RESEARCH ARTICLE                                                        OPEN ACCESS

# Automatic Patient Monitoring And Ambulance Rescue With Intelligent Traffic Light System

## A.NAGENDER RAO [1], K.VANI [2], T, SATYANARAYANA [3]

[1] , Dept Of ECE, CMR Engineering college, Hyderabad, Telangana.
[2] , Assistant professor, CMR Engineering college, Hyderabad, Telangana
[3] , Associate Professor, CMR Engineering college, Hyderabad, Telangana.

**Abstract:**
Traffic congestion and tidal flow management were recognized as major problems in modern urban areas, which have caused much uncomfortable for the ambulance. Moreover road accidents in the city have been nonstop and to bar the loss of life due to the accidents is even more crucial. To implement this we introduce a scheme called AARS (Automatic ambulance rescue system). The main theme behind this scheme is to provide a smooth flow for the ambulance to reach the hospitals in time and thus minifying the expiration. The idea behind this scheme is to implement a ITS which would control mechanically the traffic lights in the path of the ambulance. The ambulance is controlled by the central unit which furnishes the most scant route to the ambulance and also controls the traffic light according to the ambulance location and thus reaching the hospital safely.. This scheme is fully automated, thus it finds the accident spot, controls the traffic lights, helping to reach the hospital in time.
*Keywords: Microcontroller, ZIGBEE, Temperature Sensor, RF -Transceiver, Pulse Sensor, MEMS, LCD*

## I. Introduction

This AARS (Automatic ambulance rescue system) continuously monitors the patient health with the help of sensors like pulse sensor, temperature sensor and mems. By the use of pulse sensor we can monitor patient pulse, by the use of temperature sensor we can monitor patient temperature, and by the use of mems we can monitor the person direction. For automatically controlling the traffic signals we use RF Technology i.e. at each ambulance there will be one RF Transmitter and at each traffic junction there will be one RF Receiver and achieving the above mentioned task so that the ambulance would be able to cross all the traffic junctions without waiting.

For easy access the server maintains a database for each node, and hence each node will have a unique id for addressing it. The ambulance is guided to the hospital by the server through the shortest route The main server finds the nearest ambulance to the accident spot and also the shortest path between the ambulance, accident spot and the nearest hospital. We are sending the total patient information to the hospital through ZIGBEE protocol. Even though the traffic section signals are running at normal timing, But we can change the signaling status from ambulance section

## II. The Hardware System

**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.

**ARM7TDMI:** ARM is the abbreviation of Advanced RISC Machines, it is the name of a class of processors, and is the name of a kind technology too. The RISC instruction set, and related decode mechanism are much simpler than those of Complex Instruction Set Computer (CISC) designs.

**Liquid-crystal display** (**LCD**) is a flat panel display, electronic visual display that uses the light modulation properties of liquid crystals. Liquid crystals do not emit light directly. LCDs are available to display arbitrary images or fixed images which can be displayed or hidden, such as preset words, digits, and 7-segment displays as in a digital clock. They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements

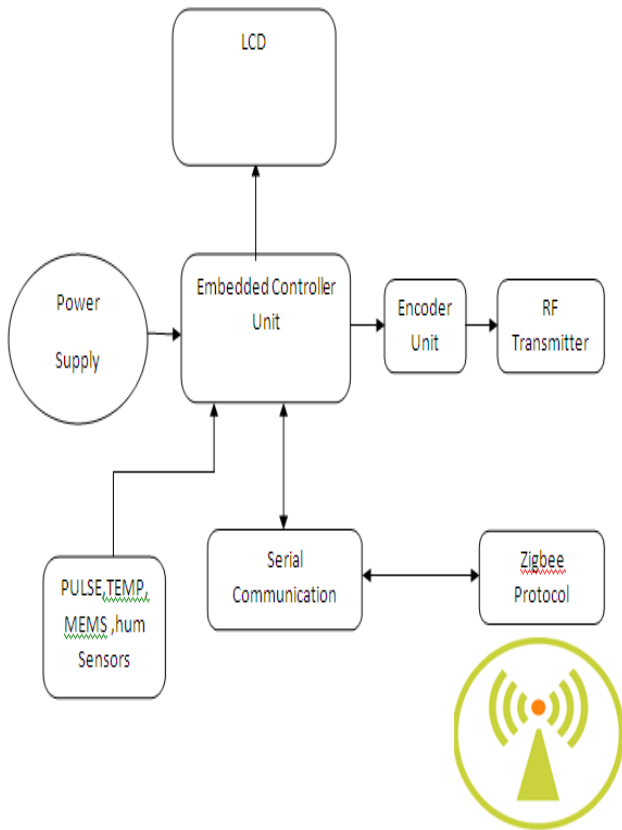## III. Design of Proposed Hardware System

*International Journal of Engineering Research and Applications (IJERA) ISSN: 2248-9622*
*NATIONAL CONFERENCE on Developments, Advances & Trends in Engineering Sciences*
*(NCDATES- 09th & 10th January 2015)*
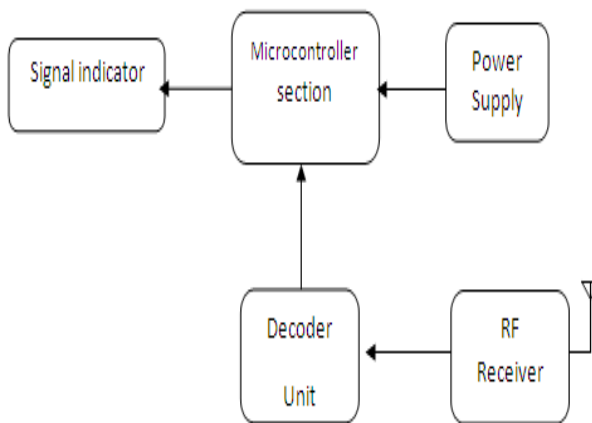
Fig.1. **Ambulance Section**

Fig.2. **Signal Section**

In the ambulance section we are monitoring the patient health and also traffic signal control. Patient health monitor by the use of pulse sensor, temperature sensor and mems .by the use of pulse sensor we can monitor patient pulse, by the use of temperature sensor we can monitor patient

temperature, by the use of mems we can monitor the person direction. Whatever the patient information we are sending to the hospital through ZIGBEE protocol. Traffic signal section signals are running normal timing. We can change the signalling status to green selected way from ambulance section
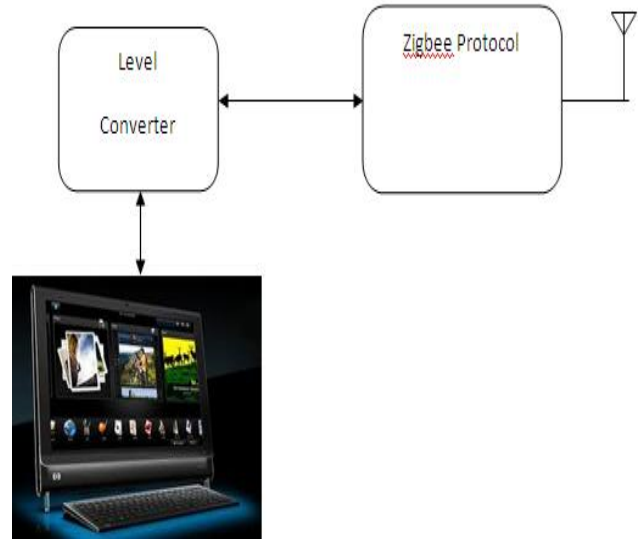
Fig.3. **Hospital Section**

## III.Board Hardware Resources Features
*Temperature Sensor:*
   The LM35 is an integrated circuit sensor that can be used to measure temperature with an electrical output proportional to the temperature (in $^oC$)
The LM35 - An Integrated Circuit Temperature Sensor You can measure temperature more accurately than a using a thermistor. The sensor circuitry is sealed and not subject to oxidation, etc. The LM35 generates a higher output voltage than thermocouples and may not require that the output voltage be amplified.

It has an output voltage that is proportional to the Celsius temperature. The scale factor is .01V/$^oC$ The LM35 does not require any external calibration or trimming and maintains an accuracy of +/-0.4 $^oC$ at room temperature and +/- 0.8 $^oC$ over a range of 0 $^oC$ to +100 $^oC$. Another important characteristic of the LM35DZ is that it draws only 60 micro amps from its supply and possesses a low self-heating

*International Journal of Engineering Research and Applications (IJERA) ISSN: 2248-9622*
*NATIONAL CONFERENCE on Developments, Advances & Trends in Engineering Sciences*
*(NCDATES- 09th & 10th January 2015)*

capability. The sensor self-heating causes less than 0.1 °C

*Pulse Sensor:*

Heart rate data can be really useful whether we are designing an exercise routine, studying our activity or anxiety levels or just want our shirt to blink with your heart beat. The problem is that heart rate can be difficult to measure. Luckily, the *Pulse Sensor* Amped can solve that problem!

The Pulse Sensor Amped is a plug-and-play heart-rate sensor for Arduino. It can be used by students, artists, athletes, makers, and game & mobile developers who want to easily incorporate live heart-rate data into their projects. It essentially combines a simple optical heart rate sensor with amplification and noise cancellation circuitry making it fast and easy to get reliable pulse readings. Also, it sips power with just 4mA current draw at 5V so it's great for mobile applications.

Simply clip the Pulse Sensor to your earlobe or finger tip and plug it into your 3 *or* 5 Volt Arduino and you're ready to read heart rate! The 24" cable on the Pulse Sensor is terminated with standard male headers so there's no soldering required. Of course Arduino example code is available as well as a Processing sketch for visualizing heart rate data.
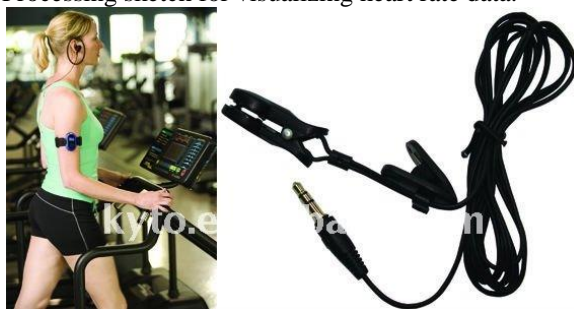


**MEMS**

Micro electro mechanical systems (MEMS) are small integrated devices or systems that combine electrical and mechanical components. Their size range from the sub micrometer (or sub micron) level to the millimeter level and there can be any number, from a few to millions, in a particular system. MEMS extend the fabrication techniques developed for the integrated circuit industry to add mechanical elements such as beams, gears, diaphragms, and springs to devices.

Examples of MEMS device applications include inkjet-printer cartridges, accelerometers, miniature robots, microengines, locks, inertial sensors, micro transmissions, micromirrors, micro actuators, optical scanners, fluid pumps, transducers and chemical, pressure and flow sensors. Many new applications are emerging as the existing technology is applied to

the miniaturization and integration of conventional devices.

These systems can sense, control and activate mechanical processes on the micro scale and function individually or in arrays to generate effects on the macro scale. The micro fabrication technology enables fabrication of large arrays of devices, which individually perform simple tasks, but in combination can accomplish complicated functions.

MEMS are not about any one application or device, or they are not defined by a single fabrication process or limited to a few materials. They are a fabrication approach that conveys the advantages of miniaturization, multiple components and microelectronics to the design and construction of integrated electromechanical systems. MEMS are not only about miniaturization of mechanical systems but they are also a new pattern for designing mechanical devices and systems.
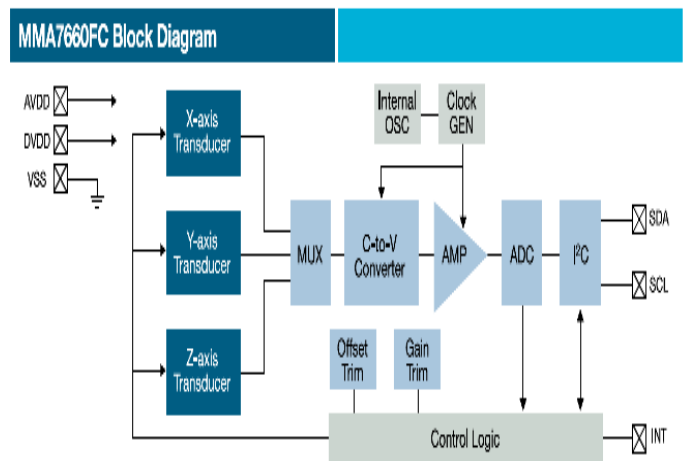


*Zigbee*

Zigbee modules feature a UART interface, which allows any microcontroller or microprocessor to immediately use the services of the Zigbee protocol. All a Zigbee hardware designer has to do in this ase is ensure that the host's serial port logic levels are compatible with the XBee's 2.8- to 3.4-V logic levels. The logic level conversion can be performed using either a standard RS-232 IC or logic level translators such as the 74LVTH125 when the host is directly connected to the XBee UART. The below table gives the pin description of transceiver. The X-Bee RF Modules interface to a host device through a logic-level asynchronous Serial port. Through its serial port, the module can communicate with any logic and voltage Compatible

*International Journal of Engineering Research and Applications (IJERA) ISSN: 2248-9622*
*NATIONAL CONFERENCE on Developments, Advances & Trends in Engineering Sciences*
*(NCDATES- 09ᵗʰ & 10ᵗʰ January 2015)*

UART; or through a level translator to any serial device.

Data is presented to the X-Bee module through its DIN pin, and it must be in the asynchronous serial format, which consists of a start bit, 8 data bits, and a stop bit. Because the input data goes directly into the input of a UART within the X-Bee module, no bit inversions are necessary within the asynchronous serial data stream. All of the required timing and parity checking is automatically taken care of by the X-Bee's UART.



**Features:**

- Internal Sourcing of almost all of main Parts

Almost all components - frame, key switches and membrane sheet - other than connecters and cord are manufactured in-house, giving Minebea an un-matched advantage in terms of quality, supply capabilities, cost-competitiveness and speed of delivery.
Especially, these products capitalize on Minebea's ultra-precision machining technology of components.

- Efficient Production System

Plant in China which supplies the global market employs the Minebea's vertically integrated manufacturing system, whereby all process, from machining components to final assembly are conducted in-house.

### RF Transmission
The RF module, as the name suggests, operates at Radio Frequency. The corresponding frequency range varies between 30 kHz & 300 GHz. In this RF system, the digital data is represented as variations in the amplitude of carrier wave. This kind of modulation is known as Amplitude Shift Keying (ASK).

Transmission through RF is better than IR (infrared) because of many reasons. Firstly, signals through RF can travel through larger distances making it suitable for long range applications. Also, while IR mostly operates in line-of-sight mode, RF signals can travel even when there is an obstruction between transmitter & receiver. Next, RF transmission is more strong and reliable than IR transmission. RF communication uses a specific frequency unlike IR signals which are affected by other IR emitting sources.
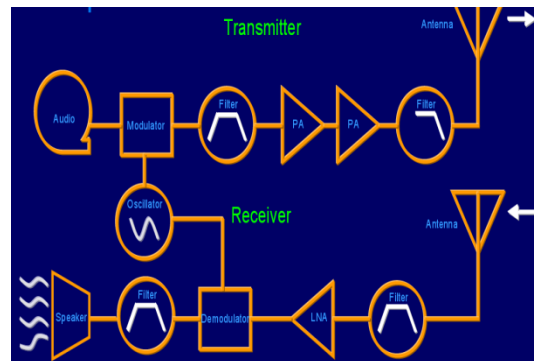


This **RF module** comprises of an **RF Transmitter** and an **RF Receiver**. The transmitter/receiver (Tx/Rx) pair operates at a frequency of **434 MHz** An RF transmitter receives serial data and transmits it wirelessly through RF through its antenna connected at pin4. The transmission occurs at the rate of 1Kbps - 10Kbps.The transmitted data is received by an RF receiver operating at the same frequency as that of the transmitter.

## IV. CONCLUSION
The main theme behind this project is to provide a smooth flow for the ambulance to reach the hospitals in time and thus minifying the expiration. To implement a ITS which would control mechanically the traffic lights in the path of the ambulance. The ambulance is controlled by the central unit which furnishes the most scant route to the ambulance and also controls the traffic light according to the ambulance location and thus reaching the hospital safely. This scheme is fully automated, thus it finds the accident spot, controls the traffic lights, helping to reach the hospital in time. This AARS (Automatic ambulance rescue system) continuously monitors the patient health with the help of sensors like pulse sensor, temperature sensor and mems and sends this information to the hospital (Doctor) using ZIGBEE Technology.

### REFERENCES
[1] A 'Green Wave' Reprieve ,Blaise Kelly B.engMSc,Blaise@kello.co.uk Available at "http://gse.cat.org.uk/papers?download=6%3 Ablaise-kellya-green-wave-reprieve" .

*International Journal of Engineering Research and Applications (IJERA) ISSN: 2248-9622*
*NATIONAL CONFERENCE on Developments, Advances & Trends in Engineering Sciences*
*(NCDATES- 09th & 10th January 2015)*

[2] Karmakar, N. , Handbook of Smart Antennas for RFID Systems , Wiley-IEEE Press, Pages: 13 -56 .

[3] Want, R. , Intel Res., Santa Clara, CA, USA , Pervasive Computing, IEEE , Jan.-March 2006 , Volume:5 ,Issue:1 Page(s): 25 - 33

[4] Introduction to high speed microcontrollers , available at http://www.atmel.com/Images/doc2545.pdf

[5] Image Processing: Principles and Applications by Camastra, F. Neural Networks, IEEE Transactions Volume: 18 , Issue: 2 Publication Year: 2007

[6] Preradovic,S. Electr. & Comput. Syst. Eng., Monash Univ., Clayton,VIC . Karmakar, N. ; Balbin, I. "RFID transponders " Volume:9 ,Issue:5 Microwave magzine, IEEE Page(s): 90 - 103

[7] Digi International Inc, "XBee/XBee-PRO RF Modules", available http://ftp1.digi.com/support/documentation/90 000982_B.pdf

[8] Atmel Corporation, "Atmega16 Datasheet", available http://www.atmel.com/dyn/resources/prod_do cuments/doc2466.pdf

[9] RFID reader manufactured by rhydoz labs , documentation available at http://www.rhydolabz.com/documents/rfid/R FID_Reader_Serial_TTL.pdf.

[10] Passive transponders http://www.rhydolabz. com/documents/rfid/EM4102_DS.pdf ".

[11] Atmel AVR Studio 5 available at www.atmel.com/tools/studioarchive.aspx

[12] Guojiang Shen " Urban Traffic Trunk Two-direction Green Wave Intelligent Control Strategy and Its Application " Intelligent Control and Automation, 2006. WCICA 2006. The Sixth World Congress . Volume: 2 Publication Year: 2006 , Page(s): 8563 –8567

[13] Wei Cheng; Xuemin Li; Pengcheng Du " Urban arterial road green-wave control based on genetic algorithm Awareness Science and Technology (iCAST), 2011 3rd International Conference" , Publication Year: 2011 , Page: 68.