

Modern Car Safety System using PIC Microcontroller

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Abstract

Intelligent car will provide very reliable and safe life to human. Safety is the most essential factor in automobile industry. One single move of driver can cause terrify accident. Percentage of the road accident is increasing day by day. Most of the innocent people lost their life in the road accident so there have always been great needs of intelligent systems. Individual car can be equipped with feature of autonomy. There are many causes of the road accident like some technical error or human error but most of them are due to the human error. The human error can be avoided by using intelligent system in the vehicles can make the journey safer. Intelligent systems in the vehicles will help to secure the lives of people on the roads and to decrease the car accidents. The intelligent car system includes Automatic wiper movement control, Automatic cooling system, obstacle detection, as well as Vehicle tracking using GPS and GSM. Also this system includes heat to electricity conversion unit which helps to generate electricity from exhaust heat.

Keywords: PIC16F877A, GPS, GSM, LCD, Ultrasonic Sensor, Resistive Rain sensor

INTRODUCTION

Safety is most important feature in modern cars. Road safety has become a core issue. Sometimes because of manual adjustment of wiper will distract driver's attention, which can cause the accident. To avoid this situation we have designed automatic wiper system and also for comfort of driver we have introduced automatic cooling system. Find a car in large park is a challenge for intelligent Parking lot management system, so for that we have developed vehicle tracking system using GPS and GSM [1, 2].

We have designed one more unit that is heat to electricity conversion using thermoelectric generator sensor. A thermoelectric generator (TEG) is a solid state device that converts heat flux (temperature differences) directly into electrical energy through a phenomenon

called the See back effect. Intelligent vehicle gives more convenience to human life and safety is the foundation for intelligent vehicle [3].

OBJECTIVE

The proposed model has made an effort in resolving four scenarios which causes threat to human life and property. The scenarios are enlisted below:

Automatic wiper and cooling system

Sometimes people are facing the problem of accident due to manual adjustment of the wiper during rainy season. To avoid this problem we have designed such a proposed model which will turn on the wiper automatically with help of resistive rain sensor. When rain will detect the wiper will move according to intensity of rain. Now a day's automation plays very important role in automobile industries.

This unit also provides the automation in the system that is while the temperature sensor LM35 will detect present temperature above threshold value then it will automatically turn on fan or AC.

Obstacle detection using ultrasonic Sensor

This system has designed to detect the obstacle near to car, while any obstacle comes within 4m distance of car then ultrasonic sensor will detect the obstacle and provides the indication that obstacle is very near to car. This system will help to reduce the accidents. This will be making an effort to save the human life due to human errors. This System is also able to control the distance between two cars with the help of ultrasonic sensor.

Vehicle tracking using GPS and GSM-

It is very difficult to finding the car in very big parking slot so, as to avoid that situation we have designed this unit. While the car owner will send the request to GPS through GSM for exact location of car then GPS will send latitude and longitude through GSM. By getting this owner can find the exact location of car. And also this unit will help to avoid theft of car. Overall this unit will reduce the time efforts of human [4].

Heat to electricity conversion

Now a day's consumer demand is more than the power production that is the major difficulty to overcome. The main aim of this unit is to develop much cleaner noise less cost effective different way of power generation method for charging the battery as well as to utilization proper only the requirement of usage [2], which helps to reduce the global warming as well as reduce the power shortages, load shedding and also we can transfer the portable generating unit. In this unit the conversion of waste heat into generate electricity by

using thermoelectric generator. Waste may refrigerator heat, vehicle radiator heat, laptop heat; even body heat can be used as an input source as a waste heat to generate electricity and it can be charged directly mobile battery and also stored in a rechargeable lead acid battery for further usage [5].

Specifications

PIC16F877A

- CPU – 8-bit PIC
- Number of pins- 40
- Timer Module- 8-bit (2), 16-bit(1)
- ADC Module- 8channel, 10-bit
- Comparator-2
- Program memory type- Flash
- CPU speed- 5MIPS

GSM

- Frequency-850MHZ/
900MHZ/1800MHZ/1900MHZ
- Baud rate- 9600bps
- Power requirement- 4.5V to12V
- Current requirement- <590mA
- Operating temperature- -40o C to +85oC

GPS

- GPS Receiver – Lassen IQ16 channels
- Antenna - Omni- directional 6db
- Connector - SMA Coax Bulkhead Jack
- Synchronization- PPS, PPM, PPH
- GPS protocol - RS 232

HC-SR04 Ultrasonic Sensor

- Operating voltage: +5V
- Theoretical Measuring Distance: 2cm to 450cm
- Practical Measuring Distance: 2cm to 80cm
- Accuracy: 3mm
- Measuring angle covered: <15°
- Operating Current: <15mA
- Operating Frequency: 40Hz

Block Diagram

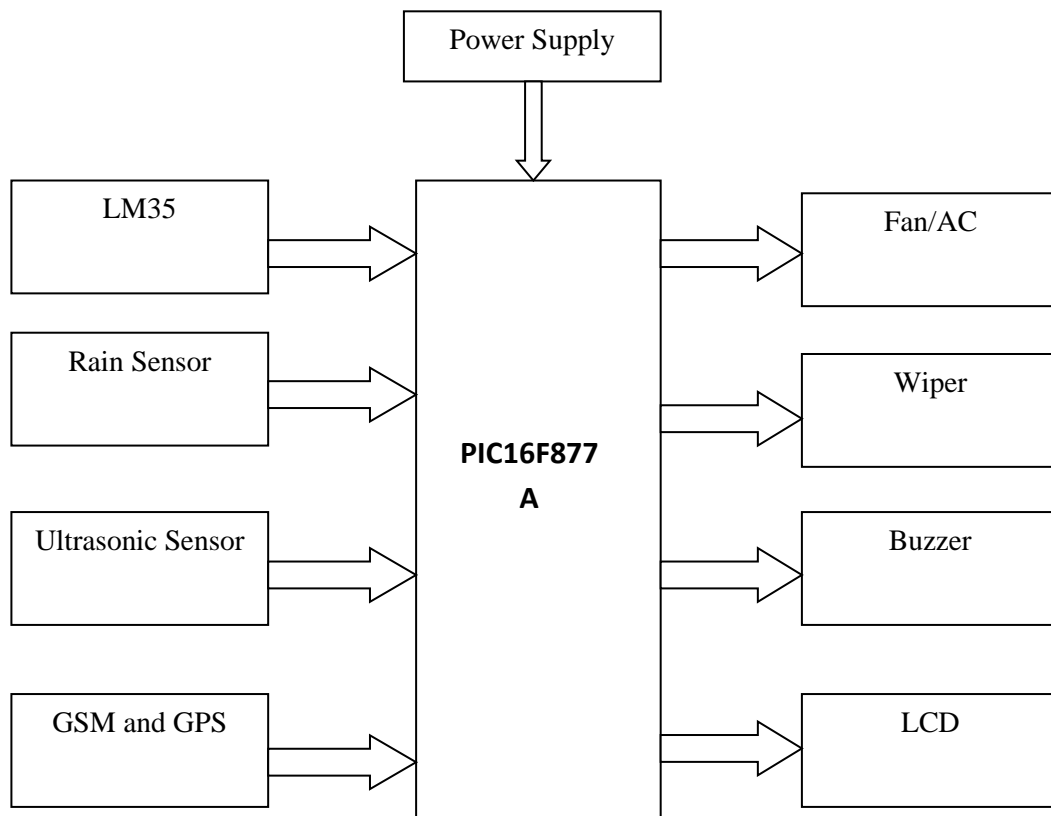
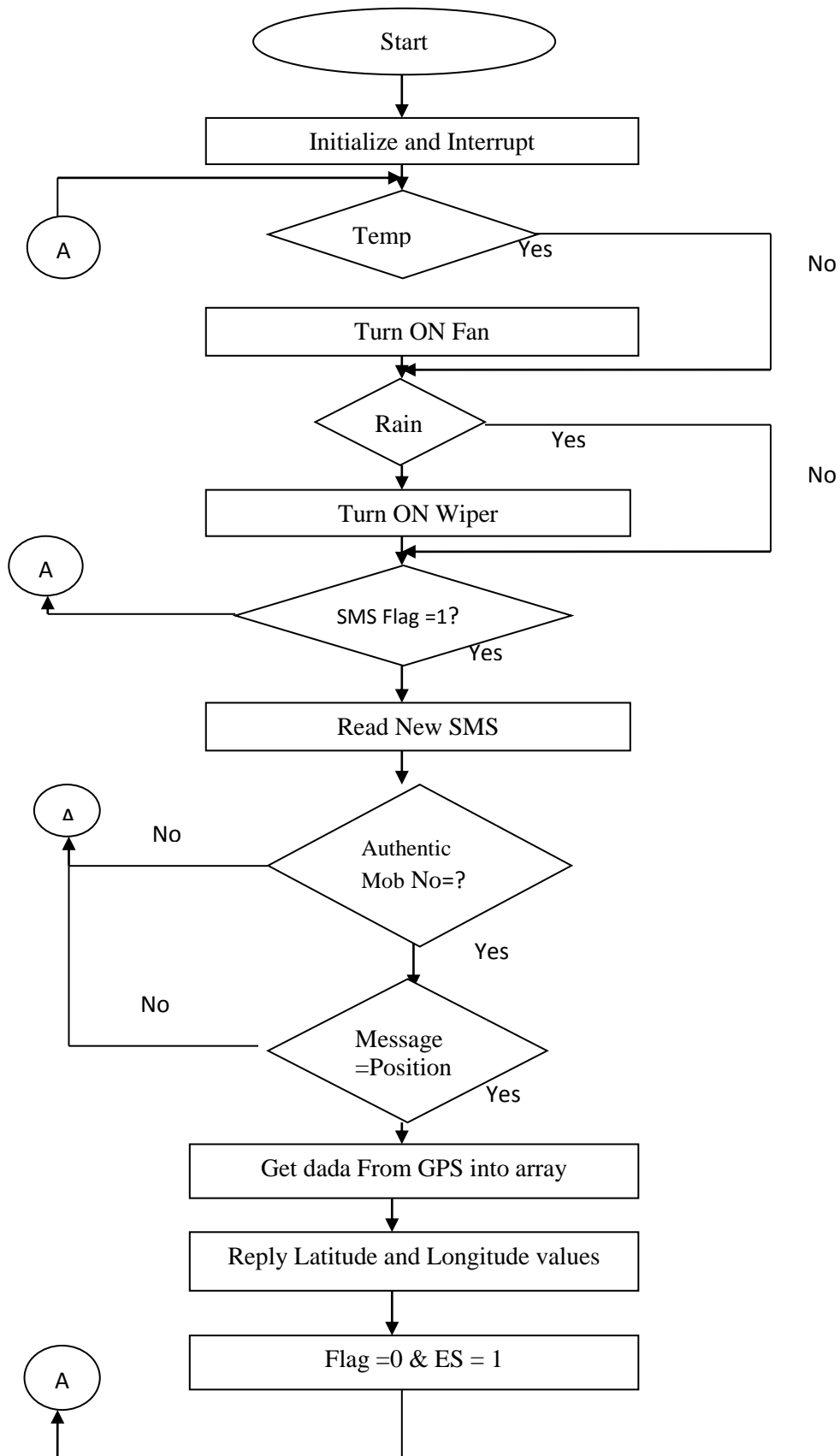


Figure 1: Block Diagram

FLOWCHART



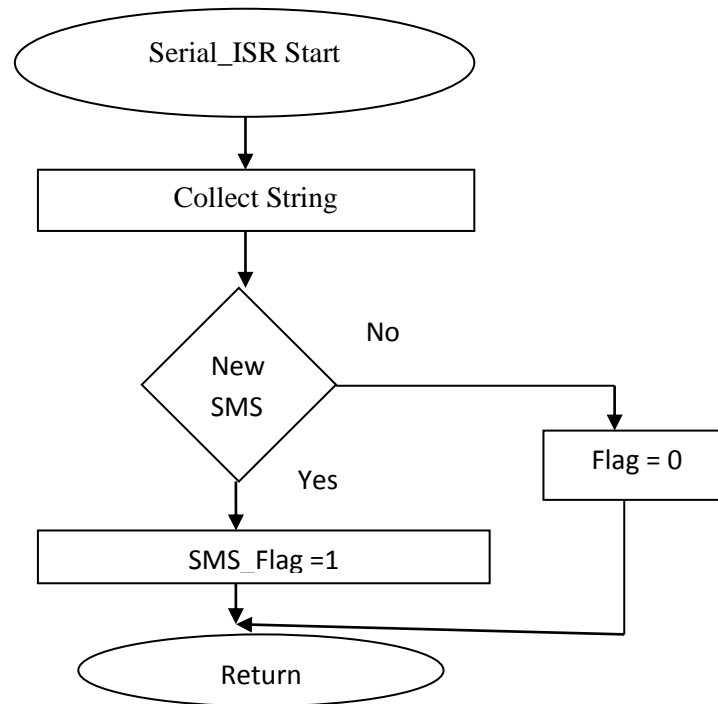


Figure 2: Flowchart

CONCLUSION

Developed system will provide or satisfy the need of safety, reliability [4] and the comfort of driver as well as also accomplish the demand of power requirement in day to day life.

Future Scope

There is a scope to use Artificial Intelligence to make system more intelligent.

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