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Gsm Based Secure and Privacy-Preserving Traffic Information Systems

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Abstract: This is the motivation of this paper: We leverage state-of-the-art cryptographic schemes and readily available tele communication infra structure. We present a comprehensive solution n for smart phone-based traffic estimation that is proven to be secure and privacy preserving. We provide a full-blown implementation on actual smart phones, along with an extensive assessment of its accuracy and efficiency. Our results confirm that smart phone-based TISs can offer accurate traffic state estimation while being secure and privacy preserving.

Introduction

Traffic congestion deteriorates the quality of life of Citizens and contributes significantly to environmental Pollution and economic loss. Traffic information systems (tiss) Aim at solving this problem by collecting traffic data, producing Traffic estimates, and providing drivers with location-specific Information. The increasing smartphone penetration, along with The wide coverage of cellular networks, defines an unprecedented Large-scale network of sensors, with extensive spatial And temporal coverage, able to serve as traffic probes for tiss. To reap the benefits of smartphone-based tiss, users must Participate in large numbers. Ideally, anyone possessing aSmartphone should contribute to the tis. Nevertheless, this Very openness of such systems renders them vulnerable to Adversaries and malicious users. It is thus necessary to secure The collection of data and render the contributing users (smart phones) Accountable. This is a task that cannot be achieved only By relying on the security of the mobile-to-cellular infrastructure Communication.

Existing method

The frequent traffic jams at major junctions call for an efficient traffic management system in place. The resulting wastage of time and increase in pollution levels can be eliminated on a city-wide scale by these systems. The project proposes to implement an intelligent traffic controller using real time image processing. The image sequences from a camera are analyzed using thresholding method to find the density. Subsequently, the number of vehicles at the intersection is evaluated and traffic is efficiently managed. The project also proposes to implement a real-time emergency vehicle detection system. In case an emergency vehicle is detected, the lane is given priority over all the others. Hardware control is done by microcontroller

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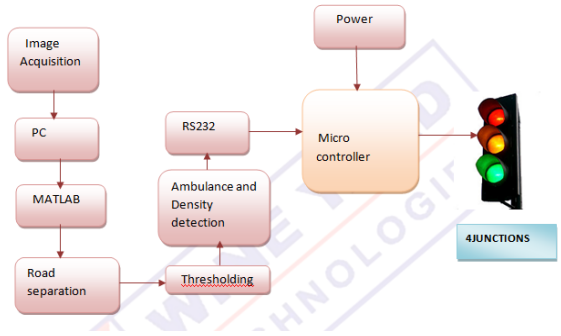
Block diagram



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Draw backs

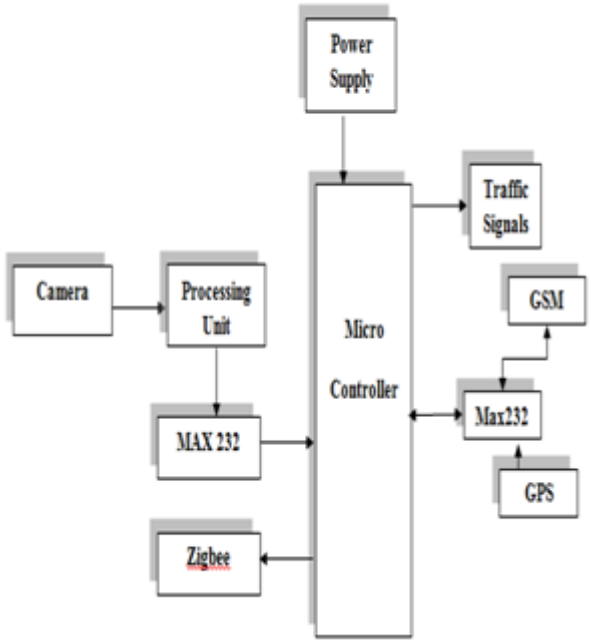
- No wireless communication to send information
- Loss of time
- Inefficient traffic system

Proposed method

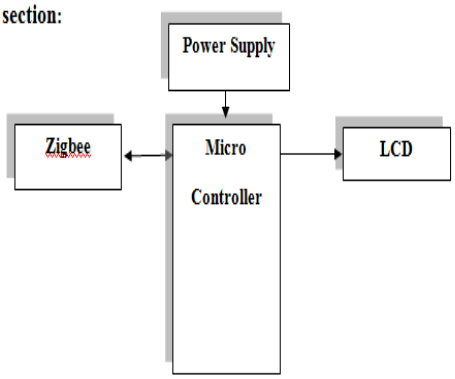
In this system we can get the traffic level before entering the traffic section by using ARM7, GPS, GSM and Zigbee. The camera is used to capture the image in traffic section by using MATLAB process we identify the traffic level, then GPS is used for to track the location and this both information, that is traffic level and location are transmitted through zigbee. And also SMS can be send to the person using GSM From this driver easily identify traffic level of the particular location so they choose the traffic less path.LCD is used to show the status of the project.

Block diagram

Traffic section:

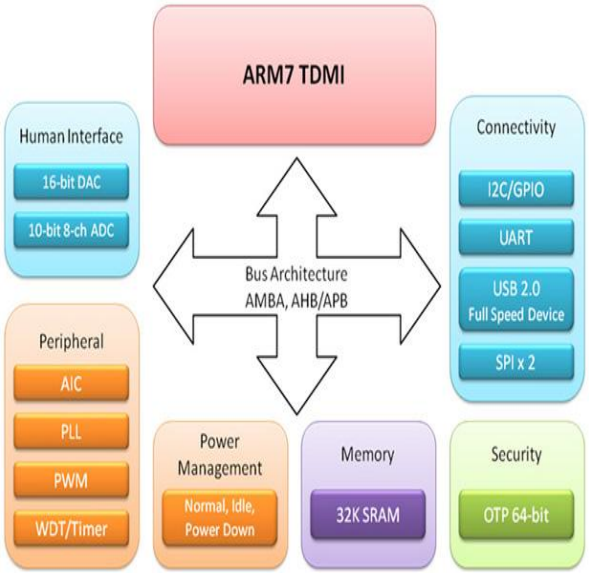


Vehicle section:



Modules used in this project

ARM PROCESSOR



ARM7TDMI Processor Core

- Current low-end ARM core for applications like digital mobile phones
- TDMI
  - T: Thumb, 16-bit compressed instruction set
  - D: on-chip Debug support, enabling the processor to halt in response to a debug request

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- M: enhanced Multiplier, yield a full 64-bit result, high performance
- I: Embedded ICE hardware

Von Neumann architecture

AT89S52

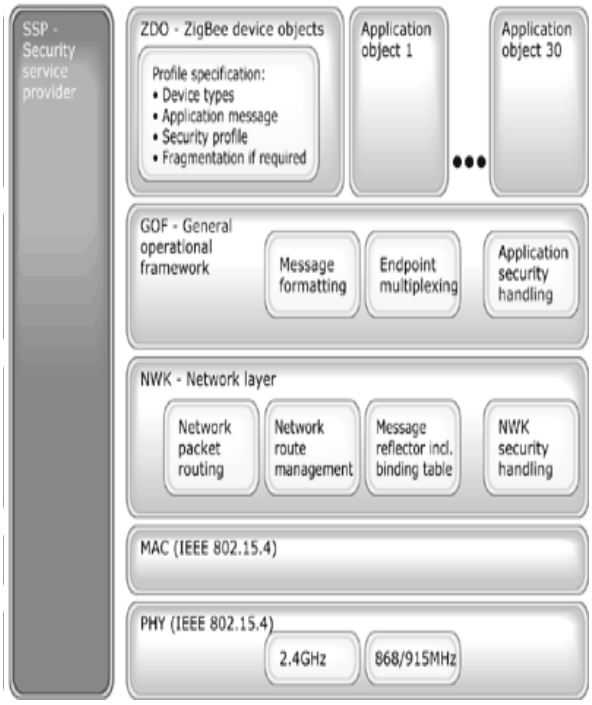
The AT89S52 is a low-voltage, high-performance CMOS 8-bit microcomputer with 4K bytes of Flash programmable memory. The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard MCS-51 instruction set. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcomputer, which provides a highly flexible and cost-effective solution to many embedded control applications.

In addition, the AT89S52 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port and interrupt system to continue functioning. The power-down mode saves the RAM contents but freezes the oscillator disabling all other chip functions until the next hardware reset.

ZIGBEE

ZigBee module. The €1 coin, shown for size reference, is about 23 mm (0.9 inch) in diameter. ZigBee is a specification for a suite of high level communication protocols using small, low-power digital radios based on the IEEE 802.15.4-2003 standard for wireless personal area networks (WPANs), such as wireless headphones connecting with cell phones via short-range radio. The technology defined by the ZigBee specification is intended to be simpler and less expensive than other WPANs, such as Bluetooth. ZigBee is targeted at radio-frequency (RF) applications that require a low data rate, long battery life, and secure networking. The ZigBee Alliance is a group of companies that maintain and publish the ZigBee standard.

ARCHITECTURE:



ZigBee is a home-area network designed specifically to replace the proliferation of individual remote controls. ZigBee was created to satisfy the market's need for a cost-effective, standards-based wireless network that supports low data rates, low power consumption, security, and reliability.

Basic concept of GPS

A GPS receiver calculates its position by precisely timing the signals sent by the GPS satellites high above the Earth. Each satellite continually transmits messages which include

- the time the message was transmitted

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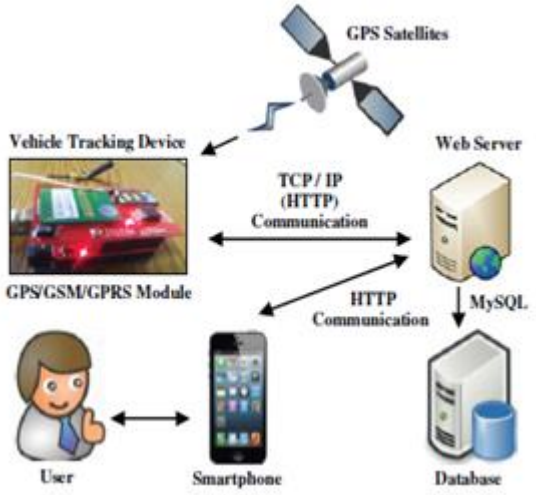
- precise orbital information (the ephemeris)
- The general system health and rough orbits of all GPS satellites (the almanac).



MATLAB -Recognition methods in image processing

Image recognition is the process of identifying and detecting an object or a feature in a digital image or video. This concept is used in many applications like systems for factory automation, toll booth monitoring, and security surveillance. Typical image recognition algorithms include:

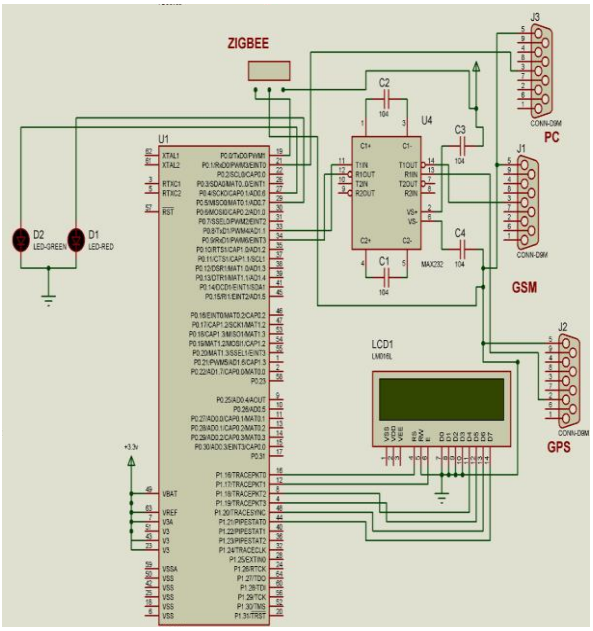
- Optical character recognition
- Pattern and gradient matching
- Face recognition
- License plate matching
- Scene change detection

Global System for Mobile Communication (GSM)

Definition:

GSM, which stands for Global System for Mobile communications, reigns (important) as the world's most widely used cell phone technology. Cell phones use a cell phone service carrier's GSM network by searching for cell phone towers in the nearby area. Global system for mobile communication (GSM) is a globally accepted standard for digital cellular communication. GSM is the name of a standardization group established in 1982 to create a common European mobile telephone standard that would formulate specifications for a pan-European mobile cellular radio system operating at 900 MHz. It is estimated that many countries outside of Europe will join the GSM partnership.

Schematic Diagram:



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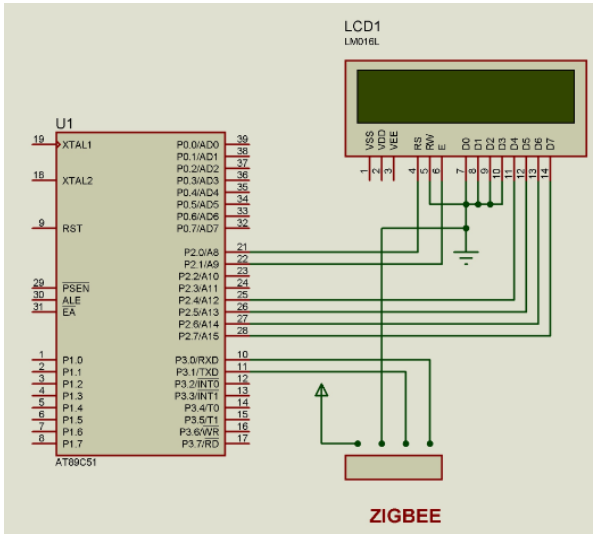
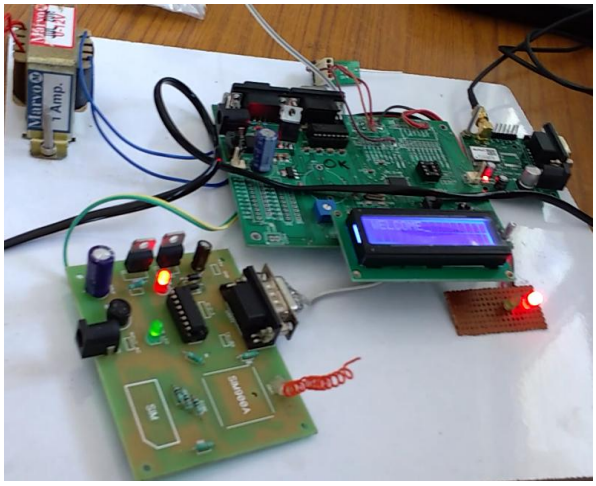
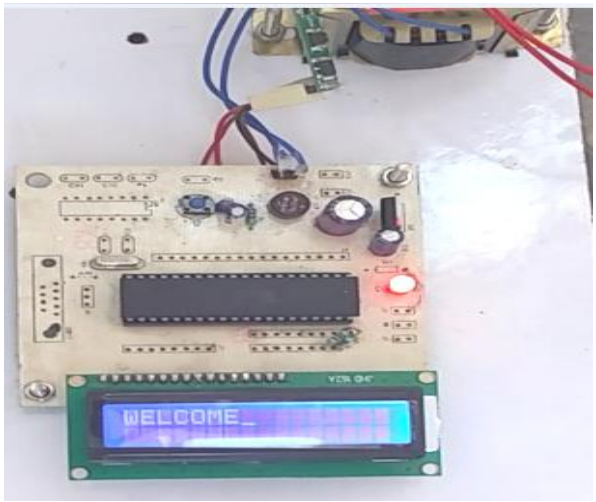


Results:





Advantages

- Enhanced safety
- Saves the human life
- Major accident avoided

Applications:

- In traffic zones
- In vehicles

Conclusion

This system discusses the design and implementation of an intelligent traffic information system based on image processing. The single camera system works by measuring the density of vehicles on the roads at an intersection in a round robin fashion and adjusts the signal time accordingly. Here zigbee is used to send traffic information to the driver when ever vehicle enters into particular traffic zone. A wireless interface using GSM engine and GPS is provided location details through GSM. The system is tested using software under various crowd conditions and found to be efficient as compared to other sensor based systems.

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