



## IOT BASED REHABILITATION SYSTEM FOR PATIENTS AND ELDERLY PEOPLE- A SURVEY

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**Abstract:** During recent days the technological advancements of the Internet of Things (IoT) and rapid growing costs of various health care devices, the main vision of these connected e-health applications has been developed that constitute Personal Health Devices. To monitor the health of elderly people and developing a rehabilitation system is a challenging task. The incorporation of the communication technology in the healthcare industry have been explored the different possibilities to optimize the all the available medical resources and provide an efficient reliable healthcare services to the elderly people and patients with disabilities, chronic illness and other healthcare issues. This paper presents a comprehensive analysis of existing techniques which are developed in various healthcare applications using the IoT for the development of Rehabilitation system based on various parameters of disease by collecting patients as well as to inform doctors by sending early notifications. The system should be developed in such way that that collects all parameters of the patient and diagnose the disease as soon as possible. The network parameter are also considered suitably for the proposed solution for different environment are also presented, which improves efficiency of rehabilitation system developed for monitoring the health of elderly people.

**Keywords:** Rehabilitation System, Personal health care, Internet of Things, E-health application

### 1. INTRODUCTION

Internet of Things is a developing innovation which lets people and things to interconnect anywhere and whenever. The IoT extent is not only depending on the interfaces also it is depending upon the type devices it interacts and the number of clients interacts with these devices. Specialists in the field estimates that there are over 45-50 different billion gadgets of devices will be connected to internet constantly by the year 2020. This field blends the transmission media and innovation in the data by offering better clinical assistance for the patients. By methods for IoT, clinical data can be traded starting with one area then onto the next to analyze the ailments and organize legitimate prescriptions that improves the patient's conditions in different areas. The innovation in the domain empowers to convey medicinal services benefits over a significant distance and furthermore limits the expense of

social insurance benefits by dealing with the constant ailments with less emergency clinic presence and less travelling for the clinical experts. As per the data received from the World Health Organization (WHO) 30 percent

of worlds are suffering from cardio vascular disease, therefore early diagnosis is the major part of the research.

The IoT is an empowered framework that comprises of well organized sensors that processes and corresponds to all the equipments based on their capacity and transmits the information to the earth. These protocols of IoT provide connection to all the devices by using cloud based innovation in the devices. The devices must have the advantage of availability, so that, they can speak with other keen gadgets far away from them with no outside mediation.

Mainly there are four different phases in structuring IoT devices. These different perform various activities like Phase 1 describes the number of devices that are associated with number of devices to get essential information regularly from the sensor devices. In Phase 2 the collected information is organized with an aim to connect to the web from the cloud computing. In phase 3 the collected information is pre-handled and executed through different IT frameworks before going for the last phase. In the last phase the information goes to the cloud capacity and store in the cloud for dynamic processing.

The rest of the section is organized as follows section 2 provides the overall literature review of existing technologies used, Section 3 provides the motivation behind the work followed by conclusion in section 4.

## 2. LITERATURE SURVEY

This section provides an overview of existing techniques used for monitoring the health of elderly people and also provides a comparative analysis of the existing methodologies used and their drawbacks.

[1] Mohd. Hamim et.al presents a model for IoT based health monitoring system of patients. This developed model consists of three different sensors where each of these sensors are used for checking heart beat, heat level and the galvanic skin sensors. Each one of these sensors is consolidated with framework with the combination of Arduino and raspberry pi. Once the information is procured from the sensor is moved to a distributed storage by the means of using the Raspberry Pi device.

The distribution stage is being persistently refreshed and stored in the databases. The mobile application is developed using the android studio and connect to the cloud database by collecting patient parameters. The main drawback of this work is it fails to provide efficient sensor devices which are used for collecting the information.

The IoT and the distributing computing plays as crucial role in the present environment. A framework has to be developed to monitor the patient's health condition through the use of body sensors by utilizing the Raspberry Pi. The patient data is maintained and specialized doctors will be going through and provide the valuable suggestions. In [2] the author presents how the data of patients can be maintained and monitored by utilizing the existing hardware devices.

In the wireless frameworks using IoT, the body sensor is mainly used to transmit the patients data using the microcontroller connected with Raspberry Pi and the information is shared to the guardian and the doctors by sitting from remote place is presented in [3]. This innovation includes analysing the patient circumstances by considering all the details of the patients and proper segregation of the data.

[4] B. Thaduagta et.al presents a novel framework that collects the information of different patients body parameters using biosensors that transmits the information by connecting to the hub server safely by using the Cipher policy attribute based encryption technique, Then this server share the collected information to medical clinics or the doctors for the further treatment. This server provides the information to the related patients during any circumstances.

[5] R. S. Pramila et. Al describes the human service monitoring framework for individual elderly people; this framework examines all the essential patient records by considering all the parameters of each patient and their routine work. Then this information is shared with specific doctors. The outcomes from the specialist will be informed and again monitored on daily basis.

The assessment of this work is carried out using two different stages. Stage 1 describes Qualitative talking and stage 2 describes Quantitative Survey. The main challenge is make all the elderly people to use the advanced applications and become used to the advances commodities.

IoT based Smart social insurance with the assistance of savvy gadgets and items improve the medicinal services observing framework viably, accordingly by lessening the wasteful aspects of existing human services framework. Shrewd gadgets with new and overhauled advances improves the information precision to be gathered, ongoing availability of patient's condition, savvy incorporation of information gathered, keeping up the coordinated information sagaciously through cloud administration, and so forth [5].

IoT alongside savvy gadgets diminish intricacy and difficulties in the social insurance framework. The entrance of portable innovations and brilliant gadgets over human services framework cause tremendous effect. The good usage of M-wellbeing and E-wellbeing applications in the daily life and age is made mindful to the individuals for improving and keeping up the great personal satisfaction. Aside from standard checking of patient's condition through wellbeing M-framework, the main aim of this is to provide valuable suggestions and provide dieting instruction for successful implementation of the application and also provide good exercise schedule to the patients [6].

[7] Presents the remote wellbeing observing framework, the persistent wellbeing parameters are recorded by an advanced cell by killing extra equipment and valuable information through a web interface [7]. This application encourages the patients to record all their health related data in the provided graphical user interface. Furthermore, this framework gives information to relative and specialist through web interface for additional observing. Thirdly, I give ongoing alert if the patient is at crisis circumstance, for example, respiratory failure, and so on.

Notwithstanding checking, there are very hardly any difficulties in utilizing the wearable GPS beacons for quite a while. Right off the bat, the day by day utilization of wearable GPS beacons depends essentially on little size, unpleasant use and low vitality utilization

[8]. Besides, the significant test is of the precision, legitimacy and respectability of estimation information with different gadgets. Thirdly, the ease of use and the encounters of the client with the gadget and its neighborly supporting programming assume crucial job in proceeding with ordinary and significant stretch utilization of wearable GPS beacons.

The IoT devices and other health related applications are integrated into framework that prompts the consistent progression of the data among carious doctors and the patients for easy communication and improving the health of the patients.

This framework has been developed by using the K53 Tower system for the healthcare applications to overcome the drawbacks over the clinical framework. There are two different viewpoints are observed under

the framework are prevention an effective detection of the early diagnosis of the disease is described in [9]

**Table 1.** Comparative study on existing methodologies used  
To monitor health of elderly people

References	Methodology used	Advantages	Drawbacks
[1]	Monitoring health using raspberry pie	Provides wellbeing sensors for monitoring different parameters of patient	Sensor devices with low complexity and no proper deployment
[2]	Monitoring through IoT and cloud computing	An efficient technique for educing cost and monitoring in ubiquitous way	No proper deployment of sensor nodes
[3]	Smart device health monitoring	Data integration and security	Up-gradation of devices is difficult
[4]	Semantic Web Rule Language	Provides proper recommendation system through contextual learning	Recommendation are provided in general
[5]	Monitoring the health through Wireless Body Area Sensor Network (WBASN)	Easy deployment of sensor into devices	Used low complexity sensor devices
[6]	The data security is provided through Cipher text Policy Attribute Based Encryption (CP-ABE)	Data protection is well maintained	Maintain of non-interactive group is difficult

From the above table 1 we observe that no such efficient rehabilitation system are developed for monitoring the health of elderly systems are developed and such system s are mainly required for monitoring the health of

### 3. MOTIVATION

The main motivation behind this literature review is to study on Existing philosophies in quiet observing framework centers around giving better social insurance offices to various patients with restricted restorative assets. These checking frameworks limit the patients to the bed and empower them to move around just a specific range from the bed side. Out of this range there is no likelihood to gather the information from patients. The choices or recommendations given by the framework are not exceptionally exact. The customary anticipating systems don't give auspicious and exact outcomes. This expands the danger of mistake in offering fitting clinical types of assistance. Remote patient checking framework takes out the obstacles, for example, separation and improves the entrance of clinical administrations. Quiet checking through android cell phone empowers the clinicians to screen the patient from different areas. Example Matching Algorithm is utilized to decide the kind of sicknesses and give the sign to Doctor. It assists with shielding the individual from chance factor.

### 4. CONCLUSION

This paper provides a comparative analysis of existing methodologies used in the existing techniques that are already developed for healthcare applications using the IoT for the development of health care system based on the healthcare parameters considered for the system which is featured by collecting patients as well as to inform doctors by sending early notifications. The system should be developed in such way that that collects all parameters of the patient and diagnose the disease as soon as possible. The system monitors different

the aged people. Therefore to design and develop rehabilitation system this work provides the existing methodologies used and their limitations, by considering these an efficient system can be developed.

parameters of the patient and diagnose the disease as soon as possible. The network parameter are also considered suitably for the proposed solution for different environment are also presented, which improves efficiency of rehabilitation system developed for monitoring the health of elderly people. In the

future, the work will be mainly focusing on improving the sensor experience by using soft materials and enabling controlled shared information among the doctors and the patients through this social par diagram.

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