveroad.com/blog/iot-in-healthcare,]

**1.3.2.4 Healthcare Automation:**

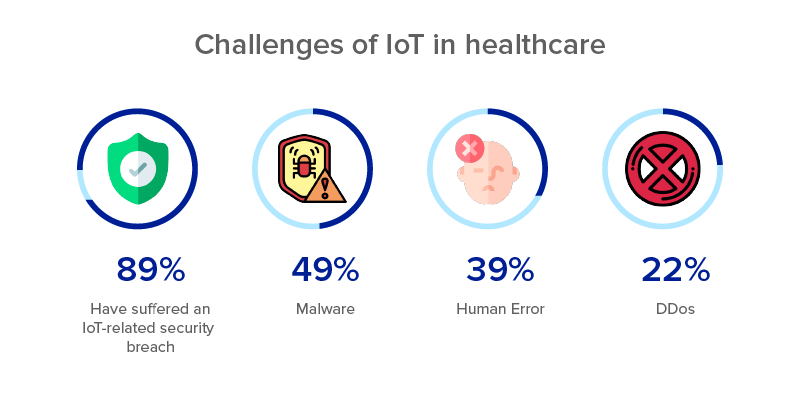
Internet of Things (IoT) devices can assist in automating administrative, manual, and routine tasks. Internet of Things medical applications can evaluate a large quantity of data and generate 20 different metrics to detect changes in patients' health problems. Data collection techniques that are automated can reduce the frequency of errors in diagnosis [https://www.cleveroad.com/blog/iot-in-healthcare,].

**1.3.2.5 Preventive Medicine:**

Many people die as a result of chronic conditions such as heart disease, diabetes, and others. It is feasible to provide patients with more individualised types of therapy and care by utilising the analytic capabilities of IoT [https://www.cleveroad.com/blog/iot-in-healthcare, ]

**1.4 Limitations of the study :**

**1.4.1.Limitation of IOT in healthcare**



**Figure 6 challenges of IOT in healthcare . [https://appinventiv.com/blog/wp-content/uploads/2019/02/Challenges-of-IoT-in-healthcare.png]**

Although IoT in healthcare has many great benefits, there are some problems that must be addressed. Without addressing these obstacles, Internet of Things Healthcare solutions cannot be considered for implementation.[ https://www.intellectsoft.net/blog/iot-in-healthcare/]

**1.4.1.1 The existing software infrastructure is out of date.**

Many hospitals' IT infrastructures are out of date. They will prevent appropriate IoT device integration. As a result, healthcare facilities will need to reform their IT procedures and implement newer, more modern technologies. They will also need to utilize virtualization (technology such as SDN and NFV), as well as ultra-fast wireless and mobile networks such as Advanced LTE or 5G.[ https://www.intellectsoft.net/blog/iot-in-healthcare/]

**1.4.1.2. The attack surface will grow as a result of IoT devices.**

IoT healthcare provides tremendous benefits to the sector, but it also introduces significant security flaws. Hackers could gain access to medical devices connected to the Internet and steal or manipulate the data. They can also go a step further and attack IoT devices with the infamous Ransomware virus, infecting an entire hospital network. That implies the hackers will take hostage patients as well as their heart-rate monitors, blood pressure readings, and brain scanners.[ https://www.intellectsoft.net/blog/iot-in-healthcare/]

**1.4.1.3. Massive amounts of created data are utilized for this purpose.**

Thousands of devices in a single healthcare institution, plus a thousand more data content from remote locations — all in real-time — will generate massive amounts of data. The data generated by IoT in healthcare will almost definitely increase storage requirements from Terabytes to Petabytes. AI-driven algorithms and the cloud, when used correctly, can help make sense of and organize enormous data, but this method will take time to evolve. As a result, developing a large-scale IoT healthcare solution will take a significant amount of time and work.[ <https://www.intellectsoft.net/blog/iot-in-healthcare/>]

**Chapter 2: Literature Review**

Summary of the h-IoT use-cases and their architectures, through this table here it’s summaries that how IoT is being use to integrate our health care system by adding it with IoT for the treatment of different diseases and for monitoring the patients health report.

**TABLE 2 summary of the use-cases and their architectures in H-IoT**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **s.no** | **Name of Reference paper** | **H-IoT application** | **Device use to monitor** | **Use Case for IOT** | **Underlying Technology** | **advantages** | **disadvantages** |
| 1 | The internet of things in healthcare: An overview [YIN, Yuehong.et al,2016 ] | A three-tiered design is used to build an IoT-based rehabilitation system. | -Networking devices  Storage devices | Assistive Healthcare System | Rehabilitation with big data | Beneficial for the people who is suffering from chronic diseases ,older people and people with disabilities. | exceedingly expensive, and there is a shortage of public funding |
| 9 7 | Effective Ways to Use Internet of Things in the Field of Medical and Smart Health Care  [ Ullah, Kaleem et al , 2016] | Patient health data management using a four-layer architecture | -Networking devices  Application layer | Assistive Healthcare System | Machine learning for alert creation | -better health outcomes.  -better engagement of patient .  - | -risk of data modifications.  - unauthorised access to data. |
| 10 8 | The IoT Architectural Framework, Design Issues and Application Domains [ Gardašević, Gordana et al ,2017] | IoT architecture standards for a variety of domains | -Networking devices  -sensors | IoT Messaging Protocol | Network layer protocols are being evaluated. | -improve the resource utilization and minimize the efforts of human | Create complexity and may create privacy and security issue |
| 11 9 | Early prediction of Cardiovascular Diseases using ECG signal: Review [ Kamaruddin, Nurul Hikmah et al,2012] | Machine learning is being used to detect CVDs. | -Electroencephalogram (EEG)  -sensor  -Networking devices | Cardio Vascular Diseases | Arrhythmia detection with machine learning | - There is no requirement for human intervention. | a lack of ability to classify an arrhythmic event |
| 12 10 | An IoT Framework for Healthcare Monitoring Systems [ Dharmik, R. C. Gotarkar et al,2021] | Cloud-based IoT Framework for a health monitoring system | Electroencephalogram (EEG)  -sensor | Cardio Vascular Diseases | Alert services in the cloud  generation | - Monitoring through the internet  - Treatment management has improved. | - The possibility of failure  - Confidentiality and security |
| 13 11 | Federated Internet of Things and Cloud Computing Pervasive Patient Health Monitoring System[ Abawajy , Jemal H.  Hassan, et al,2017] | For patients with congestive heart failure, a cloud-based IoT-based pervasive patient health monitoring system is being developed. | Electroencephalogram (EEG)  -sensor | Cardio Vascular Diseases | Classification of ECGs using ML | Monitoring through the internet improve the accuracy rate. | High maintenance , require high skilled worker and may be costly. |
| 14 12 | IOT Based Epilepsy Monitoring using Accelerometer sensor [ Jagtap, Pranjal T.  Bhosale ,Nilesh P, 2017] | Temperature, motion, and sound sensors are used in an IoT-based epileptic seizure detection system. | Sensor  Networking devices | Neurological Disorders | EEG classification databases are available online. | Taking care of patients health will become much easier than earlier. | unauthorized access can happens in patient health data from public or internet users |
| 15 13 | Patient-Aware EEG-Based Feature and Classifier Selection for e-Health Epileptic Seizure Prediction [ Nassralla, Mohammad  Haidar et al,2018] | Patient-aware epileptic seizure detection and classification using spatiotemporal features | Electroencephalogram (EEG)  -sensor | Neurological Disorders | Classification of EEG with ML | Monitoring through the internet improve the accuracy rate. | Highly Skilled worker require ,high maintenance |
| 16 14 | An Ultra-Low Power Smart Headband for Real-Time Epileptic Seizure Detection [ Lin, Shih Kai  Istiqomah et al,2018] | IoT epilepsy detection system with cloud support based on EEG | -Bluetooth low-power chip,  -customized electrodes, an analog front-end circuitry | Neurological Disorders | Cloud Computing | Detection accuracy rate is very high and useful for children who is suffering from ND | Although Accuracy rate is very high but some time it can create problem and costly too. |
| 17 15 | Optimized Deep Learning for EEG Big Data and Seizure Prediction BCI via Internet of Things [ Hosseini, Mohammad-Parsa  Pompili, Dario et al,2017] | Seizure detection and localization system based on IoT and deep learning | -mobile Device Cloud  - Restricted Boltzmann Machines | Neurological Disorders | Seizure detection with Big Data | Computers have long been used to aid physicians in the collection, management, storage, and reporting of EEG signals. | The EEG does not produce a constant signal, hence electrographic ictal patterns will differ between patients. |
| 18 16 | TREMOMARKER Tremor detection for diagnosis in a non-clinical approach using IoT[ Vijay, Anand K.  Sangeetha, K. et al,2018] | Wearable-based IoT for the detection of Parkinson's tremors | - Electroencephalogram (EEG)  -sensor | Neurological Disorders | IMU solution based on MEMS for PD classification | The device is small, light, portable, and inexpensive, and it is easily accessible and user friendly to people of all ages. | There is no objective method for recording and categorising measurable, observable symptoms for analysis. |
| 19 17 | Using IoT devices for movement detection in medical environment - Proof of Concept[ Satala, Pavol  Gaspar, Vladimir et al,2018] | IoT systems are being used to research sleep patterns and FoG in Parkinson's sufferers. | -Electrooculogram (EOG)  -Electroencephalogram (EEG)  -Elektromyogram (EMG) | Neurological Disorders | Classification of FoG patterns | It describes the most common neurological problems associated with abnormal and uncontrolled body motions. | Devices are quit expensive , not everyone can’t effort it. |
| 20 18 | Multimodal monitoring of Parkinson’s and Alzheimer’s patients using the ICT4LIFE platform [ Alvarez, Federico  Popa, Mirela et al,2017] | Sensor fusion and cloud computing are used to create an IoT platform for monitoring Alzheimer's and Parkinson's disease patients. | Electroencephalogram (EEG)  -sensor | Neurological Disorders | Recognition of activities using machine learning | The device is small, light, portable, and inexpensive, and it is easily accessible and user friendly to people of all ages. | There is no objective method for recording and categorising measurable, observable symptoms for analysis. |
| 21 19 | Internet of Things for Ambient Assisted Living: Challenges and Future Opportunities [ Wan, Jie  Gu, Xiang et al,2017] | For AAL systems, a four-layer IoT architecture was developed. | -Networking devices  -data processing devices  -sensor devices | Ambient Assisted Living | Examine the work of AAL's enabling technologies. | Access from anywhere and easy to monitor. | device failure due to a lack power or other unforeseen circumstances |
| 22 20 | Integrated IoT Medical Platform for Remote Healthcare and Assisted Living [ Wan, Jie  Gu, Xiang et al,2017] | Big data analytics support an integrated three-tier system for monitoring patients in an AAL context. | -Networking devices  -data processing devices  -sensor devices | Ambient Assisted Living | AAL system based on big data | Access from anywhere and easy to monitor. | device failure due to a lack power or other unforeseen circumstances |
| 23 21 | Home Assisted Living of Elderly People using Wireless Sensors Networks in a Cloud System [ Moraru, Sorin Aurel  Perniu, Liviu et al,2018] | AAL system based on smart homes with cloud storage. | Networking devices  -data processing devices  -sensor devices | Ambient Assisted Living | AAL system that is cloud-based | Access from anywhere and easy to monitor. | device failure due to a lack power or other unforeseen circumstances |
| 24 22 | Hands-Free One-Time and Continuous Authentication Using Glass Wearable Devices [ Damopoulos,Dimitrios &  Portokalidis, Georgios,2018] | Gauth is a hands-free voice-enabled authentication system for DASH patients that uses Google Glasses. |  | Ambient Assisted Living | An authentication system based on machine learning and the cloud | support organisations in securing their terminals from illegal access caused by users forget or missed to log out of terminals they use. | device failure due to a lack power or other unforeseen circumstances |
| 25 | Designing Smart Wearable to measure Health Parameters [ Kansara, Rashi &  Bhojani, Pritee,2018] | The creation of a smart fabric that can monitor a variety of vital signs. | Wireless Communication Module:  - Microcontroller  - Sensors | Fitness Tracking | Cloud-based H-IoT and smart fabric | Wearables allow in the monitoring of a variety of health-related data, including step count, heart rate, ECG, sleep monitoring, body mass, and body temperature. | Can cause irritation and might feel uncomfortable |
| 26 | Wearables with Heart Rate Monitors and Dynamic Workout Plans [ Ferreira, António &  Coelho, Jorge,2018] | Using wearable data to create a customised fitness workout plan | Electroencephalogram (EEG)  -sensor | Fitness Tracking | Health tracking with wearables | It introduces a novel method for assisting the creation of dynamic, personalised training routines based on data from sensors that monitor heart rate. |  |
| 27 | Health Analysis of Bicycle Rider and Security of Bicycle Using IoT [ Nath, Saumya  Sinha, Sneha et al,2018] | Analysis of fitness data using IoT for monitoring the health and safety of bicycle riders as well as the bicycle's security | -Sensing module  -Processing module  -Communication module  -Smart Lock module | Fitness Tracking | Repository of data on the cloud | It makes it easier to maintain track of a cyclist's fitness. |  |
| 28 | A two stages fuzzy logic approach for Internet of Things (IoT) wearable devices [ Nath, S., Sinha, S., Gladence,et al,2016] | Fuzzy logic used on IoT data for health monitoring | - Wearable Device  -Sensors | Fitness Tracking | Fuzzy logic and sensor fusion | Low-cost devices help in the monitoring of their health status. | Device failure can damage the result of the device. |

**Chapter 3: Conclusion & Recommendations**

**3.1 Conclusion**

The Internet of Things (IoT) is a network of sensors that collects vital health data and distributes it via a secure network. The acquired data is evaluated to look for inconsistencies, and if any are identified, an alert is generated. This is the foundation of Medicine 4.0, the new IoT-powered automated platform for patient monitoring and diagnostics. This paper examines some of the emerging technologies that fuel H-IoT systems. In H-IoT, a variety of architectures based on various computing paradigms are employed. The capabilities of ML are being used in a variety of H-IoT use cases, including network maintenance and assisting in achieving optimal network and service performance. Edge computing, by providing processing capacity to the network's edge, plays an important role in lowering system latency and increasing system reliability. It reduces the need to send traffic to the cloud through an unprotected network, so adding to data security. Fog computing provides computational capabilities for a wide range of applications, including storage, security, processing, and alarm generating. In H-IoT, the promise of big data analytics is achieved by analysing enormous data sets that are continuously recorded. Big data analytics give a framework for detecting anomalous behaviour in real time as well as forecasting the patient's state in the future. By introducing a transparent and secure way of information and distribution, the blockchain is improving data storage capacities.

**3.2 Recommendations**

IoT in the healthcare industry is not an independent process. To assist healthcare facilities, evolve in a meaningful way, all IoT devices and networks must be coupled with other technology. As previously stated, IoT will transform the healthcare business, but it will also require data, high-speed connection, as well as sufficient security and compliance.

Overall, these unique technologies are speeding large-scale adoption of H-IoT, which will be pushed further by the arrival of 5G and efficient wearables and other implantable sensors. Many significant obstacles have been identified that are hindering the mainstream adoption of H-IoT systems, although there are several unique solutions to these challenges. These issues have been acknowledged in this work, and future research directions have been identified on the basis of them. Tactile Internet is a leading paradigm shift in H-IoT connectivity that is bringing up new opportunities in healthcare. Based on a thorough examination of the literature and market trends,

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