Security system for Solar Car

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Abstract— The main idea of our project is to help the people to prevent the increase in regular theft of cars from the respective place. Here we are providing three methods of security for the car and also in each method of there will be an alertness that is sent to the car owner through GSM technology. Biometric can be seen as a solution to a lot of user identification and security problems in today's network. It refers to automatic recognition of an individual based on their behavioral. Fingerprint identification is one such method in biometric. Thermal sensors and vibration sensors are used for security purpose. The purpose of using MEMS sensor is that elements present in it have some sort of mechanical functionality whether the objects can move or not. Also a Smart Phone app is developed for monitoring the car movement.

I.INTRODUCTION

This idea is an "Incremental Innovation". To the existing technology we have included additional features like sending an alert message to the owner. Here, we are providing three levels of security for the car.

(1)Biometric System.

(2)Engine Ignition Detection using Thermal Sensors and Vibration Sensors.

(3)Vehicle Displacement Using MEMS sensor.

If an authorized person wants to access the car through biometric then only the engine will start and the car will be in motion and the remaining sensors will be inactive. But if an unauthorized person tries to access the car, then an alert message will be sent to the owner. In this case, the sensors will get activated.

If the person tries to start the car through any internal changes, then the thermal sensor and the Vibration sensor gets activated which detects the heat and also the vibration of engine and immediately sends an alert message to the owner. A Smart Phone app is used to control the vehicle if it is in motion. The last method of security is through positioning sensors, if the vehicle is at rest and if un-authorized person tries to displace the vehicle from its initial position, then the MEMS sensor gets activated and then it detects the orientation of the vehicle in X/Y/Z direction and message is sent to the owner.

Features:

1. GSM based communication is simple to operate.
2. Messages can be sent to the owner of the car.
3. Low power consumption.

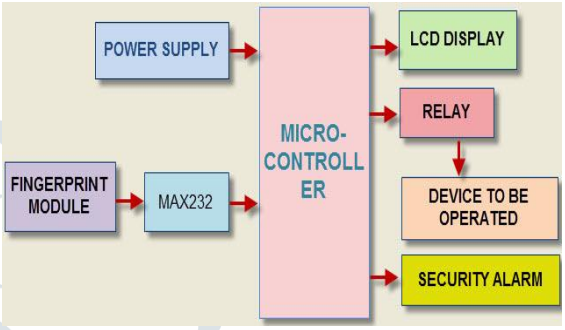
COMPONENT REQUIREMENT :

1. Microcontroller(ARM7LPC2148)
2. GSM Module
3. Finger print module
4. Thermal and MEMS sensor.
5. LCD Display.

SOFTWARE TOOLS:

i. Kiel IDE
ii. Embedded-C programming
iii. Flash magic
iv. Code dumpers

BLOCK DIAGRAM:



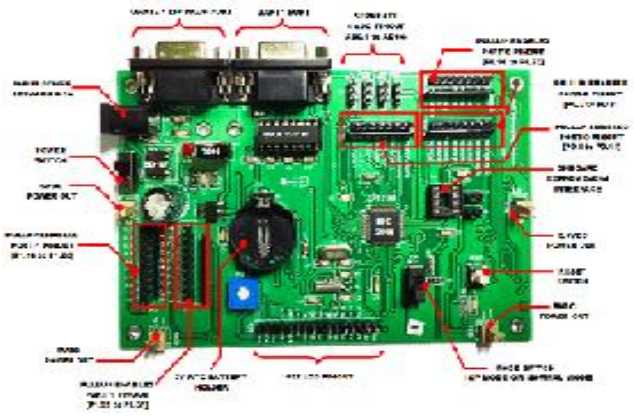
SPECIFICATIONS:

MICROCONTROLLER:

ARM7 is one of the widely used micro-controller family in embedded system application. This section is humble effort for explaining basic features of ARM-7.

ARM is a family of instruction set architectures for computer processors based on a reduced instruction set computing (RISC) architecture developed by British company ARM Holdings.

A RISC-based computer design approach means ARM processors require significantly fewer transistors than typical processors in average computers. This approach reduces costs, heat and power use. These are desirable traits for light, portable, battery-powered devices—including smartphones, laptops, tablet and notepad computers), and other embedded systems. A simpler design facilitates more efficient multi-core CPUs and higher core counts at lower cost, providing higher processing power and improved energy efficiency for servers and supercomputers.



FINGERPRINT MODULE:

This is a finger print sensor module with TTL UART interface for direct connections to microcontroller UART or to PC through MAX232 / USB-Serial adapter. The user can store the finger print data in the module and can configure it in 1:1 or 1: N mode for identifying the person. The FP module can directly interface with

3v3 or 5v Microcontroller. A level converter (like MAX232) is required for interfacing with PC serial port.

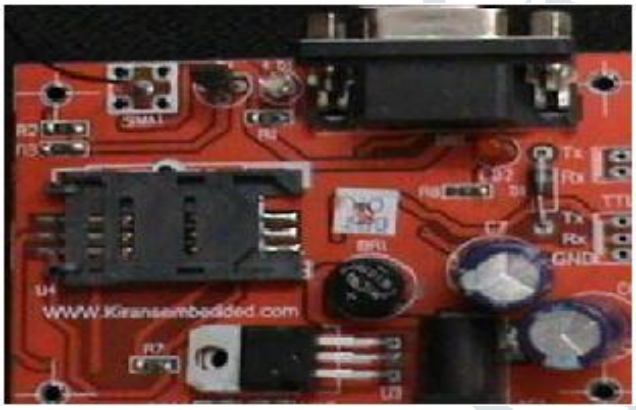
GSM MODULE:

These products are widely used for GSM voice communications and TCP or IP stacks.

These products offer a high quality serial TTL interface for easy and direct interface to microcontroller.

Uses the extremely popular SIM 300 GSM module Provides the industry standard serial RS232 interface Provides serial TTL interface for easy and direct interface to microcontroller Provision for 3V lithium battery holder Can be used for GSM voice communications, data/Fax, SMS, GPRS and TCP/IP stack Can be controlled through standard AT commands Operating Voltage: 7-15 AC or DC.

SIM300 is a triband GSM modem being able to operate only in 900, 1800, 1900 MHz band.



THERMAL SENSOR:

The LM35 is an integrated circuit sensor that can be used to measure temperature with an electrical output proportional to the temperature. It has an output voltage that is proportional to the Celsius temperature.

The scale factor is .01V/˚C.

The LM35 does not require any external calibration or trimming and maintains an accuracy of +/-0.4 ˚C at room temperature and +/- 0.8 ˚C over a range of 0 degree Celsius to +100 ˚C.

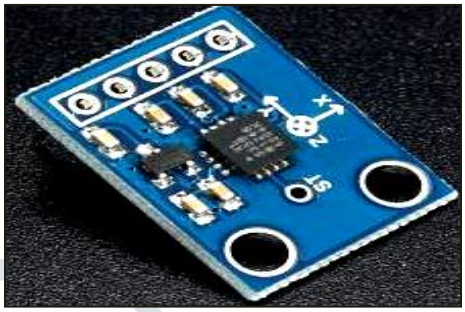
The sensor self-heating causes less than 0.1 ˚C temperature rise in still air.

Use a conversion factor that is the reciprocal, that is 100 ˚C /V Calibrated directly in ˚ Celsius (Centigrade) n

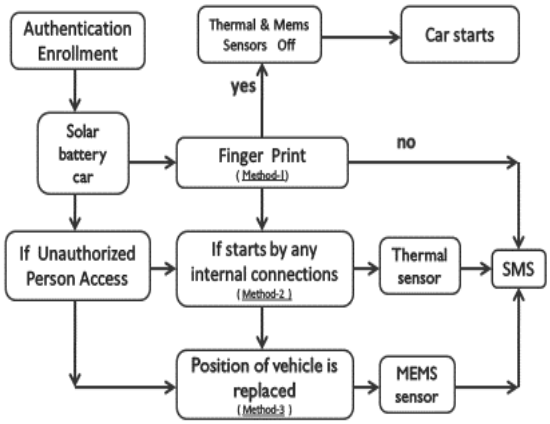
MEMS SENSOR:

Micro-Electro-Mechanical Systems, or MEMS, is a technology that in its most general form can be defined as miniaturized mechanical and electro-mechanical elements (i.e., devices and structures) that are made using the techniques of micro fabrication.

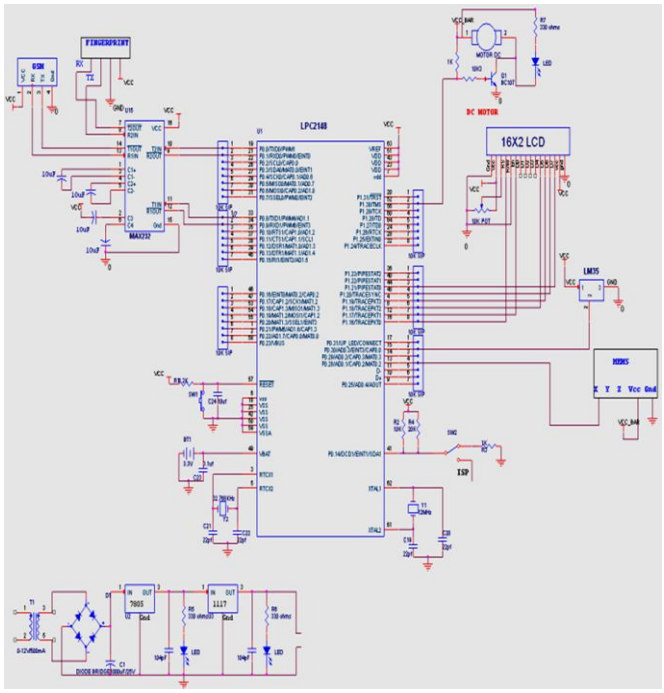
The basic principle of operation behind the MEMS accelerometer is the displacement of a small proof mass etched into the silicon surface of the integrated circuit and suspended by small beams. Consistent with Newton's second law of motion (F = ma), as an acceleration is applied to the device, a force develops which displaces the mass.

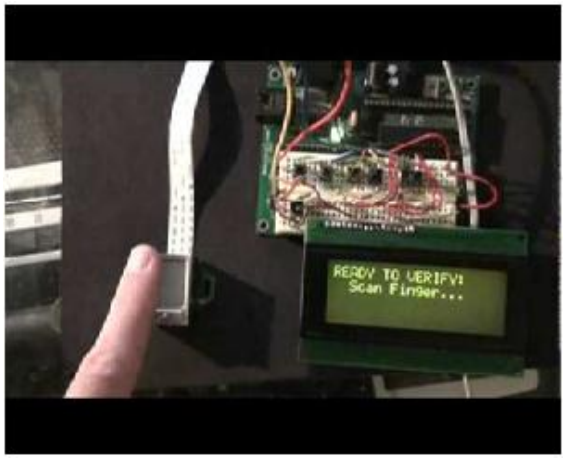


FLOWCHART:



SCHEMATIC DIAGRAM





CONCLUSION:

Hence we have implemented our idea from prototype module into a real time application with the necessary modifications when compared to the previous prototype.

By this, we can help the users to prevent the increase in regular theft of car and passive equipments from the car. For the security of passive components we will be using RFID technology. When the car is been theft, we can locate the position of the car through GPS technology. Also we can include cameras to the car so that it can capture the image of the unknown person and it will be sent to the owner.

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