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Traffic Information System Based on Smartphone

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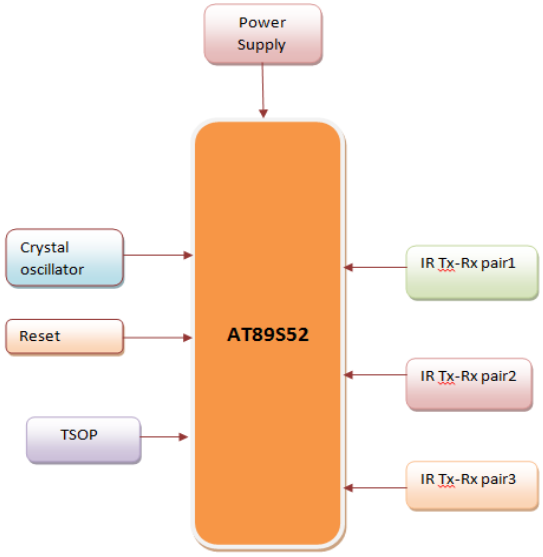
ABSTRACT

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-based TISs, we need to ensure their security and privacy and their effectiveness (e.g., accuracy).

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.



Draw back: 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 5V, 500mA power supply. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac out put of secondary of 230/12V step down transformer.

RASPBERRY-PI

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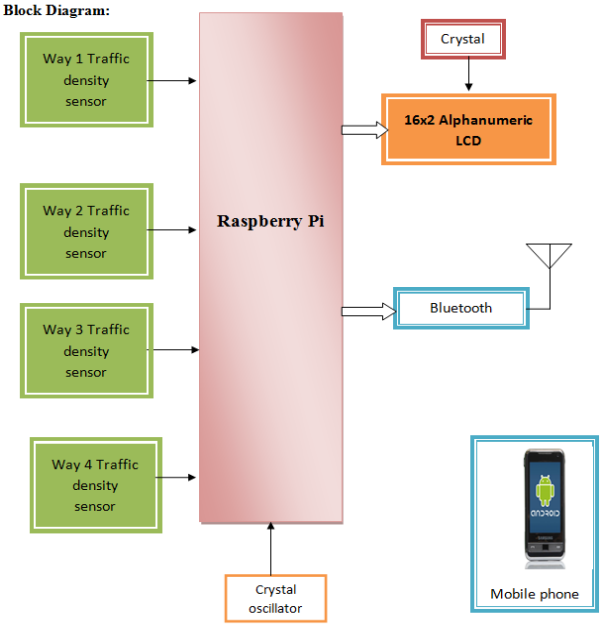
Block Diagram:

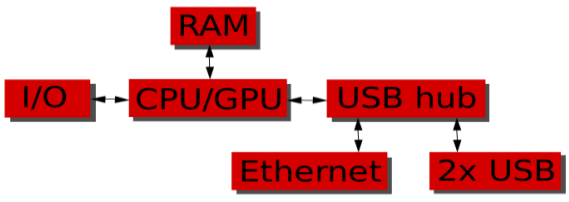


The **Raspberry Pi** has a Broadcom system on a chip (SoC).

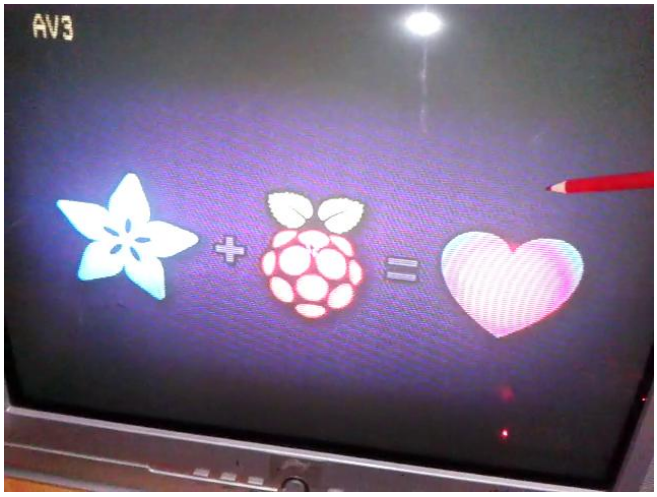
Features

- System Memory – 1GB LPDDR2
- Storage – micro SD card slot (push release type)
- Video & Audio Output – HDMI and AV via 3.5mm jack.
- Connectivity – 10/100M Ethernet
- USB – 4x USB 2.0 ports, 1x micro USB for power
- Expansion
- 2×20 pin header for GPIOs
  Camera header
  Display header
- Power – 5V via micro USB port.
- Dimensions – 85 x 56 mm

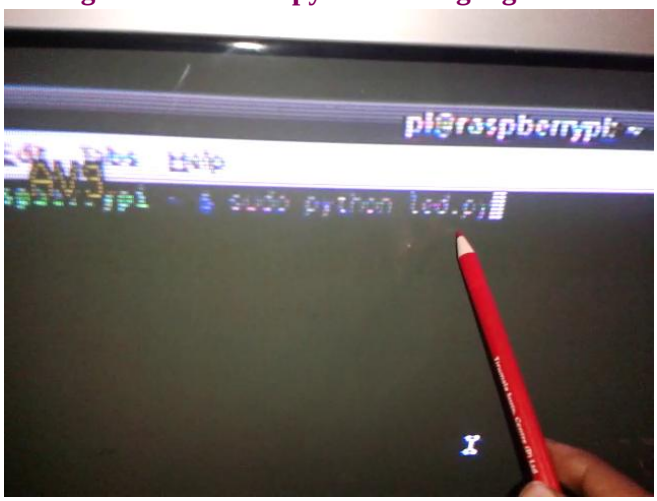
Basic Hardware of Raspberry-PI

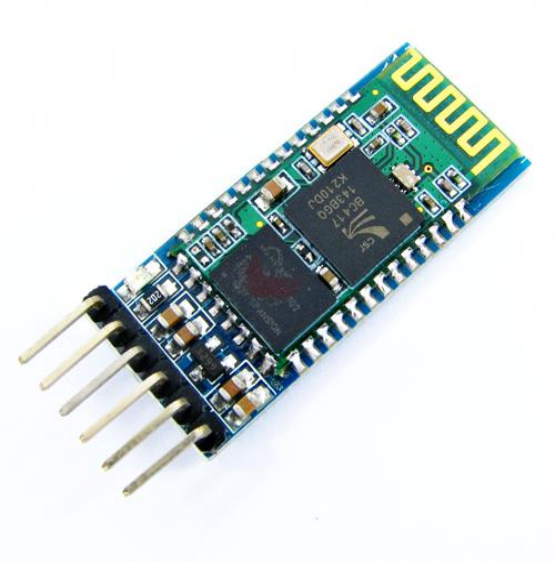


OS used in Raspberry pi is Linux



Coding will be done in python/C language





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BLUETOOTH

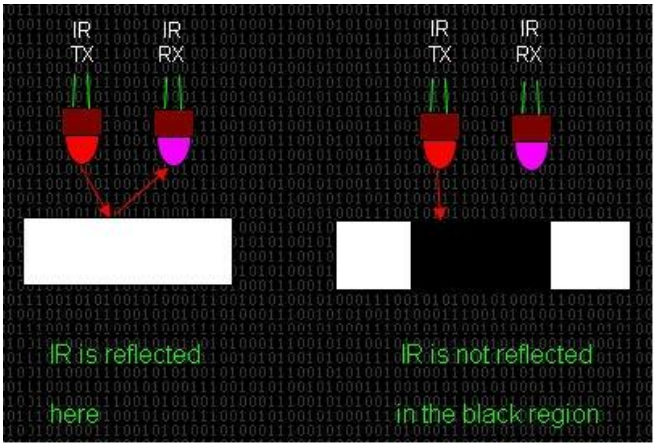
Bluetooth is a wireless technology standard for exchanging data over short distances (using short-wavelength radio transmissions in the ISM band from 2400–2480 MHz) from fixed and mobile devices, creating personal area networks (PANs) with high levels of security. Created by telecom vendor Ericsson in 1994, it was originally conceived as a wireless alternative to RS-232 data cables. It can connect several devices, overcoming problems of synchronization.

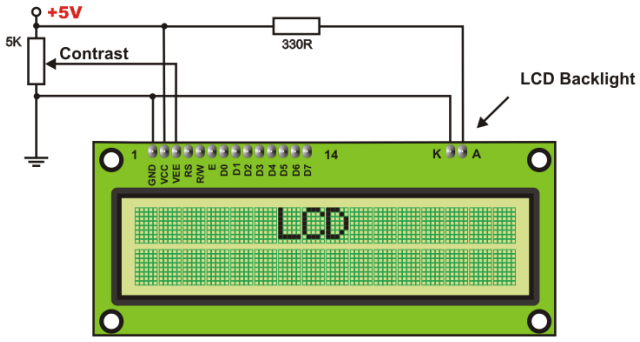
Bluetooth dongle is simply defined as an accessory to the computer. By using a Bluetooth dongle a computer can be wirelessly linked to other devices. By using these dongles one can easily connect a computer with any other computer, printer, digital cameras or cellular devices. Actually Bluetooth dongle 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

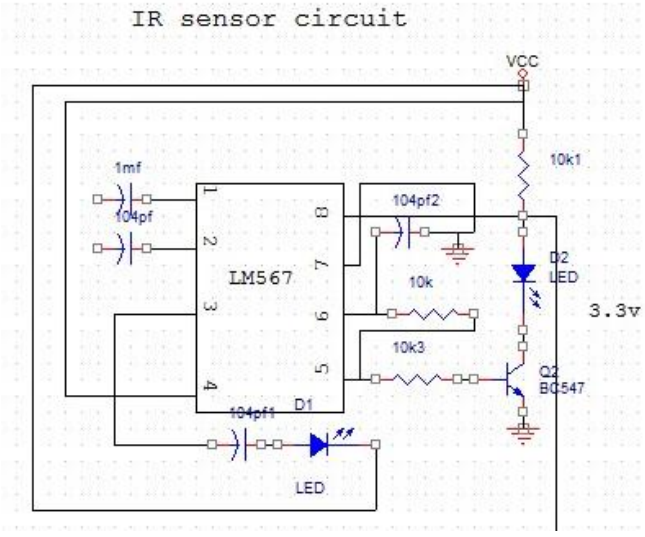
IR reflectance sensors contain a matched infrared transmitter and infrared receiver pair. These devices work by measuring the amount of light that is reflected into the receiver. Because the receiver also responds to ambient light, the device works best when well shielded from abient light, and when 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.





IR sensor schematic diagram



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

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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).

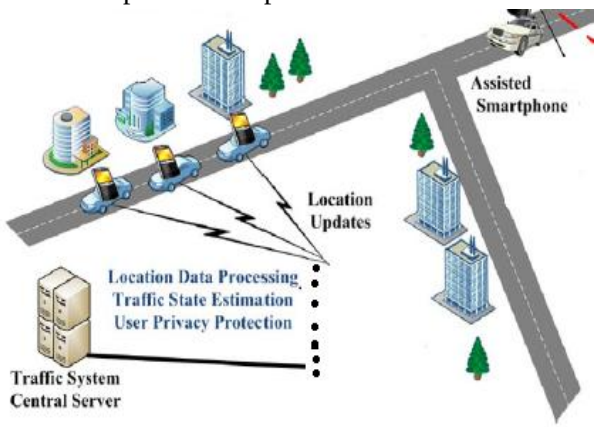
Command	RS	RW	D7	D6	D5	D4	D3	D2	D1	D0	Execution Time
Clear display	0	0	0	0	0	0	0	0	0	1	1.64mS
Cursor home	0	0	0	0	0	0	0	0	1	x	1.64mS
Entry mode set	0	0	0	0	0	0	0	1	I/D	S	40uS
Display on/off control	0	0	0	0	0	0	1	D	U	B	40uS
Cursor/Display Shift	0	0	0	0	0	1	D/C	R/L	x	x	40uS
Function set	0	0	0	0	1	DL	N	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

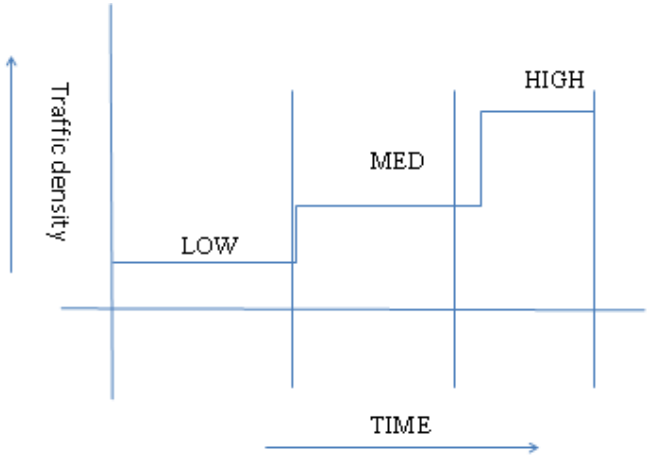
Advantages

- Accidents will be avoided
- Congestion will be controlled
- Fit and forget system
- Highly reliable
- Drivers will be alerted

Applications

- Public Transportation
- Traffic junctions
- Transportation departments





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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