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# HEALTHCARE MONITORING AND TRACKING SYSTEM USING GSM/GPRS TECHNOLOGIES

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**ABSTRACT**

*Recently, remote monitoring systems have evolved to respond for particular needs in healthcare sector, which is an essential pillar in the modern concept of smart city, we propose a smart system to monitor patient current health conditions, as a smart healthcare system based on the widely spread available technologies; namely, GSM and GPRS. Statistics shows that hypertensive heart disease and blood pressure are risk factors for high death rate to decrease it a preventive measures should be applied providing a real-time health monitoring tracking system using gsm/gprs, to save patients life at acceptable time. The objectives of this paper is to provide an effective system model, that will track, trace, and monitor patient vital readings in order to provide efficient medical services in time. By using sensors, the data will be captured and compared with a predefined threshold. The study focuses on heartbeat rate, and body temperature, thus in case of emergency an SMS will be sent to the Doctors mobile containing measured values and position. Moreover, the paper demonstrates the possibility of building a complete end-to-end smart healthcare monitoring system by using wide range of available sensors for more vital human health parameters to connect patient with doctors in cases of emergency*.

***Keywords: LPC2148, Temperature sensor, Heart beat sensor.***

## I. INTRODUCTION

According to international worldwide knowledge of the world effects of high blood pressure heart diseases the analysis study demonstrates that vital sign or high blood pressure affects over one billion folks worldwide. Instead of the high blood pressure heart diseases, the high blood are often an element and attribute to cause several different disorders, like stroke aneurysms, anemia heart, and nephritis. the chance of heart disease, as a result of high blood pressure is sort of accrued by issue 2 or three-fold and should accounts for regarding twenty fifth of all heart disease cases furthermore the high blood pressure or high vital sign in ninetieth of cases preceded or advanced the guts failure telescopically for older. High blood pressure was graded thirteenth within the leading world causes of death for all ages. A world map shows the distribution of diseases caused by high vital sign in Figure one. Statistics for

the numbers of heart diseases weren't obtainable as a result of the ill health of the many countries of the center east region, thus this project could encourage relevant establishments to gather such statistics.

In Associate in Nursing era of laziness and lack of physical exercises, fat, sugar, meats, smoking, obesity, and also the lack of consumption fruit and vegetables. Underneath the shade of adverse economic state of affairs, physical fatigue, stress and to having dignified life the vital sign illness has been the notable one within the last century as a result of poor consumption habits. These medical specialty conditions area unit chief of this type of ill health, in several countries.

GSM services area unit used for world communications any time and anyplace, GPS technology is applied for outside positioning, several works has been carried to use GPS and SMS for localization Figure three describes the flow chart of the urged system, starting with reading the guts rate and temperature by mistreatment specific sensing elements: pulse sensor and temperature sensor; the captured knowledge are going to be compared via microcontroller i.e.

## II. LITERATURE REVIEW

The most of body device networking (BSN) are communicate with explicit device with restricted distance solely heart beat device temperature sensor and etc. are connected to body and the result monitored by victimization special equipment's solely. Those equipment's provides solely analog values some pricey equipment's gives digital values. And one person need to monitor these values, if the patent health condition critical there is no alerting system.

In this system we will avoid the in particular problems. Body sensors networking(BSN) directly communicate with android mobile throw GSM/GPRS, no need to monitor patents frequently, these system can provide precise and correct health statues of the patent, and it can provide some alert once the patent health condition going to essential. Microcontroller compare predefined values with patents updated values, when the patent condition essential these system will alert, in this system consist GSM so by connecting automaton mobile with system the standing of the patent will monitor continuously.

## III. HARDWARE DESIGN

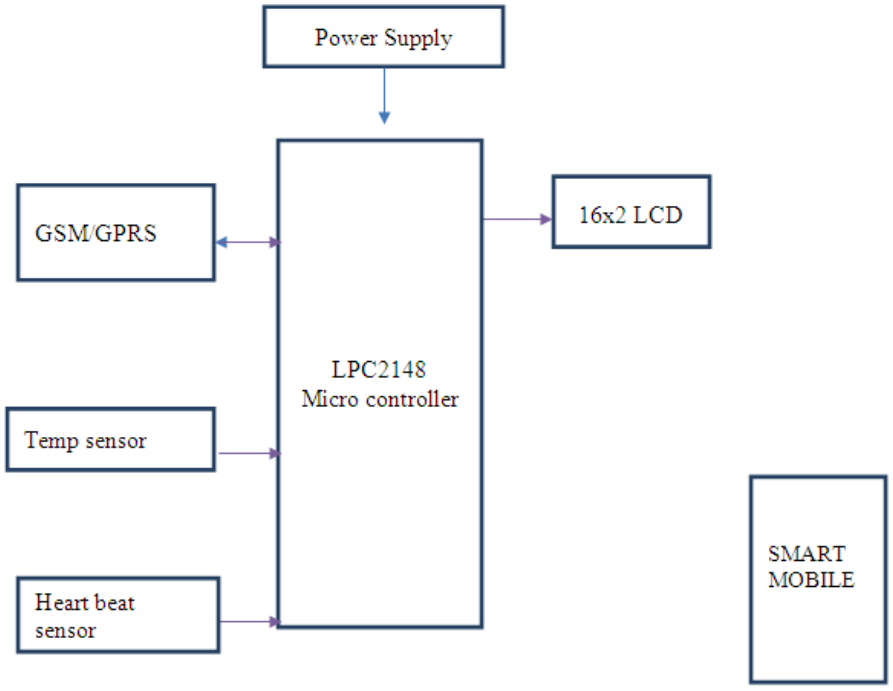



fig1: Block Diagram

### LPC2148 microcontroller

The LPC2148 microcontroller board based totally on a sixteen-bit/32-bit ARM7TDMI-S CPU with real-time emulation, sixteen-bit/32-bit ARM7TDMI-S microcontroller in a tiny LQFP64 package deal, 8 kB to 40 kB of on-chip static RAM and 32 kB to 512 kB of on-chip flash memory; 128-bit huge interface/accelerator allows high-pace 60 MHz operation, In- system Programming (ISP), unmarried 10-bit DAC affords variable analogue output, 32-bit timers/outside event counters (with four capture and 4 examine channels every), PWM unit (six outputs) and watchdog, Low strength actual-Time Clock (RTC), more than one serial interfaces which includes two UARTs , rapid I2C-bus (400kbit/s), SPI and SSP with buffering and variable information length competencies.

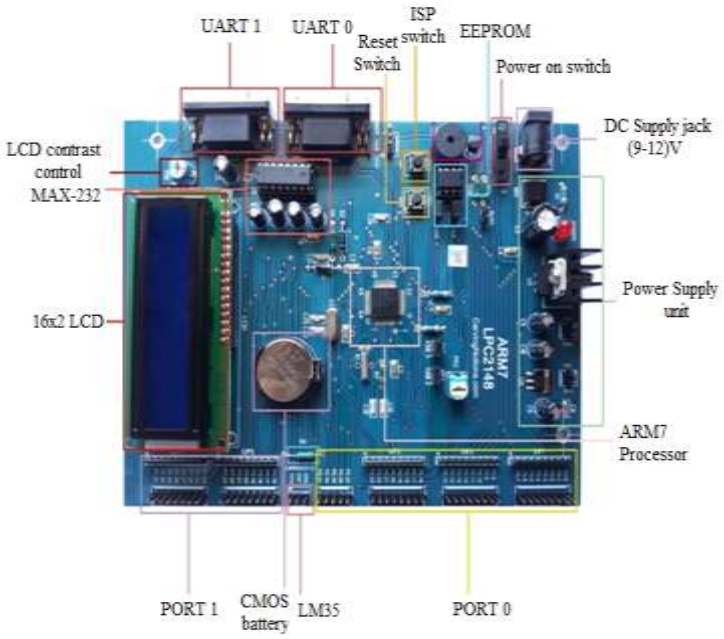



**Fig2:-LPC2148 board**

**GSM (GLOBAL SERVICE FOR MOBILE COMMUNICATION)**

The GSM module is SIM 900D is a powerful GSM module for SMS and call control .GSM networks feature in four specific frequency levels. Maximum GSM networks feature within the 900 MHz or 1800 MHz bands. A few international locations in the Americas use the 850 MHz and 1900 MHz bands because the 900 and 1800 MHz frequency bands had been already allotted. The rarer 4 hundred and 450 MHz frequency bands are assigned in a few worldwide places, wherein those frequencies were previously used for first-era structures. The module consists of SIM 900 A for calling and messages.

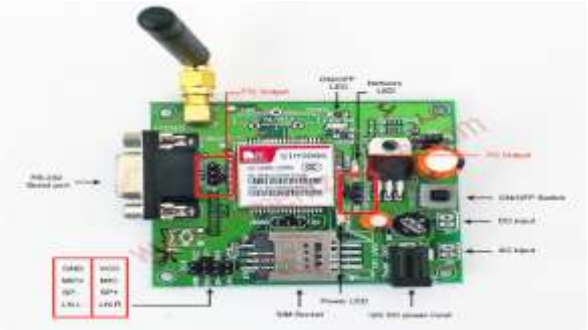
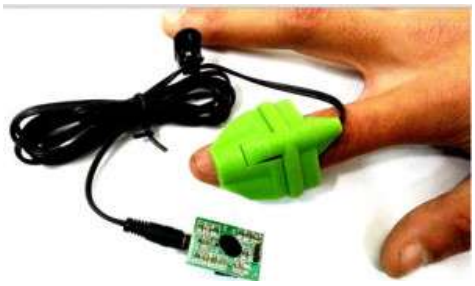


Fig 4. SIM 900D GSM MODULES

## Heartbeat Sensor

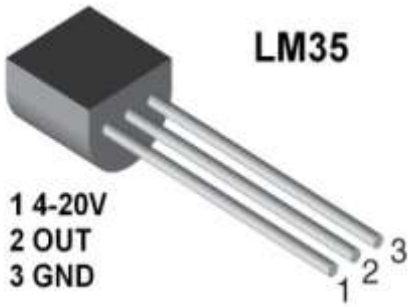
Heartbeat detector provides a straightforward thanks to study the perform of the center which might be measured supported the principle of psycho-physiological signal used as a input for the virtual- reality system. The quantity of the blood within the finger changes with regard to time.

The detector shines a light-weight lobe (a little terribly bright LED) through the ear and measures the sunshine that gets transmitted to the sunshine Dependent resistance. The amplified signal gets inverted and filtered, within the Circuit. So as to calculate the center rate supported the blood flow to the tip, a heart-rate detector is assembled with the assistance of LM358 OP-AMP for observance the heartbeat pulses.



**Temperature sensor:**

The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 thus has an advantage over linear temperature sensors calibrated in ° Kelvin, as the user is not required to subtract a large constant voltage from its output to obtain convenient Centigrade scaling. The LM35 does not require any external calibration or trimming to provide typical accuracies of ±1⁄4°C at room temperature and ±3⁄4°C over a full −55 to +150°C temperature range. Low cost is assured by trimming and calibration at the wafer level. The LM35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy. It can be used with single power supplies, or with plus and minus supplies. As it draws only 60 μA from its supply, it has very low self-heating, less than 0.1°C in still air. The LM35 is rated to operate over a −55° to +150°C temperature range, while the LM35C is rated for a −40° to +110°C range (−10° with improved accuracy). The LM35 series is available packaged in hermetic TO-46 transistor packages, while the LM35C, LM35CA, and LM35D are also available in the plastic TO-92 transistor package. The LM35D is also available in an 8-lead surface mount small outline package and a plastic TO-220 package.




## IV. SOFTWARE DESIGN

In this proposed gadget, as we used LPC2148 we want to use following software equipment to program for it.

1. Keil4 Vision
2. Flash Magic

The Keil4 Vision is an IDE for Embedded c language. in this IDE, we want to import the utilities and libraries according to the controller we're the use of. This IDE is very less difficult and in user friendly way to apply. It consists of all the C/C++ compilers, assemblers, and debuggers in it. It simplifies the manner of embedded simulation and trying out in conjunction with Hex file technology.

The flash magic is a programming utility. The C/C++ software written in IDE may be processed into Hex document i.e. in .hex layout. By using hex file we dump the code into microcontroller and perform the task with respective application.

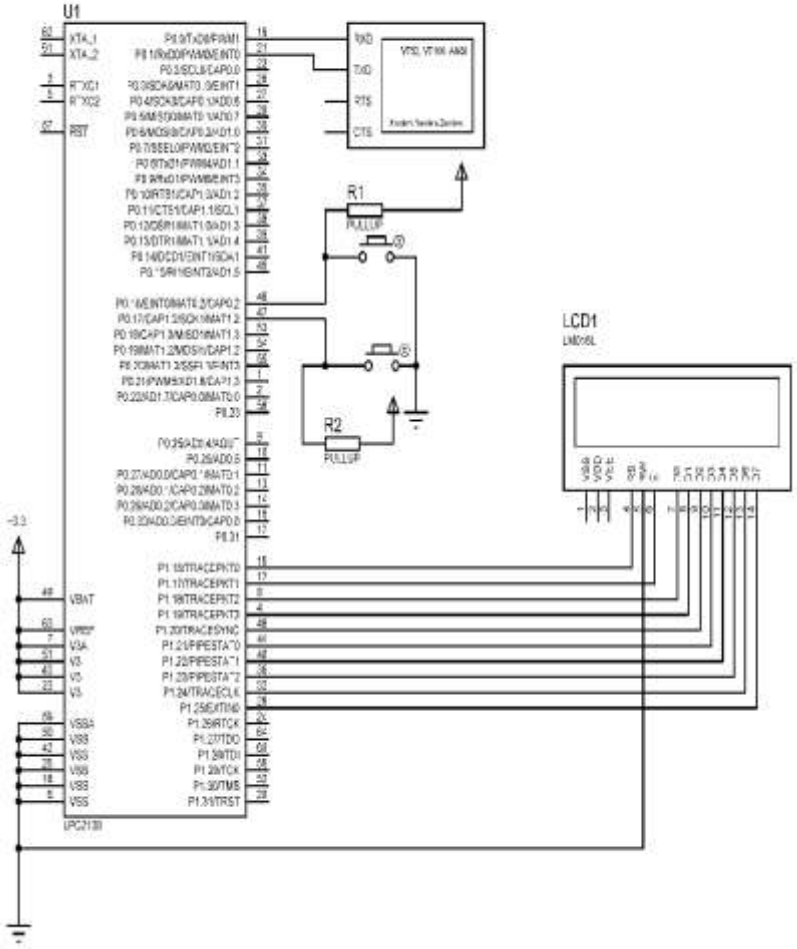
## V. WORKING DISCRRIPTION

The most objective of the project is to look at the sensor data and collectively transmit the info through GSM/GPRS technology. Thus we have a tendency to can merely monitor the data from the detector in an exceedingly predefined manner. In this project the microcontroller plays an important role to perform the specified task. The microcontroller we used in this project is ARM seven LPC2148 that has many integral options like ADC, SPI, I2C, PWM, and RTC. The sensors which area unit interfacing directly with microcontroller and we have a tendency to write the code in such manner to speak with the microcontroller and perform the precise task. The GPRS module is interfaced with microcontroller which is used to transmit the values of the corresponding detector knowledge and monitor the data through messages .

## VI. WORKING PROJECT

The project is designing of LPC2148 microcontroller its operative with heart beat sensor and temperature sensors, in this project an electronic circuit we have a tendency to area unit mistreatment to observe patents temperature and heartbeat identification in hospitals for patents health observance purpose. Here we area unit interfacing heartbeat and temperature sensors to our small controller, the sensors continuously transmits the knowledge to sensible mobile by mistreatment GPRS technology. If the controller gets more values then predefined values the system will provide the alert otherwise it unendingly transmits the sensors knowledge to the microcontroller then the microcontroller send the knowledge to the sensible mobile mistreatment SMS.

And another feature of this project is providing critical conductivity detection of patent and with alert. healthcare monitoring and tracking system using gsm/gprs technologies developed by applying GMS/GPRS technology is conferred. It can discover the body temperature, heartbeat and transfer he data unendingly.




Schematic diagram

## VII. RESULTS

Here the results are shown our project "**HEALTHCARE MONITORING AND TRACKING SYSTEM USING GSM/GPRS TECHNOLOGIES**" whenever high/low temperature and high/low heart rate detects from the various device it offer alert otherwise it unendingly transfer the body reading through GPRS. Here GPRS connected to lpc2148 microcontroller it send the data from mobile.

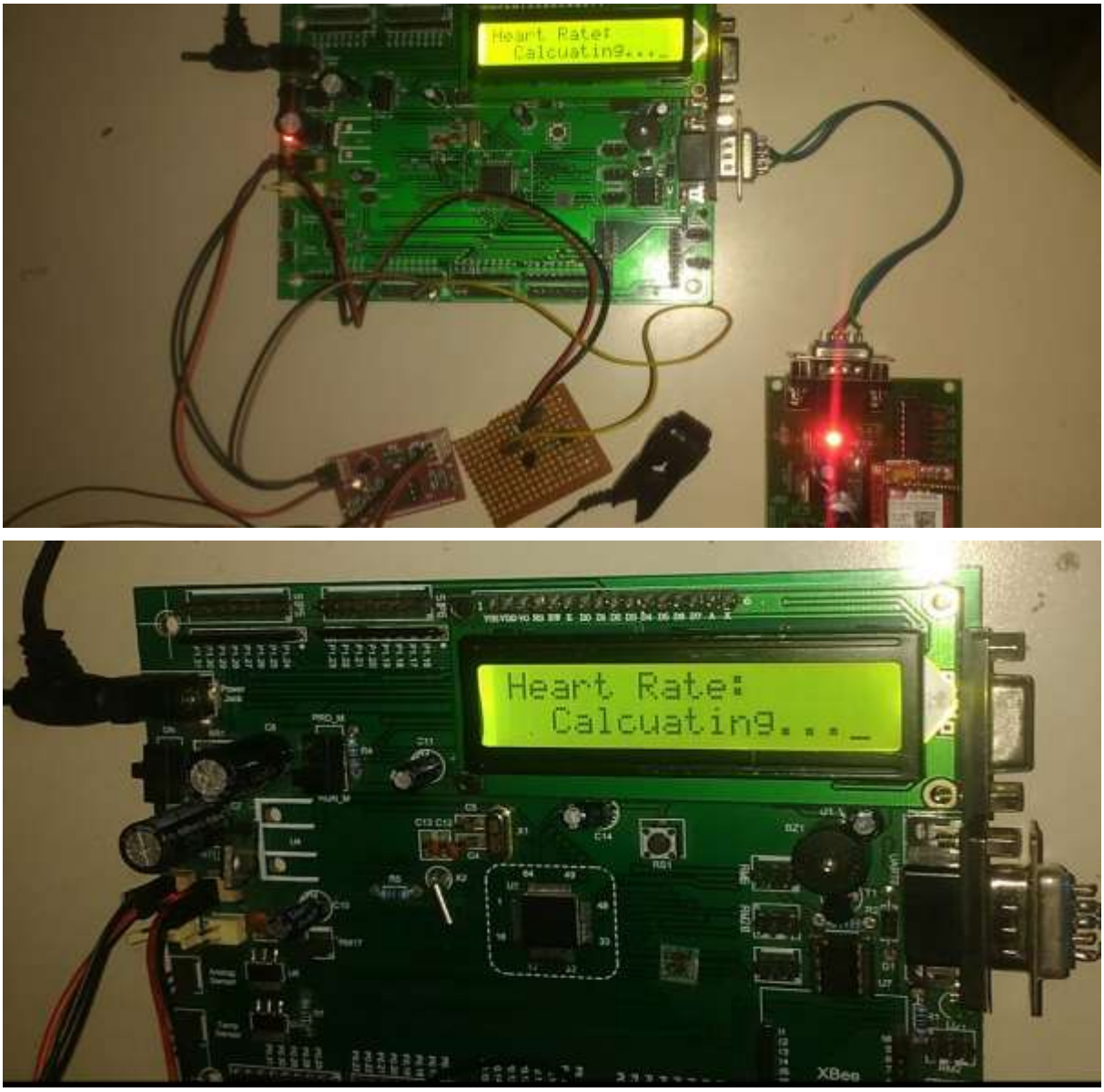



Fig: Output pics

## VIII. CONCLUSION

In these project GPRS technology used for data receiving from GSM has with success designed and testing. In all hardware components its developed by group action options area unit used. presence of every elements reasoned

placed fastidiously checkout in outputs. its as highly advanced lpc2148 microcontroller with facilitate of technology the project has been with success .

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