RFID –EMERGENCY TRAFFIC CONTROL AND THEFT ALERT SYSTEM

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Abstract:

The organized placement of emergency vehicles and traffic control devices on a roadway can create safer working conditions for emergency responders. The risks associated with working in moving traffic and the constantly changing emergency scene environment can be reduced through awareness, training, teamwork and communication. In this we are using an Embedded C application with help of RFID technology to control the traffic according to the emergency condition and also to detect theft vehicles that pass through the traffic control system. Radio-frequency identification (RFID) is the wireless use of electromagnetic fields to transfer data, for the purposes of automatically identifying and tracking tags attached to objects. The tags contain electronically stored information. RFID uses a passive system to support tracking of the theft vehicle and also alert the traffic control in case of any emergency conditions. Once the vehicle is identified as emergency or theft vehicle through RFID passive system then the following changes or made in the traffic control system so that the vehicle can pass through or can be caught hold respectively. Hence, RFID will communicate to the traffic signal system accordingly and the traffic control for any emergency condition or theft alert is done.

Keywords — **RFID, alert system, emergency traffic control, passive card.**

I. INTRODUCTION

Radio-frequency identification (RFID) is the wireless technology that uses electromagnetic fields to transfer data, for the purpose of automatically identifying and tracking tags attached to the objects. The tags contain electronically stored information while it is tracked. RFID uses a passive support system to support tracking of the theft vehicle and also alert the traffic control in case of any emergency conditions. Also In modern day vehicles, vehicle anti-theft system has major importance because of frequent thefts. Once the vehicle is identified as emergency or theft vehicle through RFID passive system then the following changes or made in the traffic control system so that the vehicle can pass through or can be caught hold of it respectively.

The project uses simple Electronic components such as LED as TRAFFIC LIGHT indicator and a MICROCONTROLLER for auto change of signal after a pre-specified time interval

according to the detected condition. Microcontroller AT89c51 is the brain of the project which initiates the traffic signal at a junction. The led's are automatically on and off by making the corresponding port pin of the micro controller high. A seven segment display also connected to display the timing of each signal. At a particular instant only one green light holds and other lights hold at red. During transition from green to red, the present group yellow led and succeeding group yellow led glows and then succeeding group led changes to green. This process continues as a cycle.

Traffic lights alternate the right of way according to road users by displaying lights of a three standard color (red, yellow, and green) following a universal color code. In the typical sequence of color phases:

- The green light regulates traffic to proceed in the direction denoted, if it is safe to do so.
- The yellow light provides warning that the signal will be changing from green to red

(and from red to green in certain countries, such as in the UK). Actions required by drivers vary, with some jurisdictions requiring drivers to stop if it is safe to proceed, and others allowing drivers to go through the intersection if it is fine to pass through.

- a flashing yellow indication is a warning signal before proceeding with the green signal.
- the red signal prohibits any traffic from proceeding further to catch hold of it.
- a flashing red indication is treated as a sudden stop sign

Traffic signals will go into a flashing mode if the controller detects a problem, such as a program that tries to display green lights to conflicting traffic. The signal may display flashing yellow to the main road and flashing red to the side road, or flashing red in all directions. Flashing operation can also be used during times of day when traffic in light conditions, such as late at night conditions.

An anti-theft system is any device or method used to prevent or detect the unauthorized appropriation of objects considered valuable. Theft is one of the most common and oldest criminal activities. From the invention of the physical lock and key to the introduction of RFID tags (both passive and active) and biometric identification, anti-theft systems have evolved to identify the introduction of new inventions to society and the resulting theft of them by criminals.
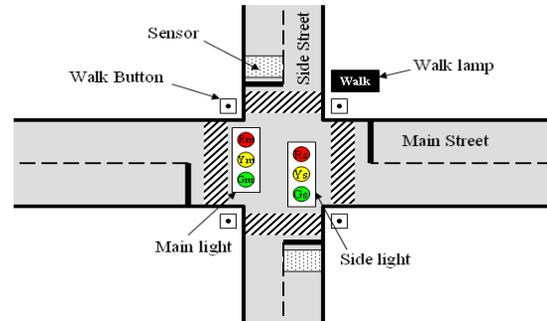

Figure 1: Diagram for intersection with corresponding lights.

- Items may require an anti-theft system for a variety of conditions, which may occur in combination depending on the type of item and its use:
- The item is valuable and has high sentimental value (prestigious car, family heirloom, birthday gift, war medals, coin collection)
- The item is impossible to replace if lost (produced in low numbers, expensive, antiques, unique works of art)
- The item is easily taken or stoled (retail/supermarket products, office stationery, no security tags(TJ)
- The item may be left unattended in an unsafe places (laptops in a library, cars in a Parking)
- Inappropriate use of the item may cause considerable damage or may enable further unauthorized acts (theft of car keys, stolen building access keys, identity theft)
- The item is highly expensive to others (jewelry, mobile phones, rare collectibles, auto parts, industrial designs)
- The item is otherwise recollectable: (Alcohol, Tobacco products, age related substances)
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II .Embedded System

Intelligent, programmable and computing electronic device developed to perform

particular tasks based on a fixed amount of time . An embedded system is a mixture of hardware and software, perhaps with some mechanical and other components designed to perform a specific set of task.
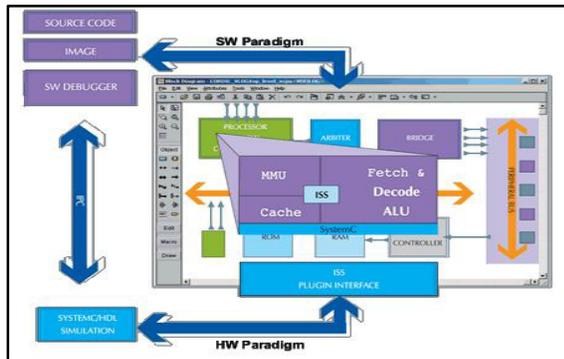

Figure 2 Embedded System Design

Electronics commonly uses either a microprocessor or a microcontroller. Some large or old systems use general-purpose mainframes computers or minicomputers.

Characteristics of Embedded System:

- It is very reactive and real time constrained.
- Increasingly high performance rate.
- Application specific processor design can be important component of embedded system.
- It serves as a single function and not used as general purpose.

A. Power Supply:

Power supply is a basically a source of electrical power. A device or system that supplies electrical or any other types of energy to an output load or combination of loads is called a power supply unit or PSU. The term is most widely applied to electrical energy supplies, less often to mechanical ones, and rarely to others.
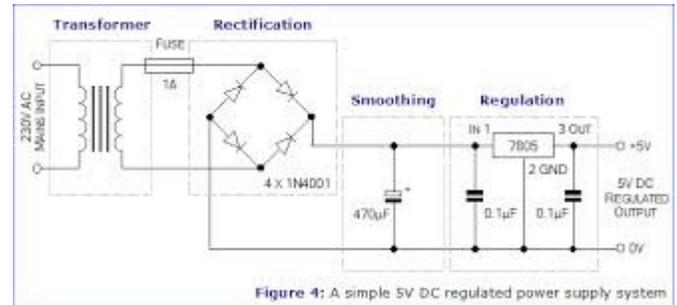

Figure 3.1 Circuit diagram of Power Supply

A 230v, 50Hz Single phase AC power supply which is given to a step down transformer to get 12v supply. This voltage is converted to DC voltage using a Bridge Rectifier. The converted pulsating DC voltage power is filtered by a capacitor and then given to 7805 voltage regulator to obtain constant 5v supply. This 5v power supply is given to all the components in the circuit. A RC time constant circuit is added to discharge all the capacitors quickly. To ensure the power supply a LED is connected for notification purpose.

Voltage Regulator:
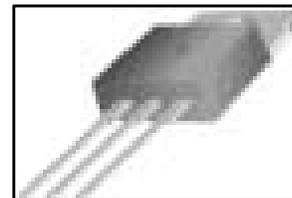
B. RFID reader:

 A transmitter/receiver that reads the contents of RFID tags .   also called an "RFID interrogator." The

maximum distance between the reader's antenna and

 the tag vary, depending on application. Credit c ards and ID badges have to be brought   closely to the readers, somewhat like bar codes. For othe r

applications, passive RFID tags can be read up t o   approximately 10 feet

away, while active tags with
 batteries can be several hundred feet from the re
ader.

Figure 3 RFID Reader

C. *Liquid Crystal Display:*

A liquid crystal display (LCD) is merely a thin, flat display device which is made up of any number of color or mono chrome pixels arrayed in front of a light source or reflector. Each pixel consists of a column of liquid crystal molecules suspended between two electrodes, and two polarizing filters, the axes of polarity of which are perpendicular to each other. Without the liquid crystals between them, light passing through one would be blocked by the other. The liquid crystal twists the polarization of light entering one filter to allow it to pass through the other. Many microcontroller devices use 'smart LCD' displays to output visual information. LCD displays designed around Hitachi's LCD HD44780 module, are inexpensive, easy to use, and it is even possible to produce a readout using the 8x80 pixels of the display.

They have a standard ASCII set of characters and mathematical symbols. For an 8-bit data bus, the display requires a +5V supply plus 11 I/O lines. For a 4-bit data bus it only requires the supply lines plus seven extra lines. When the LCD display is not enabled, data lines are tri-state and they do not interfere with the operation of the microcontroller.

D. *RFID types:*

- ■ Passive
  - – Have no attached internal power supply
  - – Electrical current inducted in antenna by the incoming signal proves power for integrated circuit in tag to power up and transmit response to it
  - – Very Small, Limited Range, Unlimited Life time.
- ■ Active
  - – Have their own internal power source
  - – Many operate at fixed intervals
  - – Also called beacons (broadcast own signal)
  - – Large (coin), Much larger memories, Longer range

E. *Traffic Module:*

The normal function of traffic lights requires sophisticated control and coordination to ensure that traffic moves as smoothly and safely as possible and that pedestrians are protected when they cross the roads. A variety of different control systems are used to accomplish this, ranging from simple clockwork mechanisms to sophisticated computerized control and coordination systems that self-adjust to minimize delay to people using the road.
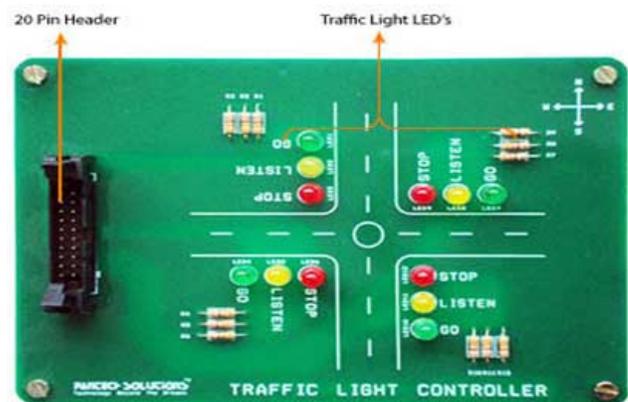

Figure 4 Traffic Light

They are, rooted in a long tradition of innovation and robustness. In order to create the best services for our customers, we offer flexible software architecture that supports open standards and is able to adapt to numerous local requirements. Its safety architecture is compliant with European and local directives and the electronics is designed to be durable, robust, sustainable and easy to maintain.

ACKNOWLEDGMENT

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