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Life Saving System and Theft Alert with Speech Recognition

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ABSTRACT

Mankind places the highest value on health-related concerns and parameters since they are vital to his survival. This study describes a system that can provide real-time remote heartbeat monitoring together with enhanced SMS alerts via the Global System for Mobile communication (GSM) and voice calls to ambulances in the event that a person experiencing a heart attack is alone. This project uses Global Positioning System (GPS) and Global System for Mobile communication (GSM) technology to create and construct a low-cost, adaptable, and efficient heartbeat monitoring and alert system. In this project, sensors measure body temperature and heartbeat, sending signals to the control unit so they may be shown on liquid Crystal Display (LCD), following appropriate processing and cardiac rate calculation. If the rate above the maximum allowed range, the vehicle will instantly stop, sound the horn constantly, and send an SMS alarm to the family and the closest medical facilities. The same message will also be turned into a voice call and transmitted to the ambulance. Keywords: LCD, threshold, GPS, GSM, Control Unit, and voice call. An Arduino microcontroller linked to a GPS unit that will be mounted in the car. The user will receive an email with the location. Additionally, a predetermined range is defined around the car; if the car leaves that range, an alarm will be sent to the owner; otherwise, the user won't receive any random alerts. An additional element that is utilized to unlock the car is face recognition. The user's visage will be used to unlock the car. The microcontroller will click the person's image and send an alarm message to the owner's email if the face does not match the image stored in the system.

Keywords— Arduino, GPS Module, GSM Modem, Pulse Sensor, Temperature Sensor, Ultrasonic Sensor.

INTRODUCTION

The human body is becoming more susceptible to heart-related ailments in today's fast-paced environment, and the number of heart disease-related deaths is rising. Heart disease concerns primarily affect the elderly in many countries. They frequently live alone with no one ready to watch over them around-the-clock. A stroke happens when there is a reduction or interruption of blood flow to a portion of the brain. Within minutes, brain cells start to die, causing symptoms including speech difficulties, paralysis, or numbness in the face or legs. According to current studies, there is a 26% probability of having a heart attack when the heart pulse exceeds the beats per minute. and it can result in demise. Yes, we can save someone's life with only one touch thanks to this paper. In earlier articles, the only way a someone could send an SMS using the GSM was if they were using a hand watch to help them during a heart attack. There is a greater likelihood that the person will pass away before arriving at the hospital while they are not conscious. Our paper proposes a one-touch life-saving system to address this issue.

The system allows a person who has suffered a heart attack to be saved with just one touch, and its sensors are made to measure a person's pulse in beats per minute (BPM), sending the data to a controller so that the entire process can be and transmits the data to the controller. All tasks can be completed via GPS; an SMS can be converted to a call with the aid of a call converter, and a call can be placed to the emergency number (108 in India) along with the GPS location for assistance. The person's relatives will receive an SMS at the same moment. This allows the doctor to determine the patient's temperature, heart rate, and overall health before they arrive at the hospital. This even helps to prevent a portion of the deaths. In this day and age, vehicle security is crucial, and car theft in public parking lots has become a serious problem. We have an idea about how to solve this issue. Systems that rely on both software and hardware components exist. Hardware is used to transmit the vehicle's location to the user. The user can also configure the vehicle's range. The user will receive an alert message if the vehicle crosses this range. GPS is linked to an Arduino microcontroller system. An additional feature is the face recognition function, which unlocks vehicles by comparing the captured image to the original data image. If the system detects an unknown person, the owner will receive a picture of that person.

BLOCK DIAGRAM

The block diagram consists of different components interfacing to a microcontroller. The block diagram is shown in figure1.

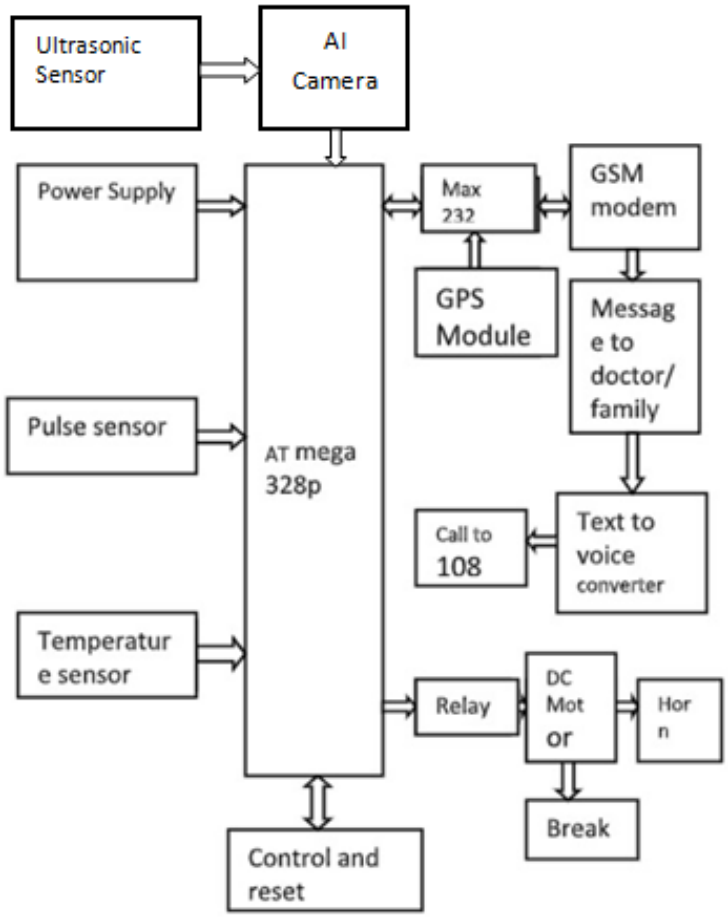


Fig. 1 Block Diagram

The various components in the block diagram are mentioned below:

1. Pulse sensor
2. Temperature Sensor LM35
3. ATmega328p (Arduino UNO)
4. Power Supply
5. Control Unit
6. 16X2 Liquid Crystal Display (LCD)
7. DC motor
8. MAX 232
9. GSM Module
10. GPS module
11. Ultra Sonic Sensor
12. AI Camera

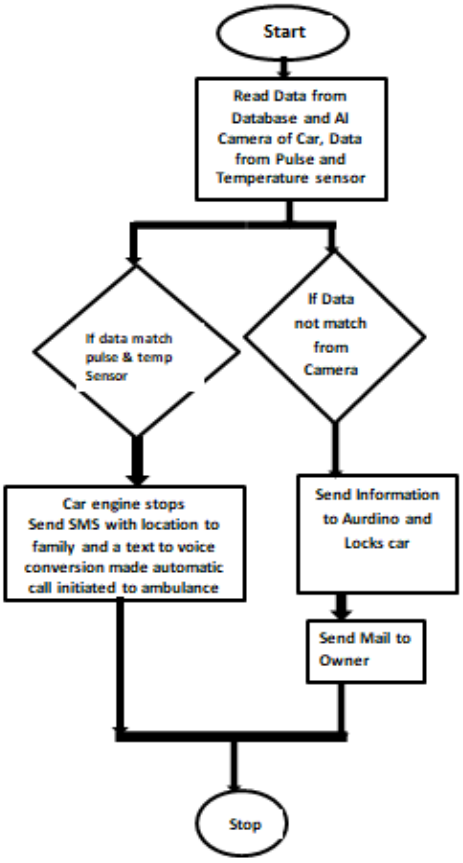


Fig. 2 Flow Chart

Pulse Sensor:

The pulse or heartbeat sensor is a two-sided device with an LED next to an ambient light sensor on one side and circuitry on the other side used for noise cancellation and amplification. The LED on the front of the sensor is over a vein in the human body. This can be applied to the tips of your fingers or ears, but it needs to be right on top of a vein. The veins only have blood flow inside of them when the heart is pumping, so if we monitor the blood flow, we can also monitor the heartbeat. Currently, LEDs emit light that falls directly onto veins. Therefore, by keeping an eye on blood flow, we can also keep an eye on heart rate. If blood flow is detected, the ambient light sensor will detect more light because the light will be reflected by the blood; this slight change in light received over time is analysed to determine heart rate. After power is applied, the sensor can operate at +5 v or 3.3 v to monitor changes in the output voltage by connecting the signal pin to the microcontroller's ADC pin.

Fig. 3 Pulse Sensor

Temperature Sensor:

The output voltage of the analog linear temperature sensor LM35 changes linearly as temperature changes. In our paper, we use the LM35 temperature sensor, which provides an electrical output relative to the temperature (in ^{o}C). With a thermometer, it can measure temperature more accurately. This may not require the output voltage to be amplified because it produces a higher output voltage than thermo couples. It has a scale factor of 0.01 v/^{o}C. The LM35 maintains an accuracy of +/-0.4^{o}C at room temperature and +/-0.8^{o}C over an arrangement of 0^{o}C to +100^{o}C C without the need for external calibration. This sensor has a low capacity for self-heating and only uses 60 micro amps from its supply ,and develops a poor capacity for self-heating. The pin arrangement handles the VCC input voltage of 5 volts for applications, and the analog output will be raised to 10 volts for each ^{o}C increase, ranging from -1 volts (-55 ^{O}C) to 6 volts (150 ^{O}C).

Micro Controller:
A microcontroller board based on the AT mega 2560 is the Arduino mega 2560.The microcontroller is equipped with a total of 54 digital input/output pins, 16 analog inputs, 4 UART (hardware serial ports), a 16 MHZ crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. To initiate operation, just connect the microcontroller to a computer via a USB cable or power it using an AC-to-DC adapter or battery. The majority of Arduino shields are compatible with the Mega. Features are Features Micro Controller: ATmega2560, Advanced RISC Architecture, RAM:8K bites, Internal SRAM:4K bytes, Programmable I/O Lines:86, ADC:16 channel-8 bit, PWM Channels:12-16 bit&4-8-bit, External Interrupts:8, Programmable watchdog timer with separate on-chip oscillator.

Power Supply:
The Arduino accepts a DC adapter with a voltage range of 7 to 12 volts and 250 milli amperes. There are various methods for powering an Arduino: with a USB cable, an ac to dc adapter, or a battery that is more than 5V.The Arduino used in this paper is supplied with an ac to dc adapter that plugs into a barrel connector with a 2.1 mm diameter. The outer sleeve is grounded and the center pin is positive. When the required power supply is given to the Arduino, the board powers on. The barrel connector receives an input of 7V–12V, which is regulated to 5V by using the on board voltage regulator.

Control Reset:
Control reset is to execute the entire cycle from beginning.

Liquid Crystal Display (LCD):
An LCD screen is a type of electronic display module that has many uses. A16X2 LCD refers to the ability to display 16 characters on a line, and such lines exist. Each character in this is shown as a 5X7 pixel matrix. Figure displays the 16X2 LCD schematic diagram. The command and data registers on this LCD are two registers. The command instructions that are given to the LCD to perform predefined tasks, such as initializing it, clearing its screen, adjusting the position of the cursor, and controlling the display, are stored in the command register. The ASCII value of the character that will be shown on the LCD is the data.

No	Symbol	Function
1	VSS	Ground
2	VDD	5V +
3	V0	Contrast
4	RS	Register
5	RW	Read/Write
6	E	Enable
7	D0	Data bus
8	D1	Data bus
9	D2	Data bus
10	D3	Data bus
11	D4	Data bus
12	D5	Data bus
13	D6	Data bus
14	D7	Data bus
15	A	Anode (5V+)
16	K	Cathode (GND)

Fig. 4 LCD Display

DC Motor:
Electrical pulses are converted to mechanical movement by DC (direct current) motors. The DC motor's maximum speed is expressed in RPM. When moving a load, the RPM is decreased, and it gets smaller as the load gets bigger. It is possible to model the permanent magnet DC motor as a device that generates torque in proportion to the current passing through it. In addition, a voltage proportionate to the voltage across its terminals was generated by it. Until the generator part of the motor model matches the supply voltage, the motor will spin faster. At that moment, the motor will stop receiving current and produce zero torque. Since there will inevitably be some friction, the motor will require some torque to spin. Therefore, some current is required. In the motor model, this current results in a voltage drop across the small series resistance. The motor spins a little bit more slowly than the supply voltage would suggest as a result of this voltage drop. 500 rpm output, 12 V input voltage, 500–600 mA current, and shaft length.

Fig. 5 DC Motor

MAX 232:
With its serial port, the Arduino can interface with serial devices. TTL logics are the logic levels at which this serial port functions. However, RS 232 logic levels are used by some serial devices. Hence, a mismatch in the logic levels happens when the Arduino and modem communicate. To prevent this mismatch, or to match the logic levels, a serial driver is used. Figure shows a serial line driver, a MAX 232. The MAX 232 voltage levels are listed as The logic 0 data transmission range for a receiver or transmitter is +3V to +15V. Data transmission from the receiver or transmitter logic 1 ranges from -3V to -15V, while the TTL voltage is 0V. TTL voltage is 5 volts, and Logic 0 control signals range from -3 to -15 volts. The control signals logic 1 ranges from +3V to +15V, while the TTL voltage is 5V. 0V is the TTL voltage.

Global System for Mobile Communication (GSM):
A GSM modem is a wireless modem that operates within a GSM wireless network. It functions similarly to a dial-up modem, with the main distinction being that the former sends and receives data via a fixed telephone line, while the latter sends and receives data via radio waves. The GSM modem operates within the 900 MHz or 1800 MHz frequency band, supporting data transfer speeds of up to 9.6 kbits/sec. In addition to SMS transmission, the modem is equipped with a serial interface that can be controlled via an AT command interface; the interface of the GSM modem with the microcontroller is depicted in figure. Figure illustrates how the microcontroller and GSM modem are interfaced. The MODEMS are managed by AT commands. Only a portion of the AT command set needs to be implemented because one of the primary goals of this application is to demonstrate how to send the message. The PC or controller is used to provide the AT commands to the GSM modem.

Global Positioning System (GPS):
A radio-based navigation system based on satellites, the GPS transmits and receives signals. These signals are picked up by a GPS receiver, which then gives the user information. One can ascertain the location with a portable device that precisely detects it by using GPS technology. The GPS receiver utilized in this instance is the Sky Traq Venus 6 GPS module ST22, which offers an interface in addition to TTL logics. Following the application of the emergency brake, the position of the car is monitored via this GPS. This program is only used when the car has stopped. The receiver's specifications include a baud rate of 9600 bits/s, 65 channels at 1Hz rate, and an operating voltage of 5 volts DC.

Fig. 6 GPS Module

Ultrasonic Sensor:
The distance and velocity of an object can be determined using an ultrasonic sensor, a non-contact sensor type. The ultrasonic sensor uses the property of sound waves to measure an object's velocity and distance; the sound wave used in the sensor is at a frequency higher than what is audible to humans. The ultrasonic sensor displays the distance between the object and the wave origin using the wave's velocity and time of travel. The Doppler shift characteristic of sound waves is used by the ultrasonic sensor in the environmental field to determine an object's velocity. One useful example of an ultrasonic sensor in the healthcare and theft industries is the Arduino-based range finder. The features are Power Supply: 3.3V – 5V. Operating Current: 8mA, Working Frequency: 40Hz, Ranging Distance : 3cm – 350cm/3.5m, Resolution : 1 cm, Measuring Angle: 15 degree, Trigger Input Pulse width: 10uS TTL, Dimension: 50mm x 25mm x 16mm.

Fig. 7 Ultrasonic Sensor

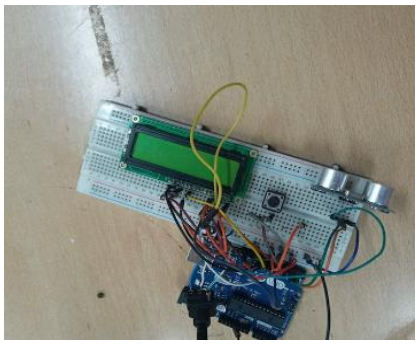
AI Camera:
With the help of specialized software, users of AI-powered cameras can now take pictures that were previously exclusive to high-end cameras. For instance, HDR+ technology can take twelve or more pictures in a split second,

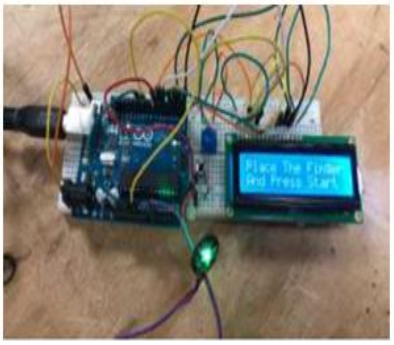
then utilize AI software to align and blend them into one seamless picture that doesn't have any blur from camera shake.

Fig. 8 AI Camera

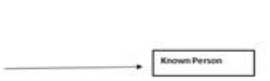
WORKING

The Arduino is receiving input from the temperature and pulse sensors simultaneously by connecting a voltage-supplied adaptor power supply to it. The LCD is also part of the Arduino's input. Under typical circumstances, an LCD will show the temperature from the temperature sensor and the pulse sensor's heart rate in bits per minute (BPM). When a condition is abnormal, the pulse sensor's range is measured in BPM (heart rate greater than 76 bpm is associated with a high risk of heart attack). If this threshold range is exceeded, an Arduino will take over the car's control, and a DC motor and relay will stop the ignition. In addition, an automatic call will be placed to the emergency number (108 in India) for assistance via mobile phone, and the Arduino will sense the GPS location of the vehicle and send an SMS to the phone numbers of doctors and family members through GSM and GPS devices connected to the Arduino at output. The SMS will be converted to voice message along with the GPS location of the vehicle. The entire system is reset as soon as someone arrives and presses the RESET button that is attached to the controller. Additionally, this device is helpful for tracking car theft. When someone opens the car door, an AI camera and ultrasonic sensor take a picture of the person and send the owner an SMS with the location of the car and the relevant facts.





```
#include <softwareserial.h >// import serial library
SoftwareSerial cam_BT(12,11);//RX,TX
Int ledpin=13;//led on D13 will show blink on/off
Int BluetoothData;//the data given from computer
//lets declare the servo objects
Servo servo1;
Servo servo2;
Long gmotor,gnum1,gnum2;
Int pos;
Int flag=0;
Int pos1=40;
Int pos2=90;
Void setup(){
Servo1.attach(3);
Servo2.attach(5);;
//**Initial position of all four servo motors**//
Servo1.write(pos1);
Servo2.write(pos2);
//**initialized**//
```



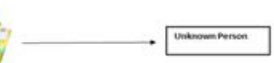


Fig. 9 Overall Hardware for Achieving Results

FUTURE SCOPE

When the working prototype system in contemporary cars is eventually commercially implemented. The proposed system's concept is to swap out the traditional security system with a mobile Android application that controls the security of the car. Additionally, it is possible to enhance the security of the automobiles by adding capabilities like finger print sensing to the hardware. Additionally, an alarm message can be sent to the closest police stations via the app.

CONCLUSION

Many heart attacks are killing people. There is a higher chance that a person who is traveling alone will die from a heart attack. Our device, a one-touch lifesaving system, can save a person's life in the event that they suffer a heart attack while alone. An Arduino that is mounted in a car can send messages to loved ones and medical professionals, as well as self-call the emergency number (108 in India) to summon help. The entire system can be activated in a matter of seconds. By doing this, we can lower the person's risk of passing away and preserve their life. advanced security system that uses an Arduino microcontroller to detect movement in vehicles, notify a mobile device, and react immediately to a security threat. The purpose of this work is to keep cars safe from thieves. It is quite simple to monitor the vehicle with greater accuracy thanks to the work that is provided in this paper. This system is user-friendly and easy to operate, and it offers additional security, an owner-friendly atmosphere, and an efficient alternative to the current antitheft system.

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