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IoT based Pedometer using Raspberry-Pi

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Abstract - *This paper describes the design of the pedometer developed as part of a larger solution, aimed to encouraging a healthier lifestyle through regular physical activity. That measures the number of steps and the distance walked by the person, Heartbeat rate and the current present temperature. So we Develop the product IoT Based Pedometer using Raspberry-Pi. This fitness tracker Pedometer is a device that measure all the movements and motions with the help of connected sensors in it. It will connect all the data and convert them into the related metrics, such as general physical activity. Steps count, Heartbeat rate, Calories burned, present temperature, etc. Pedometer- Fitness tracker has rapidly increases the popularity these days. This wearable device helps you to give a fitter and healthier life, as they easily track your fitness level all physical activities. Whether you are getting physically more active or training for sports, tracking your fitness is going to be easier than ever with a Pedometer. The Pedometer lies in the fact that it is a great motivational tool for promoting physical activity and fitness awareness.*

Key Words: Pedometer, Activity tracker, Step counter, IOT (Internet of Things),Raspberry Pi, Heartbeat Sensor, Temperature sensor, Android App.

1. INTRODUCTION

This Health is one of the most important thing of the humans life for that we are focusing on our good health which is better. A pedometer is a small device that counts the number of steps you take. It is also called a step counter. Some pedometers also tell you how far you've walked in miles or how many calories you've burned. The most important benefit of wearing a pedometer lies in the fact that it is a great motivational tool for promoting physical activity and fitness awareness. Regular exercise and physical activity increase muscle strength, bone density, flexibility, and stability. Physical fitness can reduce your risk for and resilience to accidental injuries, especially as you get older. For example, stronger muscles and better balance mean that you're less likely to slip and fall, and stronger bones. Walking is the easiest and simplest exercise you can do to get out of your inactivity rut.

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.Proposed work & Technical Discription. 2.Overview of concept. 3.Design and Implementation of. 4.Concludes the work.

2. PROPOSED WORK

The architecture of the IOT based Pedometer shows in fig. 1. The connection between the all sensors and raspberry pi is explain using the architecture. The IOT based pedometer architecture consist Raspberry Pi, Cloud, Two Step sensor, Heart beat sensor, Temperature sensor, Power bank, LCD Display and Android Application. The main purpose of I0T 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.

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. Raspberry Pi uploaded the data to the Android application. And the android application displays the result. And also shows on the LCD Display. The following Fig.1 shows the Architechutre of IoT Based Pedometer.

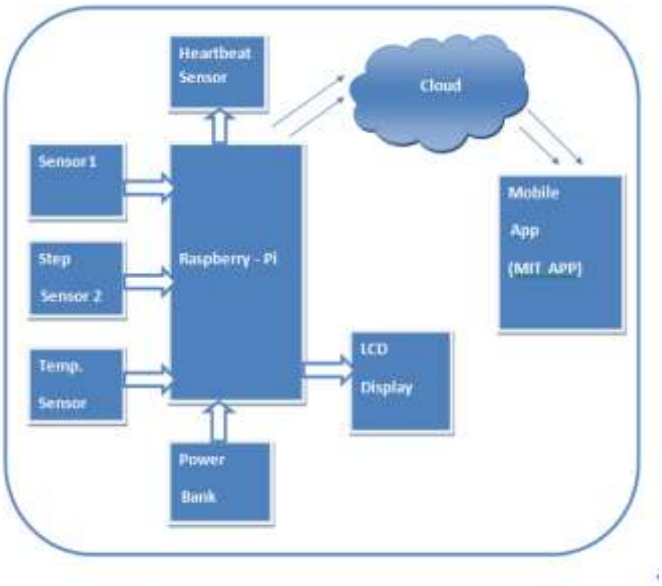

Fig.1 Architecture of IoT Based Pedometer

3. TECHNICAL DISCRIPTION

3.1 Raspberry-Pi kit

Raspberry Pi is a processor which is used in many IoT applications. The Raspberry pi is a single computer board with credit card sizes that can be used for many tasks that your computer does. The raspberry pi board is a portable and low cost. Maximum of the raspberry pi computers is used in mobile phones. When internet is connected to raspberry pi it act as server. Than server is automatically send data to the cloud. So the parameters like no of steps, heart rate, temperature, humidity etc. are monitored.

Fig-2: Raspberry-Pi Kit

3.2 DHT11

DHT11 Temperature & Humidity Sensor features a temperature & humidity sensor complex with a calibrated digital signal output. By using the exclusive digital-signal-acquisition technique and temperature & humidity sensing technology, it ensures high reliability and excellent long-term stability. This sensor includes a resistive-type humidity measurement component and an NTC temperature measurement component, and connects to a high performance 8-bit microcontroller, offering excellent quality, fast response, anti-interference ability and cost-effectiveness.

Fig -3:DHT11

3.2 Heartbeat Sensor

Heartbeat Sensor is an electronic device that is used to measure the heart rate i.e. speed of the heartbeat. Measures body temperature, heartbeat rate and blood pressure are the most important things which are essestial to keep us healthy. It comes in different shapes and sizes and allows to measure the heartbeat. Monitoring heart rate is very important for athletes, patients as it determines the condition of the heart (just heart rate). There are many ways to measure heart rate and the most precise one is using an Electrocardiography But the more easy way to monitor the heart rate is to use a Heartbeat Sensor.

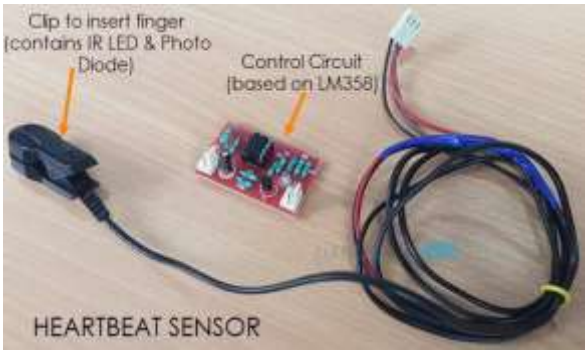

Fig-4: Heartbeat sensor

4. Flowchart

The following diagram shows the flowchart of the Iot based Pedometer.

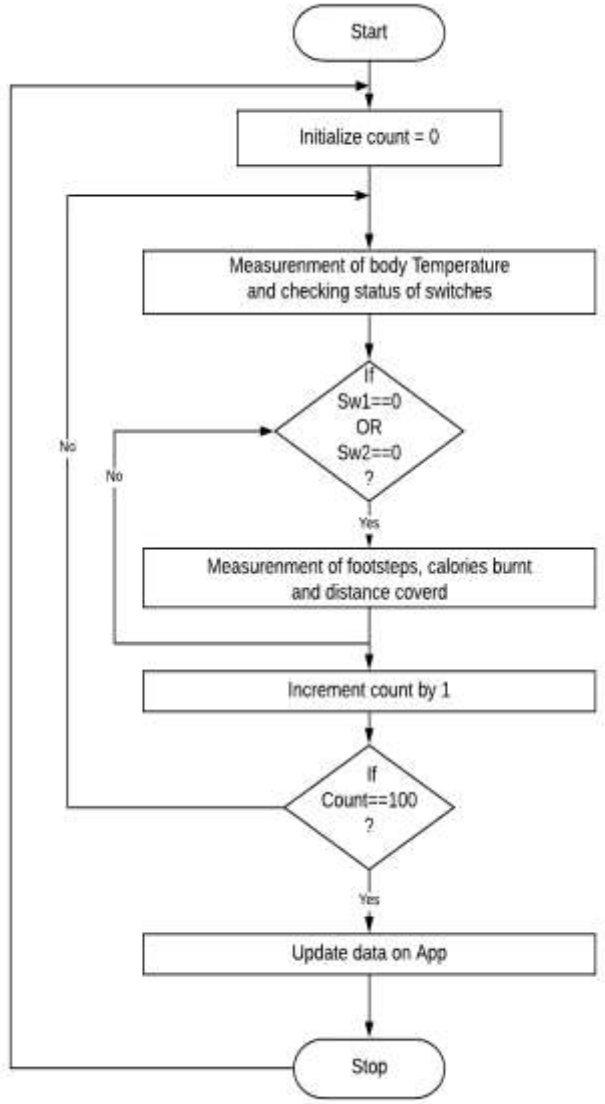

Fig-4: Flowchart of IoT Based Pedometer

5. CONCLUSIONS

Internet of Things has many applications in different areas. It has been developed for health fitness monitoring of the person. The health monitoring services are important part of our society. It is difficult to take continuous watch on person's health, if any of the parameter like Step count, Heartbeat rate,Temperature, Humidity.So The whole system of IoT Based Pedometer 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. Physicians and Trainers can make use of the data collected for a long period of time for different application for further data analysis.

6. REFERENCES

[1] M Gunasekaran , Dr. G Nallavan " Microcontroller based fitness analysis using IOT" International Journal of Physical Education, Sports and Health 2017; 4(3): 255-259

[2] N.B. Bhawarkar, P.A. Amaale , S.R.Chourey " Modern Health Monitoring System Using IOT and Raspberry Pi" 2nd National Conference Recent Innovations in Science and Engineering (NC-RISE 17) ISSN: 2321-8169 Volume: 5 Issue: 9

[3] Anurag Bajpai, Vivek Jilla, Vijay N. Tiwari, Shankar M. Venkatesan and Rangavittal Narayanan "Quantifiable Fitness Tracking Using Wearable Device" 2015 37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC). doi:10.1109/embc.2015.7318688

[4] Chelsea G. Bender, Jason C. Hoffstot, Brian T. Combs and Sara Hooshangi, , Justin Cappos "Measuring the fitness of fitness trackers" (2017)IEEE Sensors Applications Symposium (SAS). doi:10.1109/sas.2017.7894077

[5] Ms. Najme Zehra Naqvi , Dr. Ashwani Kumar, Aanchal Chauhan, Kritka Sahni "Step Counting Using Smartphone-Based Accelerometer" International Journal on Computer Science and Engineering (IJCSE) ISSN : 0975-3397 Vol. 4 No. 05 May 2012

[6] Tang, M., Gao, T., Zhou, S., & Zhao, K. (2018). " The Design of Network Pedometer Based on Bluetooth 4.0" (2018) International Conference on Intelligent Transportation, Big Data & Smart City (ICITBS). doi:10.1109/icitbs.2018.00063

[7] Wu, S.-S., & Wu, H.-Y. (2011). "The Design of an Intelligent Pedometer Using Android" 2011 Second International Conference on Innovations in Bio-Inspired Computing and Applications. doi:10.1109/ibica.2011.83

[8] Vivek P ardeshi, Saurabh Sagar , Swapnil Murmurwar, Pankaj Hage "Health Monitoring Systems using IoT and Raspberry Pi–A Review"(2017). International Conference on Innovative Mechanisms for Industry Applications(ICIMIA).doi:10.1109/icimia.2017.7975587

[9] D Pillay, T L Kolbe-Alexander, K I Proper,W van Mechelen, E V Lambert" Step that count! A feasibility study of a pedometer-based, health-promotion intervention in an employed, South African population" SJSM2014;26(1):15-19. DOI:10.7196/SAJSM.500

[10] HANNAH M. HUSTED,TAMRA L. LLEWELLYN. "The Accuracy of Pedometers in Measuring Walking Steps on a Treadmill in College Students" International Journal of Exercise Science 10(1): 146-153, 2017.

[11] TIFFANY SEARS, ELMER AVALOS, SAMANTHA LAWSON, IAN MCALISTER, CHRIS ESCHBACH, JENNIFER BUNN. "Wrist-worn Physical Activity Trackers Tend to Underestimate Steps During Walking" International Journal of Exercise Science 10(5): 764-773, 2017.

[12] Michal Tomlein, Pavol Bielik, Peter Kratky, Stefan Mitrık, Michal Barla, Maria Bielikova "ADVANCED PEDOMETER FOR SMARTPHONE-BASED ACTIVITY TRACKING" January 2012.

[13] Florina Almenares Mendoza, Luca Alonso, Andrs Mara Lopez, Daniel Daz Sanchez, Patricia Arias Cabarcos. "Assessment of Fitness Tracker Security: A Case of Study"Mdpi Journal Proceedings 2018, 2, 1235; doi:10.3390/proceedings2191235.