Health sensors

Nikita B. There, Dinesh Vitthalrao Rojatkar
Student, Asst. Professor
Electronics and TelecommunicationDepartment
Government College of Engineering
Chandrapur (MS) ,India

***Abstract*-This paper aims to review the various types of Health sensors. The theoretical foundation of this paper was formed by conducting a review on Health sensors. The five main types of Health sensors and their working are explained in this paper as well as their up application of Health sensors. Health sensors has several clinical applications that make them one of the most appealing tools in the medical device industry. This paper illustrates that Health sensors have the capability to make a significant impact on the medical device industry because of their compact and diverse nature.**

Keywords: Health sensor, Ingestible sensor, unobtrusive blood pressure sensor, Saline level sensor, e-health sensor, Automatic stress recognition sensor.

1.INTRODUCTION

What are sensors?

In medicine and biotechnology, sensors are that detects biological or physical processes and then transmit this data. Some sensors work outside the body and some sensor work inside the body. Some monitoring devices consist of number of sensors that measure a number of parameters which are related to biomedical.

Health sensors help providers of health care and patients monitor health conditions and ensure that they can make decisions about treatment. Sensors are also often used to monitor the safety of medicines, diet, otherenvironmental conditions.

What are health sensors?

In today's life health problems occurs more than last 20 years, because of industrialization. Due changes in environment are effect to health of men. So more health related problem are occurring day by day require to daily checkup of health. So we design health sensor by considering the health condition of patients .

Health sensors make device as portable which can handle by any person and also have ability to provide more flexibility .Normally occur health related problems stomach problem and so on.

Researcher design different health sensor on a single system on chip such as ingestible sensor e-health sensor,unobstrusive sensor,wrist sensor,temperature sensor, heart sensor etc.This technique gives more flexibility,reability and portability for users which uses this sensor. Here ingestible sensor is used to measure heart rate and breathing rate,temperature sensor measure use for measure for body temperature heart sensor is use for measuring heart rate of patient body.So, different health sensor depending upon researchers design which meets to their needs. Health sensors are worn on the human body for temperature, pressure, heart beat etc.

2. TYPES OF HEALTH SENSORS

2.1INGESTIBLE SENSOR

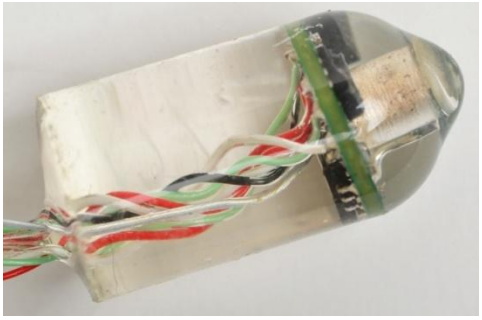

Figure: Ingestible sensor

A new way to measure heart rate and breathing rate within in intestinal tract.

This ingestible sensor is invented at MIT, so doctor are able to monitor vital activity of human by having them swallow ingestible sensor that used to measure the breathing rate and heart rate inside the body.

This type of sensors are mainly use for trauma patients. This ingestible sensor measure heart rate by using distinctive sound waves and this waves are produced by the beating of heart rate and also by inhalation and exhalation of the lungs.

This ingestible sensor is about the size of multivitamin pills and consists of tiny microphones packaged in a silicon capsule with electronics that processes sound and wirelessly send to an external devices with range of about 4 meters. For long term we have to take another capsule.

2.2UNOBTRUSIBE BLOOD PRESSURE SENSOR

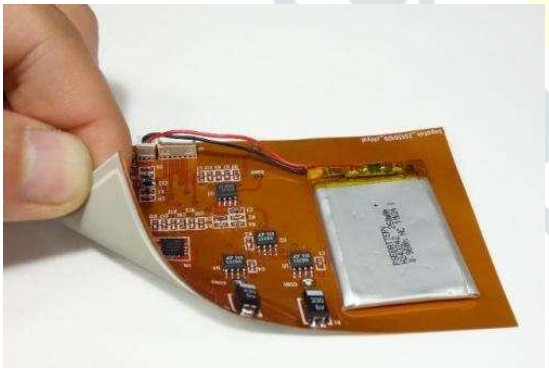

Figure: unobtrusive blood pressure sensor

A researchers in korea have developed a blood pressure sensor that is sufficiently unobtrusive which can be used to monitoring without affecting daily activities of users.

Hypertension (high blood pressure) is a medical condition affecting a large number of people.
Home monitoring using an BP device and with air pump in the unit is unwieldy and disruptive, limiting where and how often readings can be taken. It is not possible to use this devices for monitoring as a user goes about their normal activities.
For this purpose researcher invented wearable solutions However, these devices still use an inflatable cuff method to measure BP, albeit attached to the user's fingers rather than their whole limb. Even so, the periodic inflation of the cuff to apply occlusive pressure to the user's finger is still painful in long-term use.

BP is also monitors by methods, including electrocardiogram (ECG) and photoplethysmogram (PPG), have been also been invented.These devices are more compatible with normal daily life but require the user to remember to measure blood pressure and do not provide continuous monitoring.

2.3AUTOMATIC STRESSRECOGNITION SENSOR

Figure: Automatic stress recognition sensor

To anticipate the chronic physiological stress, the technologies are present to recognize the stress automatically that leads to the introduction of wearable biosensors that are more easy to wear. In this stress recognition technique, the loss function of support vector machines is advanced to encode an individual's ability to feel more or less stressed. This has been proved in a case study in which skin conductance of employees was monitored in nine call centers during one week of their ordinary work. This leads to the conclusion that employees in this type of environments are frequently interacting with angry and frustrated customers that leads to higher stress levels.

2.4e-HEALTH SENSOR

e-health sensor is a new version of medical application.It helps use us to perform biometric and medical application where body monitoring needed by using 8 different sensors.

The e-Health sensor can be powered by internal power or by an external power supply. Some of the USB ports on computers are not able to give all the current the module needs to work, if your module have problems you can use an external power supply.

Figure: e-Health sensor

How it works

Different parameter of human body are monitored using eight different types of e- health sensors.

i. Airflow sensor
ii. Electromyography sensor
iii. Patient position sensor
iv. Electrocardiogram sensor

v. Body temperature sensor
vi. Galvanic skin response sensor
vii. Blood pressure sensor
viii. Glucometer sensor

2.5 Saline level sensor

figure: Saline level sensor

Saline level sensor is used to measure the IV fluid levels. This sensor measure the saline level in the bottle and sends a message to the doctor and at the same time an alarm will indicate that the saline has completed. This sensor is made by using a 555 timer in transmitter part and TSOP1738 IR sensor in the receiver part. This sensor is placed at the neck of the bottle so that it detects the IV fluid level.

3.FUTURE APPLICATION OF HEATH SENSOR

Advances in health sensor networking have gives new opportunities in human healthcare systems. The future will see the integration of the abundance of existing specialized medical technology with wireless networks. They will exist with the installed infrastructure, and real-time response. Examples of areas in which future Biomedical systems can benefit the most from wireless sensor are in-home , smart nursing homes, and clinic and research augmentation. As the world's population ages , those suffering from diseases of the elderly will increase. In-home pervasive networks may assist residents by providing memory enhancement, control of home appliances, medical data lookup, and emergency communication. Unobtrusive, wearable sensors will allow vast amounts of data to be collected and mined for next-generation clinical trials. Data will be collected and reported automatically, reducing the cost. Therefore, many more study participants may be enrolled, benefiting biological and medical-applications research.

4. CONCLUSION

This paper is basically the detail view of most of the applications of Health sensors usually used in our daily life. As it consists of various applications such as Ingestible sensor, unobtrusive blood pressure sensor, stress recognition, preventing road accidents and so on. For every individual's consideration, many applications and techniques of these sensors are introduced. We are pointing some challenges in this area. Ingestible sensor measures heart and breathing rates from within the digestive tract. A researchers in Korea have invented a blood pressure sensor that is sufficiently unobtrusive which can be used to provide long-term continuous monitoring without affecting the daily activities of the user. Saline level sensor is used to measure the IV fluid levels. This sensor detects the saline level in the bottle and sends a message to the doctor and at the same time an alarm will indicate that the saline has completed. so we can conclude that in order to monitor health parameter in day to day life health sensors are essential.

5.REFERANCE

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