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SMART LIFE SAVER WITH AUTOMATIC TRAFFIC CONTROL

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Abstract — **The purpose of this paper is to handle a major issue of traffic in our real world entities during ambulance emergency services. Because due to emerging traffics it's critical for an ambulance to reach hospital on time. So we came up with a project "Smart life Saver with automatic traffic control" .This project deals with efficient managing of traffic during emergencies. It provides tools like GPS, Sensors, GSM modules, RF transmitter and Arduino. This tools are embedded together to provide an efficient services to victims during their emergence situation. Along with this it provides a smart app called "Smart Ambulance" which tracks victim's health conditions. So it can reduce the chances of death rate and provide an adequate service during their needs.**

***Index Terms* — Arduino UNO, GPS, GSM module.**

I. INTRODUCTION

In today's world health hazards are a major concern. The people with different age groups are the victims, and moreover the traffic conditions are worsening day by day, which results in traffic jams.

Here we are tracking the health parameters of the victims such as body temperature, blood level, heart rate and blood pressure in the ambulance, these parameters are measured using a different sensors such as LM35, IR, L14F1 respectively and the measured parameters are interfaced with the Arduino UNO microcontroller and it is sent to the hospital by using GSM Trans receiver. Which is interfaced by MAX 232, so that doctor can give treatment to the victim as early as possible, It is one of the major part of our project. In the other hand we provide the driver with a remote control with 8 buttons for 4 different lanes. The driver will see from which lane he is going and will press appropriate button will send a 4 bit data to the signaling unit through HT12E, TX433 Radio Frequency transmitter. This can be done 100 meters before the signal choke. It has a social benefit. The cost of the project estimated as our knowledge might be approximately Rs.7000/-.In our project we have future implementation; this can be used in Ambulance and Hospitals to save the victims life by providing treatment as early as possible.

II. LITERATURE SURVEY

Google has developed API for user's ease. Google Maps gives information about hospitals nearby, with its rating and distance from user's current location. The drawback of Google Maps is that it only pins the hospitals but does not provide their detailed information. Hence user may need to access information about the hospital by going to particular hospital's website. Smart ambulance system application overcomes this drawback and gives hospital information related to user's medical emergency. It's a protocol that gives information efficiently about the patient's health including pulse, blood pressure etc. It also tells about the respective drugs and medicines automatically. All this is informed to the doctor and the caretaker about the patient's condition. All these interactions are controlled and takes place under Ambient Assisted Living (AAL) system. This Project has a facility of delivering the prescribed drugs to the patients. A Device named Ubiquitous Drug Injector (UDI) also has designed. One More pervasive device is designed which is for patients. It receives inputs from the ambient sensor devices. It correctly infers the patient's condition. All the things done in this project facilitates in prescribing appropriate drugs for the respective diseases and saves lot of time.

A. EXISTING SYSTEM

An increase in world population along with a significant aging portion is forcing rapid rises in healthcare cost. The advancement of sensing technologies, embedded systems, wireless communication technologies, Nano technologies and miniaturization makes it possible to develop smart systems to monitor activities of human beings continuously.

The sensors detect abnormal or unforeseen situation by monitoring physiological parameters along with the other symptoms. ZigBee Specifications, ZigBee alliance IEEE Standard 802.15.4k 2013, 2014. This paper reviews the latest reported systems activity monitoring of humans based on sensors.

Traffic congestion is a major problem in cities of developing countries like India. Congestion on roads eventually results in slow moving traffic which increases the time of travel, thus stands-out as one of the major issues in cities.

Green wave system was used to provide clearance to any emergency vehicle by turning all the red lights to green on the path of emergency vehicle, hence providing complete green wave to the desired vehicle. Traffic congestion in Bangalore-A rising concern.

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Publisher: IEEE Sponsored by IIEEE sensor council.

B. PROPOSED SYSTEM

The system is divided into two modules depending on their functional & behavioral implementation. Both modules work on the principle of IoT with the help of REST APIs. First module is used to find locations of ambulances within the 5km radius from user's location. Also the same module is used to find hospitals and their services within radius of 10km of user's current location.

Here user's location is traced using GPS hardware device. The location is retrieved in the form of double value as latitude and longitude. E.g. 19.54526.73.87099. This is the format of the latitude and longitude. This location is transmitted to the server by executing POST request. Depending on the user's location, server processes the data and matches with records stored into the database. After processing of such data the result of user's query is sent back to the user in form of JSON format.

Smartphone application reads the response of the server and retrieves the required information and places it on to Google map client of smart phone device or displays in a listed format depending on the user's preference. A marker is used to pin point the location of retrieved data is knows as Pin. To differentiate between pins that are used for pointing hospitals and ambulances we've used custom pins. It makes easier to understand the difference even to naïve user. This can be done using Google Map API's functionality. There is a set of predefined markers that are made available by Google in their Google Map API. But for user's convenience custom pins are used. That API guideline is also provided in Google Maps documentation.

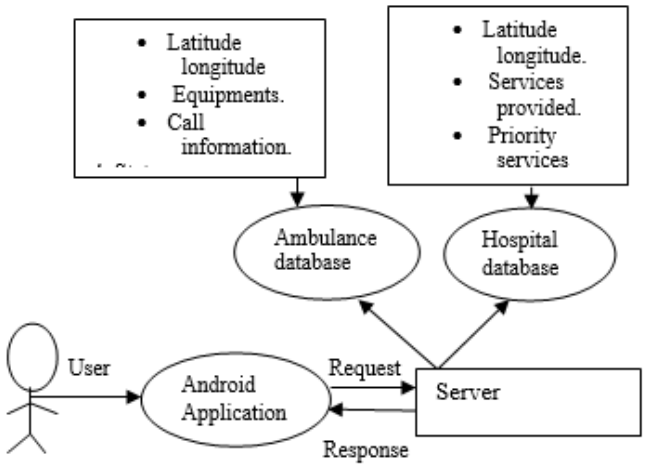
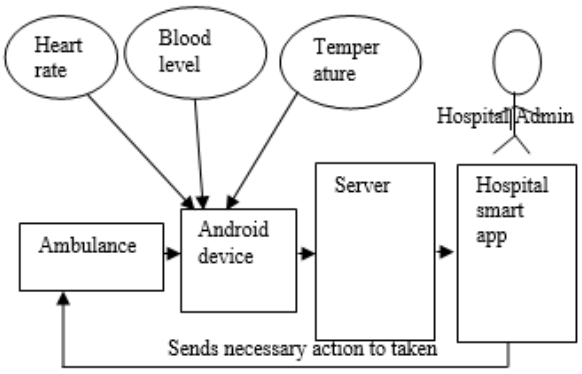


Figure 1: Module One: Finding Ambulances & Hospitals



III. SYSTEM REQUIREMENTS

A. *HARDWARE REQUIREMENT*
• Processor AT Mega328 • GSM Module SIM 900 • RG1602A LCD • IC4017 • 555 Timer • Temperature sensor-LM35, • Heart rate sensor-latest • RF Transmitter 433MHz • RF Receiver 433MHz
B. SOFTWARE REQUIREMENT
• Mobile Operating System: Android 2.3 or Later • Server Operating System: Windows XP or Later • Tools :Android Studio or Eclipse • User Interface: XML

- Code Behind: JAVA and XML

IV. SYSTEM ANALYSIS

I Ambulance Unit

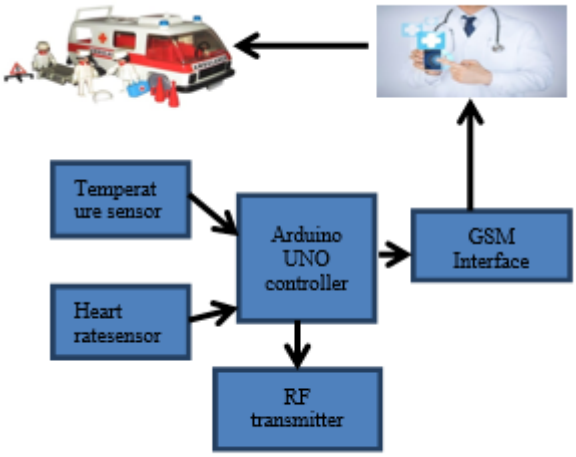


Fig: Block diagram of ambulance unit

The above block diagrams shows the flow operation

Of ambulance unit. Here victims health parameters are passed to Arduino UNO Controller through sensors and those parameters are passed to hospital app.

A. ARDUINO UNO

The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC Adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDIUSB-to-serial driver chip Instead, it features the Atmega8U2 programmed as a USB-to-serial converter. "Uno" means one in Italian and is named to mark the upcoming release of Arduino 1.0.

B. GSM MODULE

GSM is an open and digital cellular technology used for transmitting mobile voice and data services operates at the 850MHz, 900MHz, 1800MHz and 1900MHz frequency bands.

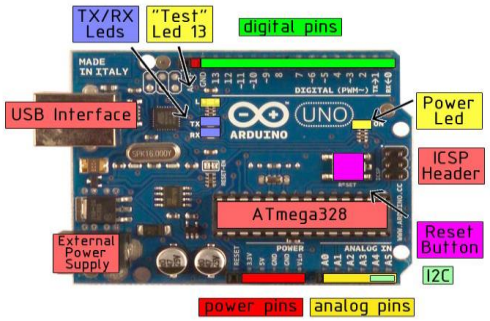


Figure1.1: Arduino UNO

Technical Specification

- Microcontroller ATmega328
- Operating Voltage 5V
- Input Voltage (recommended) 7-12V
- Input Voltage (limits) 6-20V
- Digital I/O Pins 14 (of which 6 provide PWM output)
- Analog Input Pins 6
- DC Current per I/O Pin 40 mA
- DC Current for 3.3V Pin 50 mA
- Flash Memory 32 KB of which 0.5 KB used by
- boot loader

Fig 1.2 GPRS Module (SIM900)

• SIM900 is designed with a very powerful single-chip processor integrating

• AMR926EJ-S core

• Quad – band GSM/GPRS module with a size of 24mmx24mmx3mm

• SMT type suit for customer application

• An embedded Powerful TCP/IP protocol stack

• Based upon mature and field-proven platform, backed up by our support

• Service, from definition to design and production

General features

• Quad-Band 850/ 900/ 1800/ 1900 MHz

• GPRS multi-slot class 10/8

• GPRS mobile station class B

• Compliant to GSM phase 2/2+

– Class 4 (2 W @850/ 900 MHz)

– Class 1 (1 W @ 1800/1900MHz)

• Dimensions: 24* 24 * 3 mm

- Weight: 3.4g
- Control via AT commands (GSM 07.07 ,07.05 and SIMCOM enhanced AT Commands)
- SIM application toolkit
- Supply voltage range 3.4 … 4.5 V
- Low power consumption
- Operation temperature: -30 °C to +80 °

II Traffic unit

Signals

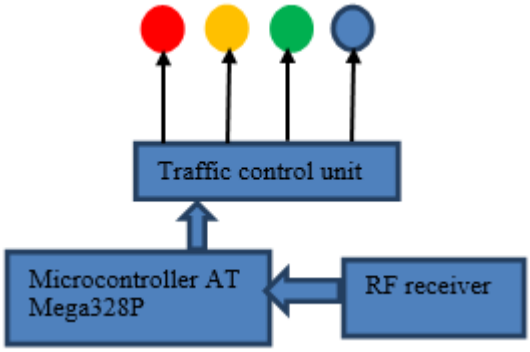


Fig 2.1: Block diagram of Traffic unit

The above block diagram describes a traffic control system This uses Microcontroller and Transmitter to control traffic

C. RF Based Wireless Remote using RX-TX MODULES (433MHz.)

This circuit utilizes the RF module (TX/Rx) for making a wireless remote, which could be used to drive an output from a distant place. RF module, as the name suggests, uses radio frequency to send signals. These signals are transmitted at a particular frequency and a baud rate. A receiver can receive these signals only if it is configured for that frequency.

A four channel encoder/decoder pair has also been used in this system. The input signals, at the transmitter side, are taken through four switches while the outputs are monitored on a set of four LEDs corresponding to each input switch. The circuit can be used for designing Remote Appliance Control system. The outputs from the receiver can drive corresponding relays connected to any household appliance.

Description: This radio frequency (RF) transmission system employs Amplitude Shift Keying (ASK) with transmitter/receiver (TX/Rx) pair operating at 434 MHz The transmitter module takes serial input and transmits these signals through RF. The transmitted signals are received by the receiver module placed away from the source of transmission.

The system allows one way communication between two nodes, namely, transmission and reception. The RF module has been used in conjunction with a set of four channel encoder/decoder ICs. Here HT12E & HT12D have been used as encoder and decoder respectively. The encoder converts the parallel inputs (from the remote switches) into serial set of signals. These signals are serially transferred through RF to the reception point. The decoder is used after the RF receiver to decode the serial format and retrieve the original signals as outputs. These outputs can be observed on corresponding LEDs.

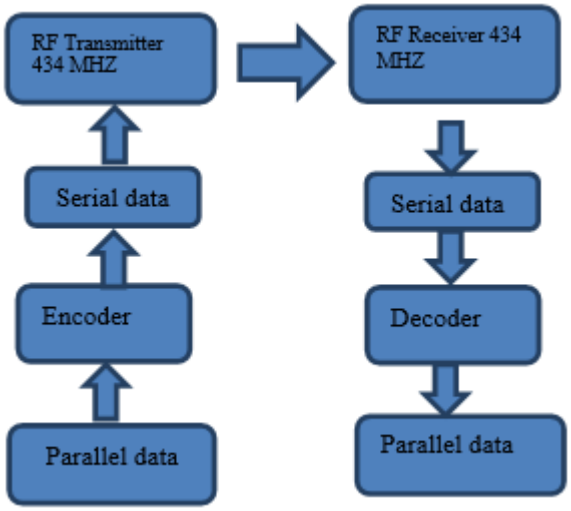


Fig 2.2 TX-RX Module (433)

Encoder IC (HT12E) receives parallel data in the form of address bits and control bits. The control signals from remote switches along with 8 address bits constitute a set of 12 parallel signals. The encoder HT12E encodes these parallel signals into serial bits. Transmission is enabled by providing ground to pin14 which is active low. The control signals are given at pins 10-13 of HT12E. The serial data is fed to the RF transmitter through pin17 of HT12E.

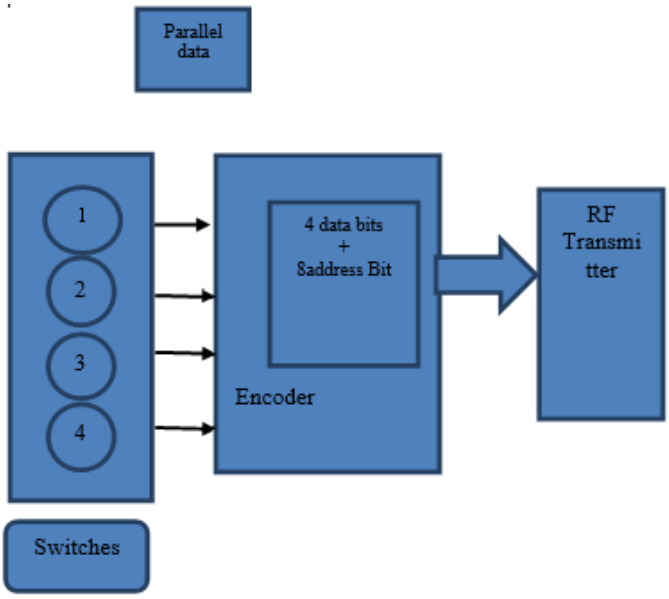


Fig 2.3: Encoder of RF Module

Transmitter, upon receiving serial data from encoder IC (HT12E), transmits it wirelessly to the RF receiver. The

receiver, upon receiving these signals, sends them to the decoder IC (HT12D) through pin2. The serial data is received at the data pin (DIN, pin14) of HT12D. The decoder then retrieves the original parallel format from the received serial data.

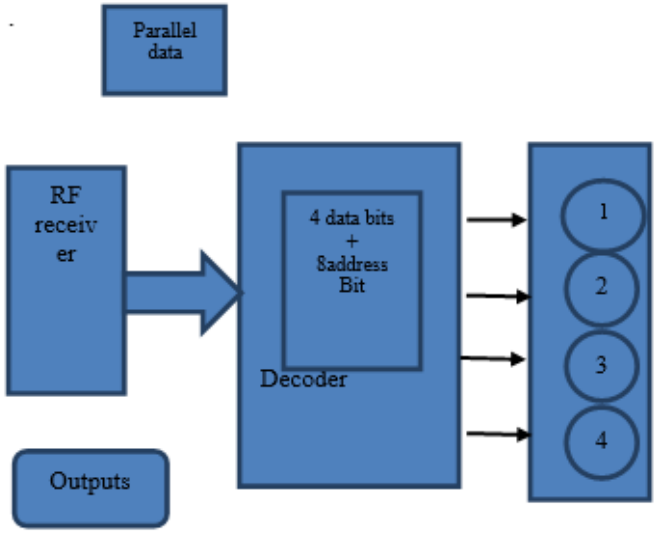


Fig 2.4: Decoder of RF Module

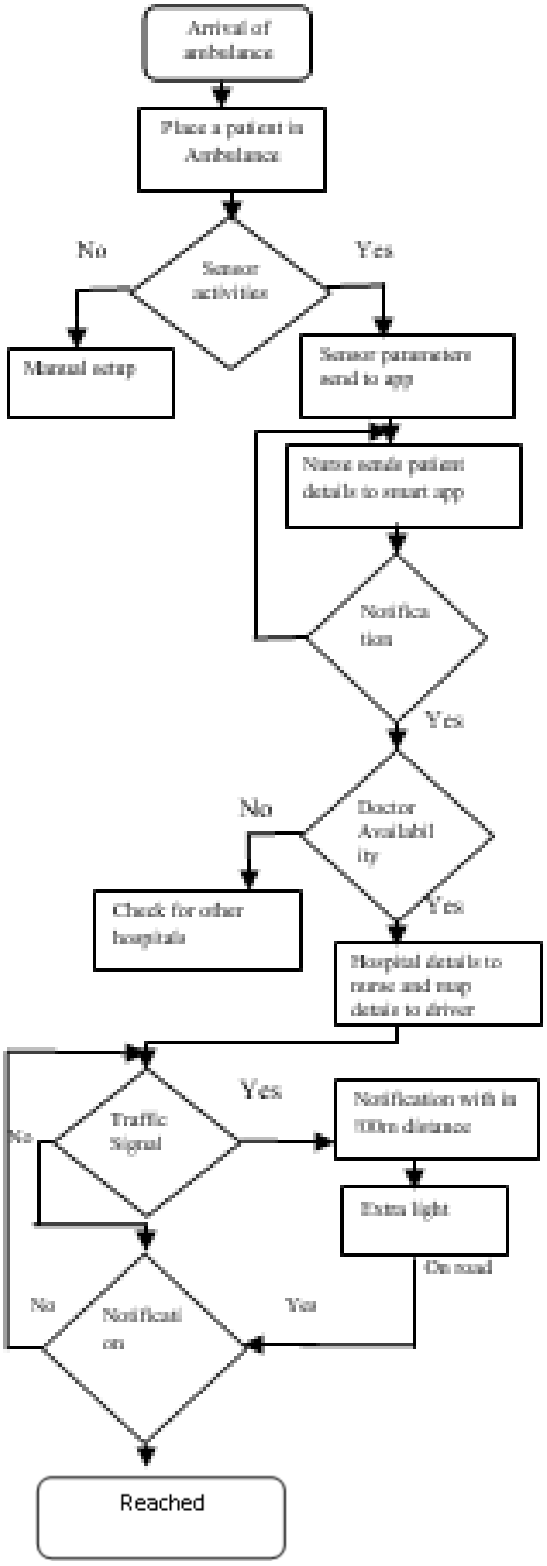
When no signal is received at data pin of HT12D, it remains in standby mode and consumes very less current (less than 1μA) for a voltage of 5V. When signal is received by receiver, it is given to DIN pin (pin14) of HT12D. On reception of signal, oscillator of HT12D gets activated. IC HT12D then decodes the serial data and checks the address bits three times. If these bits match with the local address pins (pins 1-8) of HT12D, then it puts the data bits on its data pins (pins 10-13) and makes the VT pin high. An LED is connected to VT pin (pin17) of the decoder. This LED works as an indicator to indicate a valid transmission.

The corresponding output is thus generated at the data pins of decoder IC. A signal is sent by lowering any or all the pins 10-13 of HT12E and corresponding signal is received at receiver's end (at HT12D). Address bits are configured by using the by using the first 8 pins of both encoder and decoder ICs. To send a particular signal, address bits must be same at encoder and decoder ICs. By configuring the address bits properly, a single RF transmitter can also be used to control different RF receivers of same frequency.

To summarize, on each transmission, 12 bits of data is transmitted consisting of 8 address bits and 4 data bits. The signal is received at receiver's end which is then fed into decoder IC. The outputs from this system can either be used in negative logic or NOT gates (like 74LS04) can be incorporated at data pins.

III Algorithm

Given algorithm describes how the data flow take place during its functionality and provide an efficient result.



CONCLUSION

In this paper it's going to monitor patient's health and send health parameter to prescribed hospital and get confirmation response from the hospitals.

An algorithm is design to monitor traffic control system to avoid the traffic collision. So they can save the life of a patient during emergency time. Considering the real time scenario the system is improved by embedding GPS navigation system and adding an extra light in traffic control system and placing an alert within 100m distance during ambulance arrival. So we can reduce the chance of death rate during emergencies.

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Processes and applications, microscale plasma discharges, discharges in liquids, spectroscopic diagnostics, plasma propulsion, and innovation plasma applications. He is an Associate Editor of the journal Earth, Moon, Planets, and holds two patents.

Mr. Author was a recipient of the International Association of Geomagnetism and Aeronomy Young Scientist Award for Excellence in 2008, the IEEE Electromagnetic Compatibility Society Best Symposium Paper Award in 2011, and the American Geophysical Union Outstanding Student Paper Award in Fall 2005.