

# IOT Based Pedometer-A Review

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**Abstract-** This paper reviews the field of counting the number of steps covered by the person, the Heart Beat rate and the calories burns. This is the design of Pedometer which can measure steps and also shows the temperature and the presence of humidity. Step counting is a widely used method to assess physical activity. The pedometer devices are available for any person during running exercise or during daily activities to record the number of steps taken. The benefit of using such a device is mostly gives the motivation to increase the physical activity. Although these types of device are very beneficial to all the health issues. Pedometer originally used by sports and physical fitness enthusiasts; But now it becoming popular as an everyday exercise measure and motivator. The technology for our Pedometer with Wireless Communication includes a sensors and IoT idea to count steps, Heartbeat rate the temperature and the humidity in the weather. IoT is becoming a major sources for many development, also the Raspberry Pi provides the various sensors accessibility modes for pedometer implementation. So these device may increase the interest in using pedometers as a motivational tool to promote physical activity and they are easy to use and provide immediate personalized feedback.

**Keywords:** IOT ( Internet of Things), Raspberry Pi, Pedometer, Heart Beat Sensor, Temperature sensor, ThingSpeak, Android Application.

## 1. INTRODUCTION

Now a days the health related problems like high blood pressure, cardiac related diseases, abnormal heart beat rate, are rising day by day. The normal resting heart rate for an adult ranges from 60 to 100 beats a minute. That shows the wide range of normal heart beat rate. The abnormal Heart beat rate may indicate the various underlying problems which are harmful and harshly affected to the body. Hence it is need to overcome such problems. We therefore introducing a device Pedometer which is based on the IoT and Raspberry Pi implementation. These device operating on the wireless communication that shows the number of steps walking by a person, calories burns, the Heart beat rate and also shows the temperature and the presence of humidity.

A pedometer is a device, usually portable and electronic device that counts each step a person takes by detecting the motion of the foot's step. Because the distance of each person's step varies, an informal calibration, performed by the user, is required if presentation of the distance covered in a unit of length (such as in meters) is desired. Pedometers can be a motivation tool for people wanting to increase their physical activity. Step counters can give encouragement to compete with oneself in getting fit and losing weight. Pedometers have been shown in clinical studies to increase physical activity, and reduce blood pressure levels and Body Mass Index. It is generally used by people who do measured exercise every day. The device counts the number of steps taken by the person and multiplies it by the average step length fed to give the distance walked by the person. In the

present works, we are measuring the number of steps the person takes. This has to be appropriately multiplied by the stride length of the person to calculate the actual distance traveled by the person using IOT Device. IOT Device gets a number of steps walking by a person from Smartphone using android application and also checks the Heart Beat rate of a person and also shows the temperature and the humidity by using Raspberry Pi and interact the data from Raspberry Pi to Smartphone.

The development of pedometer system requires technological implementation for various tasks such as building networks of sensors, establishing communication among objects, data collection and storage, monitoring and controlling. Lots of work is going on to develop technological solution to each of the tasks listed above and also several frameworks are build for Pedometer applications. In this paper the survey of existing frameworks for developing the IOT based Pedometer applications, Techniques to build pedometer application using IOT frameworks, the new generic framework for the development of Iot based Pedometer system presented. These factors are very helpful to develop the Pedometer more convenient for the every people used. The rest of the paper is arrange in the following sections: 1. Techniques for design Pedometer-Health Monitoring System, 2. The various design issues of pedometer system, 3. Proposed the generic framework for Iot based Pedometer, 4. Concludes the works.

## 2. TECHNIQUES FOR HEALTH MONITORING - Pedometer

There are many of frameworks and platforms to develop IOT based Pedometer applications. That frameworks are also widely adopted for use in developing the implementation of Pedometer. However, majority of them lack in ease of configuration and management of connected devices, accuracy problems, user friendly monitoring and control parameters, secured network connectivity between connected sensors, devices, Raspberry pi and the users. The brief review of techniques for developing Pedometer system frameworks is presented below.

(M Gunasekaran et.al, 2017) presents the Microcontroller based fitness analysis using IOT. Which is android application in the healthcare domain using the idea of Microcontroller and IOT device. Microcontroller measures the Heart Beat rate and then communicates to Smart Phone through IOT device. Microcontroller reads the heart beats using IR sensor. To calculate the calorie value from number of steps walked by a person and then measures the heart beat rate[1].

(N.B. Bhawarkar et.al, 2017) develop the Modern Health Monitoring Using IOT and Raspberry Pi. System that gives the implementation of health monitoring system shows They uses the sensors the one end of the sensor is connected to the body of the patient and other end of the sensor is connected to the raspberry pi through PIC or Aurdino .The analog signal from the sensor is converted to digital by using PIC. The data acquired by the sensor is stored in the Raspberry Pi ,if the data values exceeds the threshold value then alarm get triggered and at the same time data uploaded to the sever using GSM, that uploaded data can be access by doctor by certain ID and password[2].

(Anurag Bajpai et.al, 2015) presents the Quantifiable Fitness Tracking Using Wearable Devices. Which is application of comprising three major components (a) activity recognition for a detailed activity profiling (b) accurate calorie estimation based on heart rate and mapping to corresponding activity (c) a fitness tracker with a quantifiable score. Activity recognition is based on the signals from sensor hub, present in mobile or wearable device, while heart rate data is received from wearable device. The proposed system shows approach in detailed the physical activity to accurate calorie estimation and further deriving quantifiable fitness estimate using heart rate as a key parameter[3].

(Chelsea G. Bender et.al, 2017) presents the work on Measuring the Fitness of Fitness Trackers. In search of the fitness tracker compare the various parameters and experimental settings that have not been explored in previous work related to the fitness tracker. Searching the other health indicators measured by these devices, such as calories burned or distance travelled. Designe a series of experiments to compare these along with the more

count provides a general sense of movement and physical activity, calories burned and the number of miles travelled could be better indicators of an individual's energy expenditure[4].

(Ms.Najme Zehra Naqvi et.al, 2012) Implemented Step Counting Using Smartphone-Based Accelerometer. Presents a method for counting steps taken by a user while walking. The linear relation that was proposed to hold between amplitude of the acceleration signal and the frequency of a step, is shown to be effective in counting the steps taken, irrespective of the walking speed of the individual[5].

(Tang Meiyu et.al, 2018) proposed The design of network pedometer based on Bluetooth 4.0. Design a network pedometer based on Bluetooth 4.0 combining movement hotspot and Bluetooth 4.0 technology. The pedometer module, acquiring acceleration data as a pedometer calculated by acceleration sensor, and the data includes three of acceleration values in the three directions, which are front and near component, the left and right components and the upper and lower components. The values are given as X axis, Y axis, and Z axis in the algorithm[6].

(Wu, Shyi-Shiou et.al, 2011) delivered The Design of an Intelligent Pedometer using Android. Android is used to develop an intelligent pedometer application. The User's walking motion was detect by acceleration sensor and orientation sensor, and voice feedback was provide via Bluetooth. All the tracking data are saved in SQLite database, and automatic threshold control is used to improve the accuracy. Pedometer application will analyze the signal, calculates the walking distance and calories burned, and then provides real time feedback to user via Bluetooth[7].

(Vivek P ardeshi et.al, 2017) presented the review on Health Monitoring Systems using IoT and Raspberry Pi. Raspberry Pi is a master device in proposed system; all the other devices like different sensors are connected to it. A DC power supply of 5V is provided for working of raspberry pi. IoT server is attached to the system; it allows the connectivity for data exchange with other devices. IoT allows connected objects to identify and control remote access across network. The output of temperature sensor and heartbeat sensor is displayed on LCD at user end too. The output of ECG is sent to the receiver or doctor end. All the information is first acquired, processed and stored at memory of raspberry pi. The stored information is then transferred to the receiver by means of IoT server. The Receiver section is present at doctor end. At receiver section, all the information is received. Monitor displays the result of each sensor which is attached to raspberry pi[8].

It is observed from the literature survey that there are many issues related to development of IoT based technology for Pedometer system and some of the presented research works focus on effective particular management, integration of different protocols, monitoring and controlling of health monitoring parameters, the range of connectivity. However, no single technological solution has been reported for smart home system that addresses all the above listed issues. Therefore, there is a need for developing a technological solution for IoT based Pedometer for overcoming all the issues.

### 3. DESIGN ISSUES OF HEALTH MONITORING - Pedometer

1. "Microcontroller based fitness analysis using" The system produces the android application based on the Microcontroller and Iot measures the steps, heartbeat and calories burns. In the Pedometer android application, the use of microcontroller is shows the hardware circuitry more complicated. There is the possibility to use other than the microcontroller based application.

2. "Health Monitoring System Using IOT and Raspberry Pi" The System shows only the monitoring of health with the help of Raspberry Pi and the Iot technology. They can implement some more features about the health fitness with the idea of Raspberry Pi and IOT.

3. "Quantifiable Fitness Tracking Using Wearable Device" Proposed to shows the details about to calculate the physical activity to calculated calories using heartbeat rate. Shows calorie burns and the heartbeat rate. There is a possibility to increase the more interest to about the fitness tracker.

4. "Measuring the fitness of fitness trackers" Searches of fitness related various parameters. provides a general sense of movement and physical activity, calories burned and the number of miles travelled by the user.

5. "Step Counting Using Smartphone – Based Accelerometer" Implemented a method for counting the number of steps taken by the user using the smart phones based on accelerometer. Just describes the method of step detecting and step counting using the accelerometer. Rather than the accelerometer step detecting and counting, can add some more parameter related to the pedometer.

6. "The Design of Network Pedometer Based on Bluetooth 4.0" Design a network pedometer based on the Bluetooth 4.0. Combining movement hotspot and Bluetooth 4.0 technology. With the use of Bluetooth this pedometer can useful up to only the limited range not more than the particular distance. Instead of Bluetooth 4.0 use of Iot technology is get more beneficial for to increase the range of pedometer implementation.

7. "The Design of an Intelligent Pedometer Using Android" Designs the Pedometer Android application. To analyze the signals, calculated the walking distance, and the calories burn and then provide the real-time use via Bluetooth. Using the Bluetooth the range of pedometer is only for the limited area of communication. To increase the range of Pedometer use of some other technology like Iot instead of Bluetooth technology.

8. "Health Monitoring Systems using IoT and Raspberry Pi- A Review" Health monitoring systems using and Iot and

and temperature. In this system may increase the use of Iot and the Raspberry Pi thus to produce the android application used gives all the above features.

### 4. PROPOSED SYSTEM OVERVIEW

The architecture overview of the IOT based Pedometer shows in fig. 1. The connection between the sensors and raspberry pi is explain using the architecture. The IOT based pedometer architecture consist Raspberry Pi, ThingSpeak, Step sensor, Heart beat sensor, Temperature sensor, Power bank and Android Application. The main purpose of IOT based Pedometer is to develop an android application which is acts as an pedometer i.e. to counts the steps, measures the calories burn, measures the temperature and the presence of humidity. These health monitoring parameters are based on the idea of IOT and the Raspberry Pi Implementation.

If person uses the IOT pedometer then The step sensor can measures the counting of steps and the calories burn. The Heart beat sensor senses the Person Heartbeat rate. The temperature sensor shows the temperature and the humidity. These all the data is stored in the Raspberry Pi. The Raspberry Pi uploaded the data to the Android application. And the android application displays the result.

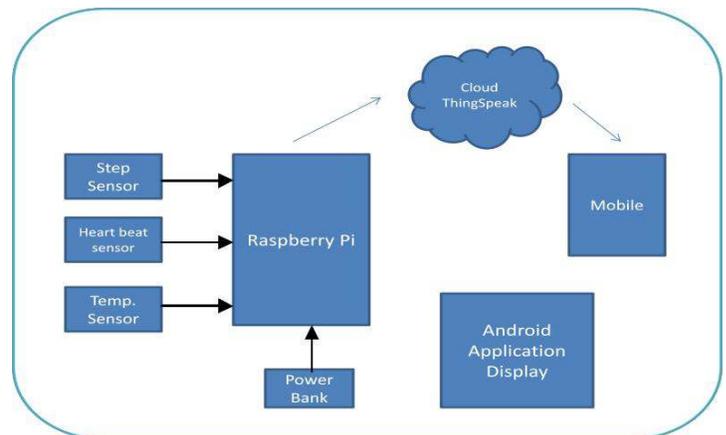


Fig. no.1 Architecture of IOT Based Pedometer

### 5. CONCLUSION

The whole system architecture of Pedometer with Raspberry pi using IoT for analyzing the fitness to reads calories burnt by steps walked, the Heartbeat rate using Heartbeat sensor, measures temperature through temperature sensor. In this type of technology, easily helps to monitor the fitness of athletes, senior citizen and common peoples. By providing these facilities to use for monitoring the step counting, calories burn, heart beat rate, temperature and humidity. The main objective of this work was to build an android application in the healthcare domain using the idea of Pedometer with Raspberry pi and IOT device. In Raspberry Pi based application, IOT is a technology that is having major impacts in many different domains. This technology is also easily used in home by common people.

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