RFID Based Medical Information and Accident Detection

Krishnaprasad.R[1], Monish Kumar.M[2], Nivedha.S[3], Prasana.A[4], Kokilamani.S[5]

[1, 2, 3, 4, 5] Department of Electronics and Communication Engineering

[1, 2, 3, 4, 5] Sri Eshwar College of Engineering, Coimbatore, India.

Abstract- Security in travel is primary concern for everyone. This project presents an automotive localization system using GPS and GSM-SMS services. When the vehicle is involved in an accident immediately an SMS will send to predefined numbers with GPS location by using vibration sensor. A switch is provided because if the person presses the switch it indicates the person is in a safe condition. RFID is used to know the information about the vehicle; information is nothing but the vehicle number and location by using GPS. This system also can be interfaced with vehicle airbag system. This detection and messaging system is composed of a GPS receiver, microcontroller and a GSM modem. GPS receiver gets the location information from satellites in the form of latitude and longitude. The project is built around the MCP430 microcontroller. This microcontroller provides all the functionality of the SMS alert system. It also takes care of filtering of the signals at the inputs. The uniqueness of this project is, not only alerting the neighbors by its siren, but also it sends a caution SMS to mobile numbers.

Keywords- MSP430, RFID, GSM, GPS, Power supply.

I. INTRODUCTION

The Security in travel is primary concern for everyone. The RFID is used to know the information about the vehicle also the medical information of the patient and its location, the information is nothing but the vehicle number and location by using GPS. This system also can be interfaced with vehicle airbag system. GPS receiver gets the location information from satellites in the form of latitude and longitude. The current location of the accident spot can be accessed with the help of the GPS and this information is send to the nearby ambulance to rescue. The uniqueness of this project is, not only alerting the neighbors by its siren, but also it sends a caution SMS to mobile numbers. It is efficient way to save the life of the patient. Radio frequency identification (RFID) is a general term that is used to describe a system that transmits the identity (in the form of a unique serial number) of an object wirelessly, using radio waves. The barcode labels that triggered a revolution in identification systems long time ago, are inadequate in an increasing number of cases. One

grand commercial vision for RFID is to change the way demand-supply chain moves.

II. OBJECTIVE

The objective of this project is to identify the patient in the hospital by using the RFID card instead of using the medical checkup ID card or the medical file history details. In this RFID card is used as medical card. So each patient has the individual RFID card. RFID reader is interfaced with microcontroller. The microcontroller is interfaced with PC. When the patient shows the RFID card in the reader, the reader will read the number and send to microcontroller. In PC the corresponding patient database is opened. The database contains the medical information such as last checkup date, disease diagnostic etc. By using patient fingerprint we can store all the data in RFID card to Aadhar card and we can access

III. FINDINGS OF THE STUDY (LITERATURE SURVEY)

The Institute of Medicine (IOM) estimated that between 44,000 and 98,000 deaths per year were related to medical errors, showing the desperate need to improve the patient safety in U.S. hospitals meanwhile; achieving high operational efficiency in healthcare is another essential goal for organizational performance evaluation. Five problems are identified as the common phenomena that lead to healthcare operation failures including: medical mistakes, increased costs, theft loss, drug counterfeiting, and inefficient workflow. It can also support nursing shift exchange to save time and efforts. PPI applications also include newborn identity reconfirmation and disaster victim identification (DVI).
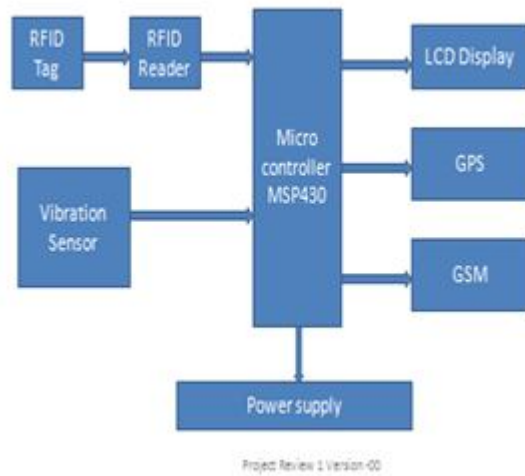
III. BLOCK DIAGRAM

Figure 1. The above block diagram represents the functioning of the system.

i)   MSP430:

The controller is used to detect the electric pulses from the vibration sensor and process it. It also reads the information from RFID tag and reader and displays it. It also gets the location from GPS and it initiates the GSM module. The Launch Pad's integrated emulator interface connects flash-based MSP430 Value Line devices to a PC for real-time, in-system programming and debugging via USB. Includes one mini USB cable to interface with a PC. Included MSP430G2xx device features: MSP430G2553IN20 – 16kB Flash, 512B RAM, interruptible GPIOs (capacitive sense-capable), 16-bit timers, 8ch 10-bit ADC, Comparator, Serial Communication (USCI – I2C, SPI & UART) & more the patient details anywhere using the patient fingerprint. This method is useful in claiming insurance and during accidents any police identification of the patient.

Figure 2. The MSP430 is a mixed-signal microcontroller family from Texas Instruments. Built around a 16-bit CPU, the MSP430 is designed for low cost and, specifically, low power consumption embedded applications.

ii)   Methodology

RFID is the special type wireless card which has inbuilt the embedded chip along with loop antenna. The inbuilt embedded chip represents the 12 digit card number. RFID reader is the circuit which generates 125KHZ magnetic signal. This magnetic signal is transmitted by the loop antenna connected along with this circuit which is used to read the RFID card number. In this project RFID card is used as medical card. So each patient has the individual RFID card. RFID reader is interfaced with microcontroller. Here the microcontroller is the flash type reprogrammable microcontroller in which we already programmed with card number. The microcontroller is interfaced with PC through RS 232 converter. The RS232 is used to convert TTL logic to RS 232 logic.

iii)   RFID in medical industry

Now a day's hospitals are currently facing challenges of improving patient safety and reducing operational costs, which are often compromised by human and systemic errors. Misidentification is one of the major sources of medical errors and it can be reduced by RFID. Positive patient identifications (PPI) applications include using a smart patient wristband that when scanned by a RFID reader reveals patient information such as name, date of birth, admitting orders, insurance information, and the surgical site

Figure 3. RFID

Figure 4. RFID (Radio-frequency identification uses electromagnetic fields to automatically identify and track tags attached to objects. The tags contain electronically stored information. Passive tags collect energy from a nearby RFID reader's interrogating radio waves.

iv) LCD

LCD stands for Liquid Crystal Display which is used to display the location of bus. We are using 14 pins LCD which are given below:

- Pin 7 to Pin 14 All 8 pins are responsible for the transfer of data.
- Pin 4 this is RS i.e., register select pin. 5 This is R/W
- Pin 6 This is Enable pin
- Pin 2 This is VDD
- Pin 1 This is VSS
- Pin 3 This is short pin

Figure 5. LCD (liquid crystal display) is the technology used for displays in notebook and other smaller computers. Like light-emitting diode (LED) and gas-plasma technologies, LCDs allow displays to be much thinner than cathode ray tube (CRT) technology.

v) GSM/GPS

The SIM908 module which counts with both GPS and GSM technologies what allows to easily perform real time tracking applications. This module is connected with MSP board and accessed using AT commands. It is used to inform the nearby ambulance about the accident through SMS service and also it also indicates the location by using GPS. It is used to find the actual location of the accident spot and send the data to the controller.

Figure 5 GSM & GPS (Global System for Mobile communications) is an open, digital cellular technology used for transmitting mobile voice and data services. The Global Positioning System is a satellite-based

navigation system made up of at least 24 satellites. It works in any weather conditions, anywhere in the world.

vi) VIBRATION SENSOR

It is used to detect the vibrations during accident, and it sends an electric pulse to the controller. The Minuses 100 from Measurement Specialties is a low-cost cantilever-type vibration sensor loaded by a mass to offer high sensitivity at low frequencies. Useful for detecting vibration and 'tap' inputs from a user. A small AC and large voltage (up to +/- 90V) is created when the film moves back and forth. A simple resistor should get the voltage down to ADC levels. Can also be used for impact sensing or a flexible switch. Comes with solder pins that allows for vertical mounting.

Figure 6. A piezoelectric sensor is a device that uses the piezoelectric effect, to measure change in pressure, acceleration, temperature, strain, or force by converting them to an electrical charge.

vii) POWER SUPPLY

Power supply is the source of electrical power. Normally we use +12V DC power for regular working of

almost any electronic circuit. The primary function of a power supply is to convert one form of electrical energy to another source. Some power supplies are discrete, stand-alone devices, whereas others are built into larger devices along with their loads. For each module the power supply is given as per the requirements.
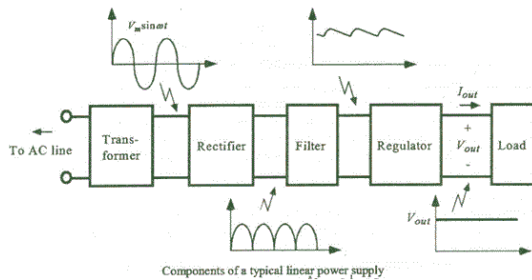

Figure 7. A power supply is an electronic device that supplies electric energy to an electrical load.

V. RESULTS AND DISCUSSION

Advantage:
1. Low power consumption.
2. Improve security performance in the hospital.
3. We can add new patient users.
4. Patient database maintained individually so we can avoid the man made error.

A patient identification system has been implemented and evaluated in the University College Hospital in Galway, Ireland, to improve patient safety. Beth Israel Deaconess Medical Center found that a combination of bar codes, passive RFID and active RFID worked well for patient identification in their pilots study. ID-based system using RFID technology can also be used for automatic identification of medical articles in hospitals. By using this method the accidents can be identified as soon as possible with the help of gsm and gps then the rescue method is done simple.

VI. CONCLUSION AND FUTURE SCOPE

This proposed system accepts the location, stores it and delivers an alert message to the ambulance and guardian of the patient. Even basic mobile is enough to get the message. This project is very used to improve the security performance and provide the easy access in the hospital. In this project RFID card is used as medical ID card. In this project patient medical information are maintained in the individual data base in PC. The patients RFID card is used to access their database. So we can avoid the man made error. So this project improves the security performance because we cannot make the duplicate RFID card.

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ABOUT THE AUTHORS

R.Krishnaprasad is currently pursuing her Bachelor of Engineering in the Department of Electronics and Communication Engineering at Sri Eshwar College of Engineering, India. Her area of interest includes Microprocessor and Microcontrollers &Wireless Networks.

M.Monish Kumar is currently pursuing her Bachelor of Engineering in the Department of Electronics and Communication Engineering at Sri Eshwar College of Engineering, India. Her area of interest includes Microprocessor and Microcontrollers & Wireless Communication.

S.Nivedha is currently pursuing her Bachelor of Engineering in the Department of Electronics and Communication Engineering at Sri Eshwar College of Engineering, India. Her area of interest includes Computer Networks & Embedded Systems.

A.Prasana is currently pursuing her Bachelor of Engineering in the Department of Electronics and Communication Engineering at Sri Eshwar College of Engineering, India. Her area of interest includes Computer Networks & Embedded Systems.

S.Kokilamani is currently working as an Assistant Professor in the Department of Electronics and Communication Engineering at Sri Eshwar College of Engineering, India. He received his Bachelor of Engineering in 2011, from Anna University of Technology and Masters Degree from Anna University, Chennai in the year 2013. His areas of interest include Analog Electronics, Low Power VLSI Design and Circuit Analysis.