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WEARABLE SENSOR FOR HUMAN ACTIVITY MONITOING

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ABSTRACT:

Healthcare costs are rising at an alarming rate due to an increasing global population and an aging society. Health care is undergoing a transition that allows residents to be monitored even while they are not in the hospital. Developing smart systems that constantly monitor human activity is now possible thanks to advancements in sensing technologies, embedded systems, wireless communication technologies, nano technologies, and miniaturization. Physiological and other signs are monitored by wearable sensors in order to detect aberrant or unexpected occurrences.

As a result, assistance can be delivered when it is most needed. This study examines the most recent wearable sensor-based systems for tracking human activity and the obstacles they face.

Keywords: Heart beat sensor, Temperature sensor, Arduino UNO, GSM module

INTRODUCTION:

Recently, wearable devices got a lot of interests and wide acceptance due to their small sizes, reasonable computation power, and practical power capabilities. These Wearable devices loaded with sensors (e.g. accelerometer, gyroscope) provide a good candidate to monitor user's daily behavior (e.g. walking, jogging, and smoking). Nowadays wearable devices are used in several domains (e.g. activity detection), where health monitoring is one of the prominent issue. Recent advancement of wearable technology has resulted in utilization of wearable and non-intrusive systems for health and activity monitoring. Moreover, wearable technology has empowered the user to quantify, and take control of their lifestyle. In the long run, such consciousness among people will help the society to be healthy and productive. Maintaining such healthy life will also reduce the cost of health-care by allowing the people to spend less time in the hospital or make fewer visit to the doctor. Wearable technology faces three main

challenges: communication capacity, computation power, and limited energy of the wearable device. In

In this research, we present a framework for tracking user activity using wearable devices. It provides a way for wearable devices to decrease the amount of data they need to transmit. Thus, the wearable device is able to better regulate its power consumption. For monitoring applications, data processing overhead is a significant burden. The suggested approach eliminates that burden entirely. Furthermore, it gives the apps more control over their monitoring needs. As part of the proposed framework, wearable devices and accompanying hosts, such as a smartphone, are responsible for tracking an individual's physical activity. Using a

wearable device, raw data is collected, cleaned, and segmented. On the other side, the monitoring program on the host device will process these data segments based on its interest in detecting specific activity patterns. Moreover
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LITERATURE SURVEY

Monitoring human activity is becoming increasingly important as the global old population grows and expectations for caretaking increase. Wireless technology is used to send vital signs for medical evaluation in these systems. The overarching Project's purpose is to improve health care for individuals in a more affordable and relevant manner. Currently, the demand for a health-monitoring system is greater than ever before.
due to escalating health care costs over the last few decades.
Weapons equipped with sensors are proving to be incredibly handy for gathering detailed data on people's movements and habits. Human activities are currently being monitored by smart sensing devices that are currently being developed. Among other things, wearable sensors can be used to monitor the wearer's physiological status, as well as to classify their activity level. Numerous uses for wearable motion sensors (such as accelerometers and gyroscopes) have been reported, including tracking human fall, body motion analysis, and postural alignment. The use of various wearable sensors is becoming increasingly popular, even in sports and training. There is a lot of effort being put into developing smart wearable devices that can continuously monitor a wide range of human activities around the clock.
The design, development, implementation, and use of continuous monitoring are all faced with a number of obstacles. In the following sections, we discuss these issues and how the suggested framework can address them. Varying wearable devices' hardware means that they have different sensor accuracies, frequencies, and transmission rates. Wearable sensors and transmission capabilities present a unique set of challenges when developing an activity detection system. Prior to feature extraction, ensuring the accuracy of the data requires extensive pre-processing (e.g., cleaning, activity/non-activity detection). Preprocessing entails removing noise, motion artifacts, sensor error, data formatting, data normalization, and data synchronization from the captured data before further processing. Sensor data in a continuous monitoring scenario may contain large swaths of data that are completely inactive. Time-series sensor data must be analyzed in order to distinguish between regions of activity and those that are not. It is a difficulty to extract the right features and develop a recognition algorithm/- model for activity detection.

EXISTING SYSTEM:

In Existing framework the health parameters are going to be measured and these parameters are going to send the nearest hospitality or doctors in order to know the patient’s health parameters. But here we should require man power to monitor the health parameters continuously and send that information to the nearer people and hospitality.

The Disadvantages of the Existing System is as follows:

◉ Disconnected environments for patient disease management.

◉ Computational overhead from large volumes of health information data.

Lack of support for user-centric customizable healthcare systems

Proposed system:

In the proposed human health monitoring system using android smart phone includes the aspects of acquisition of medical parameters like Body temperature, Pulse rate and quantity of alcohol consumption. In this system we are using temperature sensor, Heart beat sensor and alcohol sensor for sensing the temperature, heart rate and alcohol consumption quantity of a particular person. Processing of a collected data using Arduino micro controller and processed data is then displayed on doctor's data base. Also the data can be displayed on personal computer.

Block diagram:

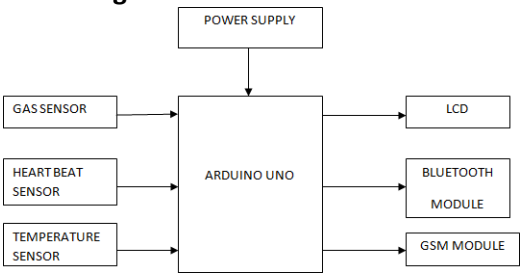

Fig1: Block diagram of the system Hard ware requirements:

Power supply:

Fig2: Flow chart of power supply

ARDUINO

Because the Arduino is open source, it is easier to use than other microcontrollers. As a result, it has a modest price tag and comes with no additional software costs. Both C and C++ can be used to program the Arduino microcontroller.

Arduino features:

- It is 8-Bit Microcontroller.
- It has two 8-bit Timer/Counters.
- Operating frequency 12 MHz-20 MHz

Fig3: Arduino micro controller

MQ-2 Gas sensor:

MQ-2 sensor is used to detect gasses like LPG, alcohol, Hydrogen. This sensor have digital pin which is used to detect the particular gas without micro controller. For measuring the gas in ppm the analog pin is used.

Applications:

* Domestic gas leakage detector
* Industrial Combustible gas detector

Humidity sensor (DHT11 sensor):

An abbreviation for digital humidity/temperature (DHT) is DHT. Measures the temperature and humidity of an area. It uses a resistive element to measure the temperature of the surrounding air.

Fig5: DHT11 sensor BLUETOOTH:

To facilitate the establishment of a wireless serial connection using Bluetooth SPP (Serial Port Protocol), we've developed the HC-05 module. All the necessary components for Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation are included in the serial port

Bluetooth module. A single-chip Bluetooth system using CMOS technology and AFH is used in this device (Adaptive Frequency Hopping Feature).

BLUETOOTH

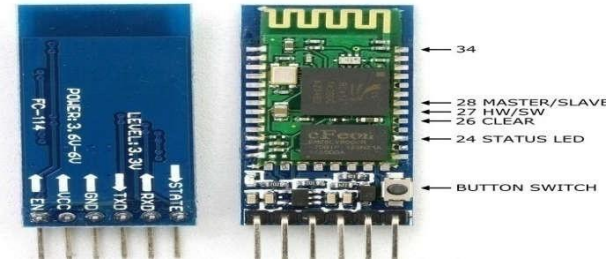

Fig6: Bluetooth module Heart beat sensor:
The transmitter module includes three sensors. All three of these sensors can be found on the Heartbeat Sensor. When a finger is placed on it, this sensor produces a digital readout of the heart rate. The beat LED glows in time with each heartbeat while the heart beat detector is operational. It is possible to link this digital output directly to a microcontroller in order to measure the BPM rate. Light is modulated by the blood flow through the finger at each pulse, and this is how it works.

Fig7: Heart beat sensor
GSM
"Global System for Mobile Communications" is what GSM stands for. Second generation (2G) digital cellular networks are described in this standard set published by the European Telecommunications Standards Institute (ETSI). It is a gadget that modulates and demodulates signals to match the communication needs of a given situation. Demodulation of an analog carrier signal is used to decode the encoded digital information that has been sent.

SOFTWARE REQUIREMENT:

Arduino IDE:

The Arduino IDE is a Java-based application that runs on all major operating systems, including Windows, Mac OS X, and Linux. With the Wiring library, the Arduino IDE can do many standard input and output tasks.

WORKING OF THE PROJECT:

The primary goal of this project is to use wearable sensors to track human activities for the purpose of health care. In order to keep tabs on the participants' body temperatures, pulse rates, and alcohol intake, we've implemented temperature sensors, heart beat sensors, and alcohol sensors. Then, based on the threshold readings, the controller will conduct the necessary action as outlined in the controller's coding. Arduino microcontrollers are used to control all human operations in this project. It begins by determining a patient's temperature using sensors like a DHT11 sensor and a heart rate sensor. Because the sensor readings are analog, they must be converted to digital using the Arduino board's built-in analog to digital converter. Once the critical values have been established, these results are compared to them.

programming. Once such criteria are established, the controller uses GSM and Bluetooth to send data to other hospitals and to the patient's family members. If the person has ingested any alcohol, the controller will get information from the alcohol sensor. SMS messages are then sent to the person's friends and family to alert them to the fact that the subject has been drinking more than usual. Afterwards, the family members will explain the situation to the person in question. People's actions will be tracked as part of this study, and the data collected will be used to help improve their health. Application:

- Hospitals

- Industries

Advantages:

• Portable

• Smart

Results:
Figure 8 depicts the project's hardware setup. BPM, temperature, and gas measurements are displayed on the LCD in Fig9.

To keep tabs on the system and send data to the server, the project uses sensors such as a gas sensor, a heart rate sensor, and a temperature sensor, all of which are connected to an Arduino microcontroller. Figure 8 depicts the system's hardware configuration, while Figure 9 depicts the BPM, gas, and temperature values in LCD dipslay. Figures 10 and 11 depict the data transfer to the server, while Figures 12,13, and 14 depict the findings.

CONCLUSION

Using wearable sensors, this research provides the most up-to-date human activity recognition technology. The primary goal of this project is to create a system that uses wearable sensors to keep tabs on people's movements. Organization of human activity systems by response time and learning scheme is introduced in a two-level taxonomy. Other systems are contrasted in terms of response time, learning approach, obtrusiveness, adaptability, recognition accuracy, and other critical design aspects. Because they are essential to every human activity system, the principles of feature extraction and machine learning have been incorporated as well. As a concluding point, a number of recommendations for further research in this area have been presented.

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