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Traffic Information System Based on Smartphone

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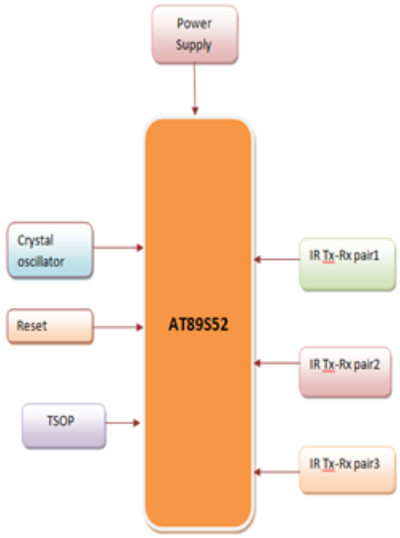
ABSTRACT:
Increasing smartphone penetration, combined with the wide coverage of cellular infrastructures, renders smart phone based traffic information systems (TISs) an attractive option. The main purpose of such systems is to alleviate traffic congestion that exists in every major city. Nevertheless, to reap the benefits of smartphone.

Existing System:
Traffic density is calculated using IR sensors. A siren alert is given when the density is high at that particular road. This is a signal for common man to avoid travelling through that road.



Drawback: No wireless communication

Proposed system:
The project is built around MCU. Here we are using IR sensor. Here in our project we want to avoid to travel to the places/ on roads where there is huge traffic. So for that reason IR sensors are being placed at different locations of a road and the intensity of the traffic will be detected and that information will be sent to the controller.

A Bluetooth module is interfaced to the controller where the data can be sent to the public. This can be implemented using smart phones. Here the driver or the traveller can receive the status of traffic using Bluetooth in their mobile. So that they can decide whether to travel through that route or not. This project uses regulated 3.3V, 500mA power supply. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac output of secondary of 230/12V step down transformer.

Modules used in this Project:
The **LPC2148** are based on a 16/32 bit ARM7TDMI-S™ CPU with real-time emulation and embedded trace support, together with 128/512 kilobytes of embedded high speed flash memory. A 128-bit wide memory interface and unique accelerator architecture enable 32-bit code execution at maximum clock rate. For critical code size applications, the alternative 16-bit Thumb Mode reduces code by more than 30% with minimal performance penalty. With their compact 64 pin package, low power consumption, various 32-bit timers, 4- channel 10-bit ADC, USB PORT,PWM channels and 46 GPIO lines with up to 9 external interrupt pins these microcontrollers are particularly suitable for industrial control, medical systems, access control and point-of-sale. With a wide range of serial communications interfaces, they are also very well suited for communication gateways, protocol converters and embedded soft modems as well as many other general-purpose applications.

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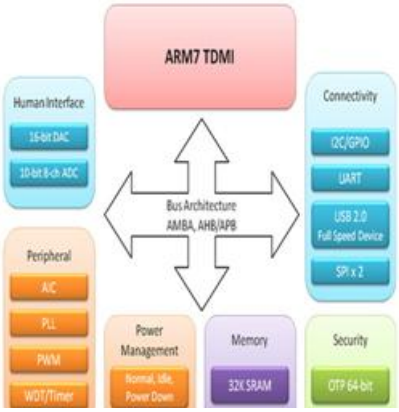

This project uses regulated 3.3V, 500mA power supply. Unregulated 12V DC is used for relay. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac output of secondary of 230/12V step down transformer.

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

BLUETOOTH:

Bluetooth is a wireless technology standard for exchanging data over short distances (using short-wavelength radio transmissions in the ISM band from 2400–2480 MHz) from fixed and mobile devices, creating personal area networks (PANs) with high levels of security. Created by telecom vendor Ericsson in 1994, it was originally conceived as a wireless alternative to RS-232 data cables. It can connect several devices, overcoming problems of synchronization. Bluetooth dongle is simply defined as an accessory to the computer. By using a Bluetooth dongle a computer can be wirelessly linked to other devices. By using these dongles one can easily connect a computer with any other computer, printer, digital cameras or cellular devices. Actually Bluetooth dongle possesses a small microchip, which makes it capable of connecting and exchanging the data with all other devices which contain such microchips and with all other dongle devices. USB ports are used to connect a Bluetooth dongle with the computer. Just like other USB attachments these dongles also get powered from computers itself. Once we disconnect a Bluetooth dongle it gets deactivated on its own.

IR sensor:

IR reflectance sensors contain a matched infrared transmitter and infrared receiver pair. These devices work by measuring the amount of light that is reflected into the receiver. Because the receiver also responds to ambient light, the device works best when well shielded from abient light, and when the distance between the sensor and the reflective surface is small(less than 5mm). IR reflectance sensors are often used to detect white and black surfaces. White surfaces generally reflect well, while black surfaces reflect poorly. One of such applications is the line follower of a robot.

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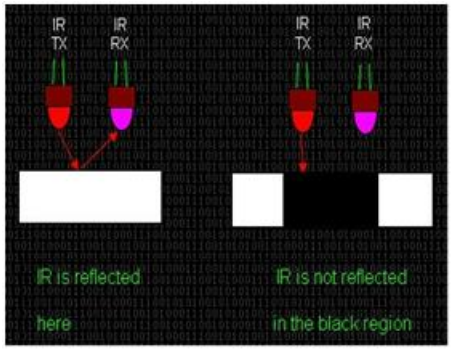
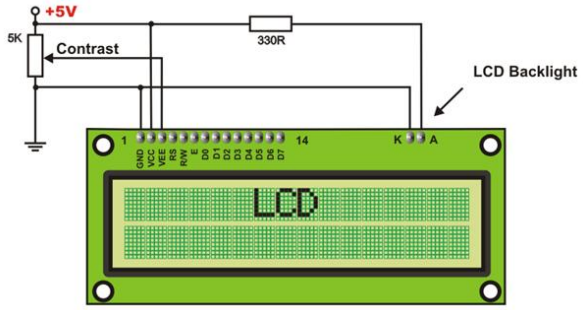


16x2 LCD

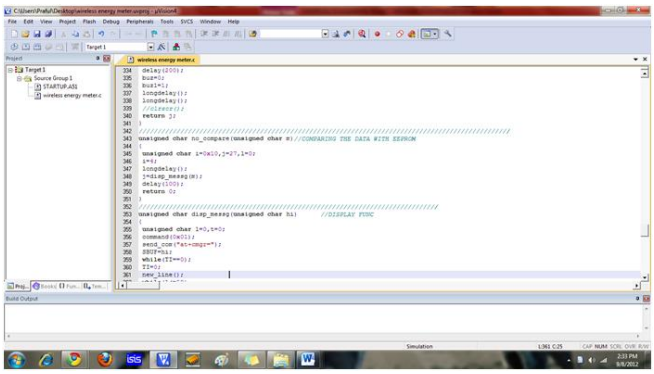
LCD screen consists of two lines with 16 characters each. Each character consists of 5x7 dot matrix. Contrast on display depends on the power supply voltage and whether messages are displayed in one or two lines. For that reason, variable voltage 0-Vdd is applied on pin marked as Vee. Trimmer potentiometer is usually used for that purpose. Some versions of displays have built in backlight (blue or green diodes). When used during operating, a resistor for current limitation should be used (like with any LE diode).



Command	RS	RW	D7	D6	D5	D4	D3	D2	D1	D0	Execution Time
Clear display	0	0	0	0	0	0	0	0	0	1	1.64mS
Cursor home	0	0	0	0	0	0	0	0	1	x	1.64mS
Entry mode set	0	0	0	0	0	0	0	1	I/D	S	40uS
Display on/off control	0	0	0	0	0	0	1	D	U	B	40uS
Cursor/Display Shift	0	0	0	0	0	1	D/C	R/L	x	x	40uS
Function set	0	0	0	0	1	DL	N	F	x	x	40uS
Set CGRAM address	0	0	0	1	CGRAM address						40uS
Set DDRAM address	0	0	1	DDRAM address							40uS
Read "BUSY" flag (BF)	0	1	BF	DDRAM address							-
Write to CGRAM or DDRAM	1	0	D7	D6	D5	D4	D3	D2	D1	D0	40uS
Read from CGRAM or DDRAM	1	1	D7	D6	D5	D4	D3	D2	D1	D0	40uS

Software Tools:

Keil compiler is a software used where the machine language code is written and compiled. After compilation, the machine source code is converted into hex code which is to be dumped into the microcontroller for further processing. Keil compiler also supports C language code.



Flash Magic:

Flash Magic is a tool which is used to program hex code in EEPROM of micro-controller. It is a freeware tool. It only supports the micro-controller of Philips and NXP. It can burn a hex code into that controller which supports ISP (in system programming) feature. Flash magic supports several chips like **ARM Cortex M0, M3, M4, ARM7 and 8051.**

Advantages:

- Accidents will be avoided
- Congestion will be controlled

Applications:

- Public Transportation
- Traffic junctions

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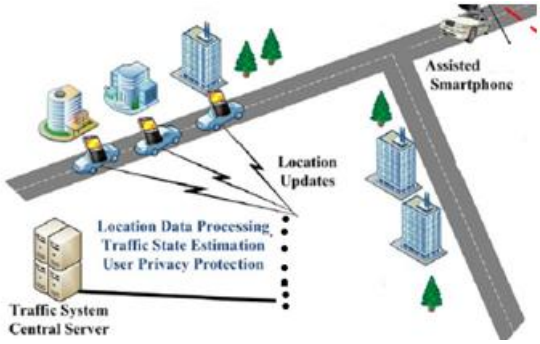
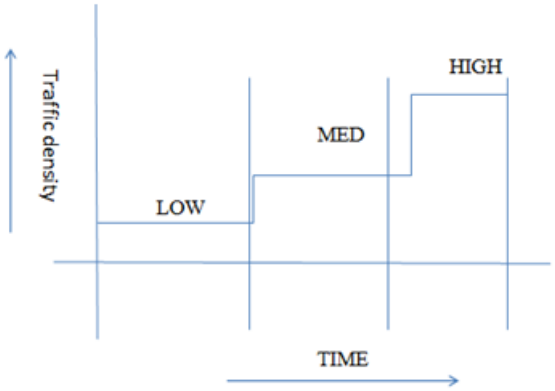


Graph Representation:



Conclusion:

As road traffic is increasing day by day, monitoring it in an effective way has been the challenge to researchers. Since Smart phones are penetrating into common people's lives very fast, utilizing the sensors available in them for traffic monitoring is a good idea. All this can be done in an energy efficient manner by using low energy consuming components

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