IOT BASED HEALTH MONITORING SYSTEM

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I. ABSTRACT

Monitoring of various medical parameters of patient outside hospitals has become widespread phenomenon. The Reason behind this project is to design a system for monitoring the patient's body at any time using internet connectivity. The function of this system is to measuring some biological parameter of the patient's body like Temperature, Heartbeat, body position by using sensors and the sensors will sense the body temperature, heartbeat and body position of the patient and sends the values to IOT platform through GPRS Module. All information about the patient health will be send to the web server, it enables the doctors to monitor patient's health, where the doctor can continuously monitor the patient's condition on his Smart phone. The results showed that this project can effectively use IOT technology to monitor patient health status and the power consumption of GPRS module can be reduced as much as possible. Thus, the designed system provides low complexity, low power consumptions and highly portable for healthcare monitoring of patients.

Keywords: *Microcontroller, Temperature sensor, Pulse sensor, MEMS, GPRS.*

II. INTRODUCTION

The development of world, Health monitoring system is used every field such as hospital, home care unit, This health monitoring system use for chronicle diseases patients who have daily check-up. Remote health monitoring system was designed that extends healthcare from the traditional clinic or hospital setting to the patient's home. The system was to collect a heartbeat detection system data, fall detection system data, temperature data and few other parameters. The data from the single parameter monitoring systems .The system is developed for home use by patients that are not in a critical condition but need to be timely monitored by doctor or family. So that we can easily save many lives by providing them quick service. The average heartbeat per minute for 25-year old

ranges between 140-170 bpm while for a 60-year old it is around between 115-140 bpm and body temperature is 37degree Celsius or 98.6 Fahrenheit. Patients are not well versed with manual treatment which doctors normally use for tracking the count of heartbeat. Researcher designed different health monitoring system based on requirement. Different platform like Microcontrollers are used to design the system based on this performance. Different biomedical sensors like temperature sensor, heart rate sensor, and blood pressure sensor are used for monitoring the health condition which is integrated on single system on chip. Health monitoring system is an extension of a hospital medical system where a patient's vital body state can be monitored remotely. Traditionally the detection systems were only found in hospitals and were characterized by huge and complex circuitry which required high power consumption. The use of sensors detects the conditions of the patient and the data is collected and transferred using a microcontroller. Doctors and nurses need to visit the patient frequently to examine his/her current condition. In addition to this, use of multiple microcontrollers based intelligent system provides high-level applicability in hospitals where many patients must be frequently monitored.

III. BLOCK DIAGRAM

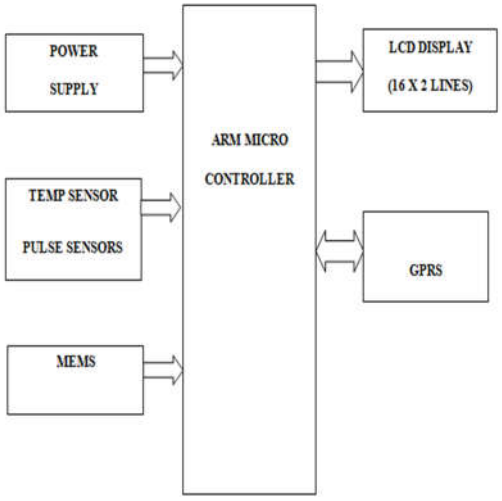


Fig (3.1): System block diagram

Power supply:

This section is meant for supplying Power to all the sections mentioned above. It basically consists of a Transformer to step down the 230V ac to 9V ac followed by diodes. Here diodes are used to rectify the ac to dc. After rectification the obtained rippled dc is filtered using a capacitor Filter. A positive voltage regulator is used to regulate the obtained dc voltage.

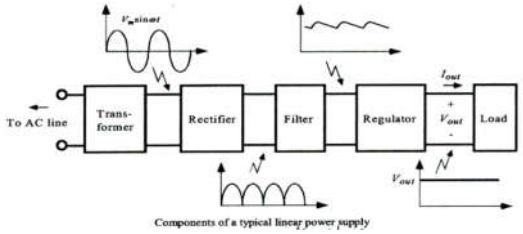


Fig (3.2): Functional block diagram

Micro controller:

This section forms the control unit of the whole project. This section basically consists of a Microcontroller with its associated circuitry like

Crystal with capacitors, Reset circuitry, Pull up resistors (if needed) and so on. The Microcontroller forms the heart of the project because it controls the devices being interfaced and communicates with the devices according to the program being written.

The microcontroller is the final decision making body on the system. The logic is developed and then the program is burned inside the microcontroller and the other peripherals are accessed via microcontroller only. The ARM7TDMI-S is a general purpose 32-bit microprocessor, which offers high-performance and very low power consumption. In this system controller is the most important part. The microcontroller is fundamental piece of this undertaking, so we utilized LPC2148 microcontroller for controlling all gadgets. LPC2148 is an ARM7TDMI-S based superior 32-bit RISC Microcontroller with Thumb augmentations 512KB on-chip Flash ROM with In-System Programming (ISP) and In-Application Programming (IAP), 32KB RAM, Vectored Interrupt Controller, Two 10bit ADCs with 14 channels, one with full modem interface.

Fig (3.3): LPC2148 IC

LCD Display:

This section is basically meant to show up the status of the project. This project makes use of Liquid Crystal Display to display / prompt for necessary information.LCD Display A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD.

Fig (3.4): LCD Display

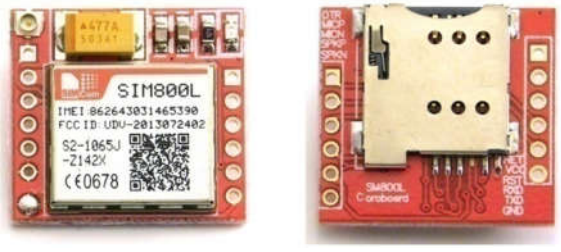
Temperature sensor: Thermistors are a temperature sensing devise. It is used to sense the temperature. In this project by depends on the value of temperature the exhaust fan will run.

Fig (3.5): Temperature Sensor

The word thermistor is an acronym for thermal resistor, i.e., a temperature sensitive resistor. It is used to detect very small changes in temperature. The variation in temperature is reflected through appreciable variation of the resistance of the device. Thermistors with both negative-temperature-coefficients (NTC) and positive temperature coefficient (PTC) are available, but NTC thermistors are more common. The negative-temperature coefficient means that the resistance increases with the increase in temperature.

GPRS Module:

This section consists of a GPRS modem. The modem will communicate with microcontroller using serial communication. The modem is interfaced to microcontroller using MAX 232, a serial driver. The Global Packet Radio Service is a TDMA based digital wireless network technology that is used for connecting directly to internet. GPRS module will help us to post data in the web page directly.



Fig(3.6): GPRS Module

MEMS:

Accelerometers are acceleration sensors. An inertial mass suspended by springs is acted upon by acceleration forces that cause the mass to be deflected from its initial position. This deflection is converted to an electrical signal, which appears at the sensor output. The application of MEMS technology to accelerometers is a relatively new development.

Pulse sensor:

Heart rate data can be really useful whether you're designing an exercise routine, studying your activity or anxiety levels or just want your shirt to blink with your heart beat. The Pulse Sensor Amped is a plug-and-play heart-rate sensor. Simply clip the Pulse Sensor to your earlobe or finger tip.

IV. RESULTS:

Fig (4.1): Temp and pulse will be normal position shown on web server.

Fig (4.2): Temp and pulse will be normal position shown on web server.

Fig (4.3): Temp and pulse will be Fall display on web server.

FIG (4.4): Parameter is display on web server

V. CONCLUSION

The main objective of the experiment was successfully achieved. All the individual modules are viewing gave out the intended results. With the development in the integrated circuit industry, Micro Electro Mechanical Systems (MEMs) and microcontrollers have become affordable; have increased processing speeds, miniaturized and power efficient.

Each health monitoring system has different specification as per patient's requirement. This system provides more medical instrument facility on single system on-chip compare to conventional system. This system takes less than 1 minute to calculate result related to health condition. Size also reduces compared to the conventional system because of integration of number of medical instrument on single chip. So, size, cost and complexity also reduce.

REFFERENCES:

[1] 2. Warsuzarina Mat Jubadi, Siti Faridatul Aisyah Mohd ahak",Heartbeat Monitoring Alert via SMS", 978-1-4244- 4683-4/09/$25.00 ©2009 IEEE.

[2] S. M. Mahalle, P. V. Ingole, "Design and Implementation of Wireless Body Area Sensor Network Based Health Monitoring System", International Journal of Engineering Research & Technology, Vol. 2 Issue 6, pp. 105-113, June 2013.

[3] "Healthcare Monitoring System Using Wireless Sensor Network", D. Mahesh Kumar, Department of Electronics, PSG College of Arts and Science, Coimbatore - 641 014. Volume 04, Issue 01 Pages:1497-1500 (2012), ISSN: 0975-0290.

[4]. Yin, Y., Zeng, Y., Chen, X, Fan, Y.: The internet of things in healthcare: An overview, Journal of Industrial Information Integration, vol. 1, pp. 3-13, (2016).

[5] A. Pantelopoulos and N. Bourbakis, "A survey on wearable sensor-based systems for health monitoring and prognosis," IEEE Trans. Sys., Man, and Cybernetics, Part C: Applic. and Reviews, vol. 40, no. 1, pp. 1–12, Jan 2010.

[6] A. Milenkovi, C. Otto, and E. Jovanov, "Wireless sensor networks for personal health monitoring: Issues and an implementation," Comput. Commun., vol. 29, no. 1314, pp. 2521 – 2533, 2006, wirelsess Senson Networks and Wired/Wireless Internet Communications. [Online]. Available.

[7] C. Rolim, F. Koch, C. Westphall, J. Werner, A. Fracalossi, and G. Salvador, "A cloud computing solution for patient's data collection in health care institutions," in Second Int. Conf. on eHealth, Telemedicine, and Social Medicine, ETELEMED '10., Feb 2010, pp. 95–99.

[8] M. Lan, L. Samy, N. Alshurafa, M.-K. Suh, H. Ghasemzadeh, A. Macabasco-O'Connell, and M. Sarrafzadeh, "Wanda: An end-to-end remote health monitoring and analytics system for heart failure patients," in Proc. of the Conf. on Wireless Health, ser. WH '12. New York, NY, USA: ACM, 2012, pp. 9:1–9:8.

[9] N. Bui and M. Zorzi, "Health care applications: A solution based on the internet of things," in Proc. of the 4th Int. Symposium on Applied Sciences in Biomed. and Com. Tech., ser. ISABEL '11. New York, NY, USA: ACM, 2011, pp. 131:1–131:5.