# Monitoring of patients medical parameters by wireless system by using AT89S52IC

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***Abstract*—In our project we have applied a method to improvise the observation system for patients, with the help of biosensor to measure the temperature and movement of the body. The proposed system uses wireless sensor network rather than wired communication technology available for the ICU patients in hospitals. Here we use an embedded processor for uninterrupted examine of the condition of patients and any unusual condition if absorbed an alerting system is provided to intimate the respective doctors and medical officials. The processing is achieved by microcontroller and the outcomes are obtained.**

***Key words* – sensors, microcontroller, patient, monitoring, alerting.**

## I. INTRODUCTION

For a long time wired system have been implemented all over the science field which are now being replaced by the wireless communication network via Wi-Fi and the sensors make these researches more flexible for the current generation.

The main priority of any research is to make human life easy and to develop a lifesaving technology. The human health is one of the major aspects which is to be taken care of. Here we develop a system which can be implemented on patients whose health variations is to be observed to avoid critical conditions. The main goal of our project is to have a automatic altering system when the patient is undergoing any abnormal variation in their body temperature or have a unauthorized motion. The alerting system consist of the GSM module that sends the message to a pre-stored number about the patient's varied condition , a GPS intimating the location of the patient and a buzzer to alert the surrounding medical staff.

The required operations are undertaken by a microcontroller to perform which is programmed by a embedded C language.

## II. IMPORTANCE OF BIOMEDICAL ENGINEERING

The biomedical engineering is to apply principles and techniques from the physical and engineering science to medical and biological problems. The main idea of implementing the biomedical engineering is to improvise the current monitoring system in hospitals so as to decrease the wired system.

The biosensors which used in these biomedical engineering are simple to understand and easy to handle and are efficient in providing information about the medical parameters which are to be observed for example, elderly people have make frequent visits to their doctors to get their vital signs measure. The main aim is to develop low cost, low power, reliable, non-invasive vital signs monitor which collect different type of body and the sampled parameters are wireless.Remote patient monitoring is a technology to enable monitoring of patients outside of conventional clinical settings, which may increase to access to care and decrease health care delivery cost.

## III. CIRCUIT DIAGRAM AND WORKING

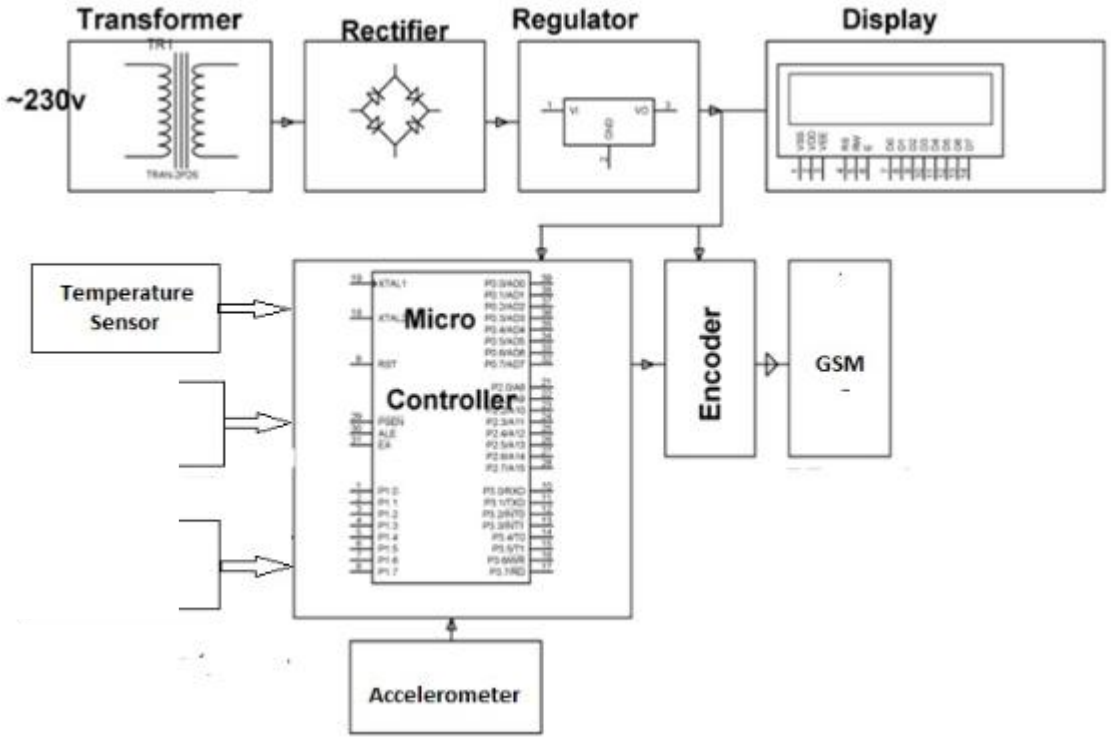


Fig 1: Circuit diagram

The system consist of mainly two sensors, a temperature sensor LM35 and a Accelerometer. When the supply is given to the system the sensors are switched on, these sensors are interfaced with the microcontroller. With any variation in the sensors are found, that means the sensors are high with certain voltage. The microcontroller gets input as a voltage from the sensor output and the processing takes place as the microcontroller is been programed, then the output of the microcontroller is given as the input to the alerting unit, which consist of a GSM module and the LCD display.

The LCD display, displays the varied parameter and its current value whereas the GSM sends the message via SMS to intimate the authorized staff or guardian whose number is pre-stored in the microcontroller, the GSM module requires a SIM slot in order to send the SMS. Since the microcontroller has only one serial communication port hence a relay is used to connect the GSM module to the microcontroller. The transformer used is a step-down transformer which steps down the supply voltage and provides sufficient voltage to the microcontroller required for the operation.

## IV. DETAILS OF SENSING SYSTEM

The current system consist of two sensors, a temperature sensor and a motion sensor, which senses signals from patients and is then amplified which will be harmless to the human health, the details of these sensors are given below.

**Temperature sensor [LM35]**

The LM35 is the temperature measuring device which uses an integrated circuit. It has the operating temperature range of -55C to +122C. The scratchpad memory contains the 2-byte temperature register that stores the digital output from the temperature sensor; another feature of the LM3 is the ability to operate without an external power supply.

Fig 2: LM35

The direct to direct temperature sensor is the core function of LM35. The output data from the sensor is calibrated in degree Centigrade. The ambient temperature is converted into electrical voltage by a circuit in the IC where the temperature change is proportional to the output voltage changes.

**Motion sensor [Accelerometer]**

Accelerometer is a motion or vibration sensing electro-mechanical device used to measure acceleration force, it is a transducer that is used to measure the physical or measurable acceleration that is made by an object. It works as for the piezoelectric effect and the capacitance sensor.

The piezoelectric effect uses microscopic crystal structure that becomes stressed due to accelerometer force. The capacitance accelerometer senses changes in capacitance between microstructure located next to the device. The accelerometer used in our system is tri-axial model, these are high sensitive device which measure very minute shafts in acceleration.

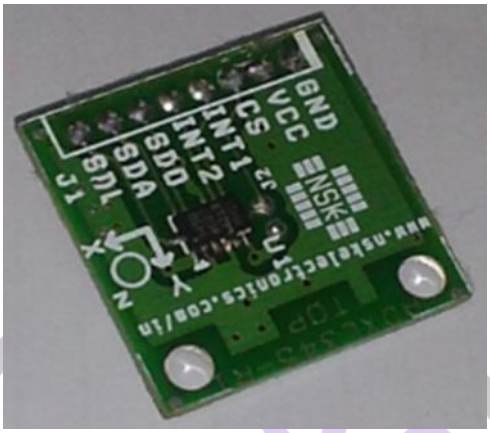


Fig 3: Accelerometer

The static acceleration is measured within the used measuring device, the measuring device will decide at that the thing is leaning .and therefore the speed and therefore the direction may be measured. escape board for the three axis ADXL335 from Analog Devices. it's the recently well-tried line of analog devices - The ADXL335 may be a triple axis MEMS measuring device with very low noise and power consumption - solely 320uA! The sensor includes a full sensing vary of +/-3g. Board comes absolutely assembled and tested with external parts put in. The enclosed zero.1uF capacitors set the information measure of every axis to 50Hz. and aboard regulator three.3volts.

## V. INTERFACING OF MICROCONTROLLER

The 8051 microcontroller utilized in our project has been programmed victimization associate degree embedded C language for the operation of the sensors, the output from the sensing element is that the input to the microcontroller that is within the variety of analog and digital voltages, every sensing element encompasses a determined port because the operative channel.

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The microcontroller reads the output code of an analog-to-digital converter, which is driven by a thermistor-resistor voltage divider. Each sensor's signal is been sampled at a predefined rate through interrupt-driven algorithms. The program used for the system is in such a way that it is a very ending loop for the check of variation in the parameters in the sensors that is , once the supply is given to the microcontroller the program runs and goes on checking for any variation in the sensors, it can be shown in the below fig 4 Flow chart.

The LCD display glows when supply is given, the microcontroller program checks if the temperature sensor is high or not, if true then the program enters the loop and gives signal to the GSM and GPS, the GPS can be used to locate the needy which are to be monitored, once the operation is completed it comes out of the loop and again starts from the beginning, if temperature sensor is not high the condition is false hence it jumps to next loop directly and checks for the acceleration sensor for being high, if true the alerting is done and if false then the step is skipped and goes back to check the next sensor. This loop checking operation is uninterrupted until the supply is cutoff.

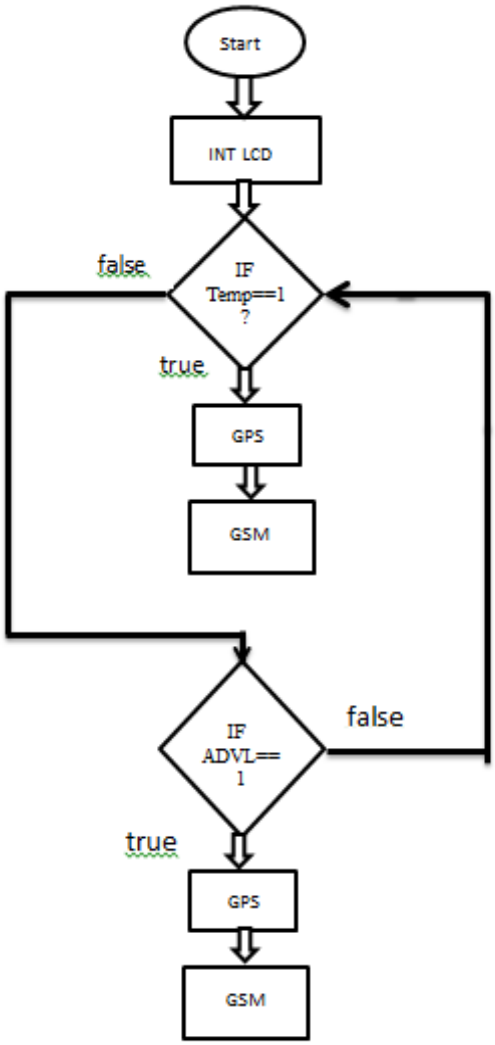


Fig 4: Flow chart of proposed system

## VI. EXPERIMENTAL RESULTS

The patient's body parameter will be taken as the input from the sensors connected, the sensors sends information to the microcontroller which will compare with the reference value pre-programmed in the microcontroller, the LCD displays the varied parameter and the information is sent to authorized doctors using GSM module, for safety purpose buzzer can also be installed.

## VII. APPLICATIONS AND FUTURE SCOPES

- Emergency paramedic help to save life up to ambulance reach out for service.
- Since the system is non-harmful to the humans, it can be made warble by further development
- The system can also be utilized for military use in order to monitor the solider or the missiles that are need to be tracked
- As the system consists of only two sensors, it can be added with others sensors which helps to create a whole monitoring system for patients.
- As it is portable not only in hospitals, it can also be installed in homes.

## VIII. CONCLUSION

Hence we designed high technological equipment which is very useful for hospital application as well to save the life of patients in case of emergency and we implemented a module by using GPS to track the patient area remotely. The whole system can be installed in homes if necessary and can be warble, which uses less power and is more efficient and accurate.

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