International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 2 Issue 4, April - 2013

Intend Of Intellectual Transfer Beam Organizer Using Entrenched System

S. Suganya[1],C. Swetha[2] ,V. Shobana[3] ,S. Sivaranjini[4] & B. Pradeep Raja[5]

Department Of Electronics and Communication Engineering

Alpha College Of Engineering,Chennai,India

ABSTRACT

The need for change as the population dramatically increases , the number of vehicles on the nation's roads and highways increases,as a result Vehicular traffic is continuously increasing around the world, especially in large urban areas, so a new methods of traffic control have become necessary. The existing methods for traffic management, surveillance and control are not adequately efficient in terms of performance, cost, maintenance, and support. Due to the fixed time intervals of green, orange and red signals the waiting time is more and the usage of fuels is in larger amount. To make traffic light controlling more efficient, the advent of new technique called as "INTEND OF INTELLECTUAL TRANSFER BEAM ORGANIZER USING ENTRENCHED SYSTEM" has been designed.This makes the use of Sensor Networks along with Embedded Technology. The timings of Red, Green lights at each crossing of road will be logically decided based on the total traffic on all adjacent roads. Thus, optimization of traffic light switching increases road capacity and traffic flow, and can prevent traffic congestions. GSM cell phone interface is also provided for users to obtain the current position of traffic on congested roads. This is a unique feature of this model which is very useful to car drivers or an emergency vehicle to take an alternate route in case of congestion.

Keywords: Intellectual Transfer beam organizer (ITBO),Sensors,Relay

I. INTRODUCTION

Fast transportation systems and rapid transit systems are nerves of economic developments for any nation. All developed nations have a well developed transportation system with efficient traffic control on road, rail and air.. Mismanagement and traffic congestion results in long waiting times, loss of fuel and money. The operation of standard traffic lights which are currently deployed in many junctions, are based on predetermined timing schemes, which are fixed during the installation and remain until further resetting. The timing is no more than a default setup to control what may be considered as normal traffic. Traffic signals are the most convenient method of controlling traffic in a busy junction. But, we can see that these signals fail to control the traffic effectively when a particular lane has got more traffic than the other lanes. This situation makes that particular lane more crowded with the vehicles than the other lanes. If the traffic signals can allot different time slots to different lanes according to the traffic present in each lane, then, this problem can be solved easily.It is therefore utmost necessary to have a fast, economical and efficient traffic control system for national development. The monitoring and control of city traffic is becoming a major problem in many countries. The measures taken are development of new roads and flyovers in the middle of the city; building of several ring such as the inner ring road, middle ring road and outer ring road; introduction of city trains such as the light rapid transit (LRT), and monorails; restricting of large vehicles in the city during peak hours; and also development of sophisticated traffic monitoring and control systems. Growing numbers of road users and the limited resource provided by current infrastructures lead to ever increasing traveling times One way to improve traffic flow and safety of the current transportation system is to apply automation and intelligent control methods to roadside infrastructure and vehicles.

Sensors for detecting vehicles play an important role in traffic control as they are used to acquire traffic jam information and control traffic signals.Some other vehicle sensor systems (e.g. ultrasonic sensor systems, image sensor systems) have been developed and employed according to their intended applications Any vehicle sensor will required high accuracy, a low price, a high installation flexibility, and contribute to aesthetic preservation after installation. To satisfy these needs, Sumitomo Electric has developed a vehicle sensor that is comprised of a far infrared receiver element called a " thermopile". This paper describes a development of a far infrared vehicle sensor and application for a traffic signal control. Some sensors has been listed in table of vehicle sensor system below based on their application.

Table 1: Vehicle Sensor system

Sensors	Function	Number of lanes scanned by one sensor unit	Features	Location of Installation	Electric power consumption
Ultrasonic sensor unit	Number of Vehicle occupancy	1 Lane	Many examples of good performance	Directly above the target lane	5W
Image sensor unit	Number of vehicle occupancy, velocity, length of jam	2-4 Lane	Multiple Function	Middle of the group of target lane	40W
Far infrared sensor unit	Number of vehicle occupancy	1 Lane	Extremely low power consumption	Obliquely above the target line	50mW

The problems of typical conventional traffic light Controller are mentioned below:

A. Heavy Traffic Jams

With increasing number of vehicles on road, heavy traffic congestion has substantially increased in major cities. This happened usually at the main junctions commonly in the morning, before office hour and in the evening, office hours. The main effect of this matter is increased time wasting of the people on the road. The solution for this problem is after by developing the program which sets different delays for different junctions. The delay for junctions that have high volume of traffic should be setting longer than the delay for the junction that has low of traffic.

B. No traffic, but still need to wait

At certain junctions, sometimes even if there is no traffic, people have to wait. Because the traffic light remains red for the preset time period, the road users should wait until the light turn to green. If they run the red light, they have to pay fine. The solution of this problem is by developing a system which detects traffic flow on each road and set timings of signals accordingly. Moreover, synchronization of traffic signals in adjacent junctions is also necessary

C. Emergency car stuck in traffic jam

Usually, during traffic jam, the emergency vehicle,such as ambulance, fire brigade and police will be stuck especially at the traffic light junction. This is because the road users waiting for the traffic light turn to green. This is very critical problem because it can cause the emergency case become complicate.

D. Lack of Traffic Information to users

Present traffic systems fail to provide traffic information including congested roads and alternate routes available in case of congestion. In the proposed Intellectual transfer beam organizer(ITBO) all these limitations of existing controller are eliminated. This model uses embedded system (microcontroller 89C51) and has advantages of efficient control, GSM Interface to mobile phones and fast response time. The problem of fixed timing traffic light is totally replaced by this ITBO.

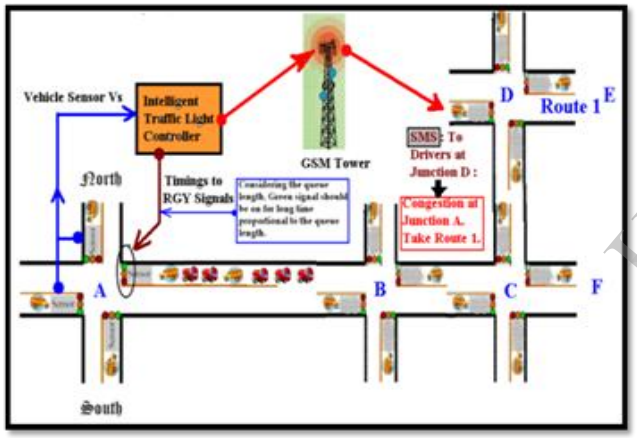
II. PROPOSED MODEL

The traditional methods for controlling the traffic jam do not prevent the vehicle from getting into the jam .In this project we aims to design a safe and efficient traffic flow, to assign the right way and minimizes the delay or waiting time at road. The traffic jam will be reduced by increasing the green signal time on busy road and decrease the red signal time in non busy road.The basic operation of ITBO can be realized by using embedded system which has advantages of simplicity, user friendly, easily programmable and a facility for GSM mobile interface.

The proposed operations of Intellectual Transfer beam Organiser are shown in Figure 1. In this the junctions are shown by letters A to F. The Infrared Sensors to detect vehicles is mounted on road. The presence or absence of a vehicle is sensed by a sensor assembly mounted on each road. This acts as an input to the ITBO unit. The ITBO unit generates output signals for Red, Green and Orange Signal and monitor their timings taking into consideration the length of vehicles on each road.In presence of congestion "Traffic Congestion Alert" can be automatically sent using GSM. It can be implemented in the lanes and junctions which carry heavy traffic. For instance if a vehicle driver at junction send message on GSM mobile phone to ITBO unit, the driver will get message indicting congestion status of road In this case it will inform that junction A is congested and the best possible route at this instant is Route 1

via junction E. Thus the rider is alerted for the congestion condition beforehand. This facilitates the rider in taking an alternate congestion free route, avoiding being stuck in the traffic jam (congestion). After the particular lane clears, the LANE CLEAR message is also displayed. This helps in diverting the traffic and hence reducing congestion.In addition to above, in the emergency mode, for a vehicle like ambulance, fire fighter or police car, the signals are altered for the fast and easy movement of these vehicle. Consider Figure 1, if an emergency vehicle is passing by the route A-B-C-F, the signals on the roads which are crossing this route. by using the Same IR transmitter and IR receiver sensor which immediately makes the signal red to stop vehicles on these routes. It is observed that this mode of operation is working satisfactory and the vehicles on crossing the route of emergency vehicle gets an alert and Red Signal till emergency vehicle passes by its route usefull in case of emergency.The figure below shows the concept of the proposed model :

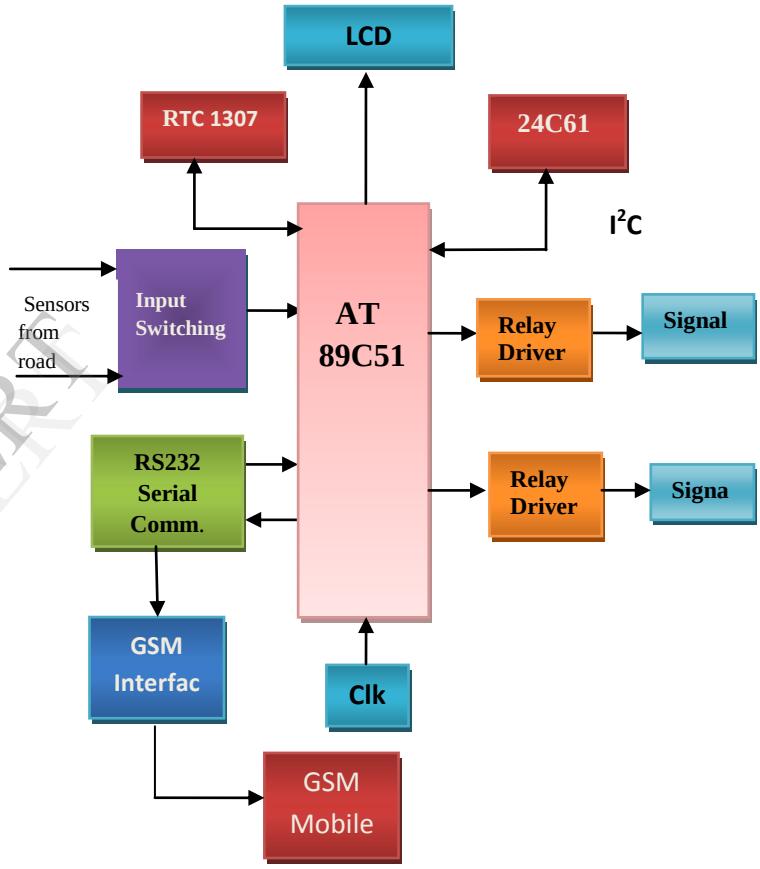
FIGURE 1:Basic Concept of the proposed model:



III.CONSTRUCTION OF ITBO

In our proposed model the basic operations are implemented using Microcontroller89c51AT. The main reason for selecting this microcontroller is ease of program.The block diagram of the proposed model is shown in Figure 2. The heart of the system is microcontroller AT89c51. For communicating with the external signals additional ports and multiplexers are used. Additional RAM and ROM are used for storing system program and application program. Then the input switching is implemented to communicate with the sensors i.e the sensors senses and send information to the input switching as input. Matrices are the most versatile type of switching module. one can connect any input to any output, individually or in combination. One can use matrix switches to route signals from oscilloscopes, DMMs, arbitrary waveform generators, and power supplies to various test points on a UUT. The primary benefit of matrix switches is simplified wiring -- the overall test system can easily and dynamically change the internal connection path without any external manual intervention. The block diagram consists of the micro controller, input switching matrix, serial communication interface, GSM interface, Real Time Clock 1307, Clock circuit, Relay Driver ULN 2003, LED interfacing circuit. The detailed description of each is listed below:

Figure 2 : Block Schematic of Intellectual Traffic Light Controller with GSM Interface.

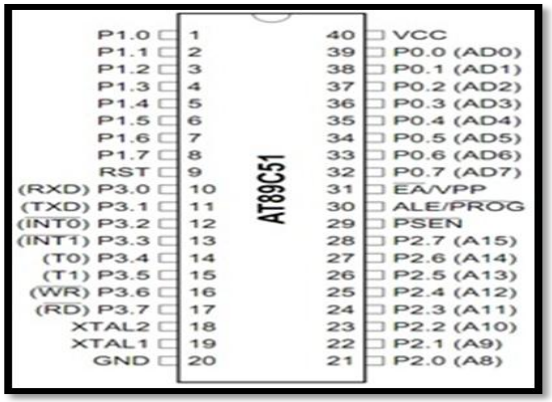


FUNCTIONAL ELEMENTS OF THE BLOCK:

1.MICROCONTROLLER AT89C51:

AT89C51 is an 8-bit microcontroller and belongs to Atmel's 8051 family. It has a 4KB of Flash programmable and erasable read only memory (PEROM) and 128 bytes of RAMThere are four ports designated as AT89C51 has an inbuilt UART for serial communication. It can be programmed to operate at different baud rates. Including two timers & hardware interrupts, it has a total of six interrupts.The pin diagram and its description are given below

Figure 3:Pin Diagram:



Pin Description:

Ports: P_1, P_2, P_3 & P_0,.all these ports are 8-bit bi-directional ports, *i.e.*, they can be used as both input and output ports. Except P_0 which needs external pull-ups, rest of the ports have internal pull-ups. When 1s are written to these port pins, they are pulled high by the internal pull-ups and can be used as inputs. These ports are also bit addressable and so their bits can also be accessed individually.

ALE/PROG:

Address Latch Enable output pulse for latching the low byte of the address during accesses to external memory. This pin is also the program pulse input (PROG) during Flash programming. In normal operation ALE is emitted at a constant rate of 1/6 the oscillator frequency, and may be used for external timing or clocking purpose

PSEN:

Program Store Enable is the read strobe to external program memory. When the AT89C51 is executing code from external program memory, PSEN is activated twice each machine cycle, except that two PSEN activations are skipped during each access to external data memory.

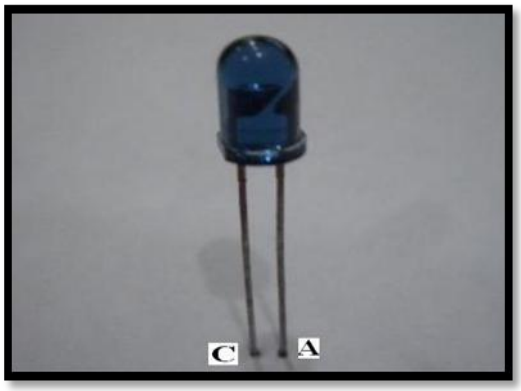
EA/VPP:

External Access Enable must be strapped to GND in order to enable the device to fetch code from external program memory locations starting at 0000H up to FFFFH. Note, however, that if lock bit 1 is programmed, EA will be internally latched on reset. EA should be strapped to VCC for internal program executions.

.2.SENSORS:

Infrared sensors are in the form of diodes with 2 terminals. One can buy a pair of such diode (one transmitter and one receiver) at a very low cost of about 5 - 7 rupees only. Tx refers to a transmitter and Rx refers to a receiver diode.

Figure 4: IR SENSOR

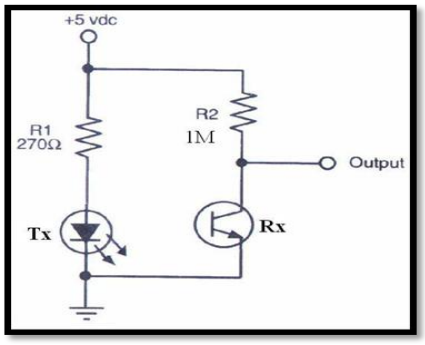


Upon careful observation, one will notice that amongst the two 'legs', one has a much wider base within the diode. This is normally the cathode (negative) whereas the leg having a smaller base would be the anode (positive terminal).

When the Tx is forward biased, it begins emitting infrared. Since it's not in visible spectrum, you will not be able to see it through naked eyes but you will be able to view it through an ordinary cell phone camera. The resistance R1 in the above circuit can vary. It should not be a very high value (~ 1Kohm) as then the current flowing through the diode would be very less and hence the intensity of emitted IR would be lesser. By increasing the current flowing in the circuit, you can increase the effective distance of your IR sensor. However, there are drawbacks of reducing the resistance. Firstly, it would increase the current consumption of your circuit and hence drain the battery (one of the few 'precious' resources for any embedded system) faster. Secondly, increasing the current might destroy the Tx. So, the final choice should be a calculated trade-off between these various factors. One can also modulate the IR to achieve better distance and immunity. The receiver diode has a very high resistance, typically of the order of mega Ohms when IR is not incident upon it. However, when IR is incident upon it, the resistance decreases sharply to the order of a few kilo Ohms or even lesser. This feature forms the basis of using IR as a sensor. You will need to connect a resistance of the order of a few mega Ohm in series with the Rx. Then tap the output voltage at the point of connectivity of these two resistors.

The output voltage is in the form of analog voltage. One needs to convert it into digital format so that whenever IR is incident upon the Rx, the final conditioned output voltage is a logic high (binary 1) and whenever IR is not incident upon the Rx, the conditioned output voltage should be a logic low (binary 0). One can use a comparator IC to serve this purpose. A comparator IC compares 2 input voltages using an op-amp and gives logic high or a logic low as the final output. LM324 is one such comparator. A complete Tx-Rx circuit is given below.

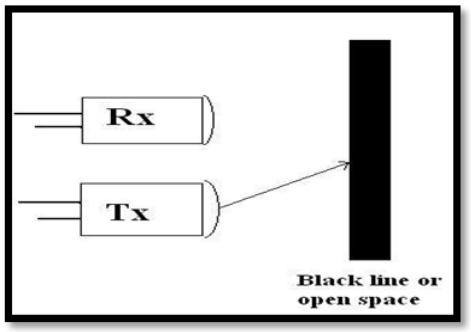
Figure 5: Tx-Rx Pair Circuitry



Case 1: when IR is not incident upon the Rx.

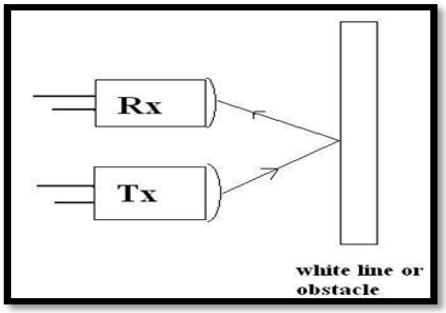
When the IR Tx is above a black line, the black line will absorb all the IR and will not reflect an appreciable amount of IR for the Rx to receive. If you are making an obstacle avoiding robot, then when there is no obstacle in front of the IR Tx, Rx will not receive back the 15 transmitted IR. However, when an obstacle comes in front of the Tx, it will reflect the IR incident upon it and hence Rx will receive the IR. In this case, the output voltage of the sensor = 2.5v. Hence the input voltage at pin2 =2.5v. Input voltage at pin2 > input voltage at pin3 ; Output1=> logic 0

Figure 6:Black line obstacle



Case 2: when IR is incident upon the Rx, the output voltage of the sensor = 1.8v. Hence the input voltage at pin2 =1.8v. Input voltage at pin2 logic 1

Figure 7:White line obstacle



TRAFFIC LIGHT MODEL

The four ways junction is developed using Woods, Screws, Light Emitting Diodes, Resistors and 12V light bulbs. his traffic light model will be four lane based traffic system. In order to display the simulation of the traffic light control system, each traffic light lane has a set of traffic light signal “Red, Yellow, and Green” which changes from red to yellow and then yellow to green and then yellow after that back to yellow and then finally red signal. In this duration, all other lanes have red light glowing to allow the vehicles from the lane having green signal to pass through that lane .As soon as the red light get switched on, the yellow light of next lane in order switches on and then its traffic lights changes in the same sequence. Each lane also has IR sensor on sideway of the road.

The sensor used for the design of these traffic light system is an infra-red detector which as an infra-red diode and transistor as a pair. The sensors are placed on each lane to detect and count the number of cars through that lane.Four infra-red sensors (detectors) are placed on 4 lanes coming to a junction, one per lane. The sensor is placed at a distance away from the junction so that it doesn’t get disturbed by the vehicles stopping at the signal. These sensors are connected to the PLC, which counts the pulses coming from the sensors.From this combination of sensor, we will know the expected time for green signal on when each lane change to the green signal

INFRARED (IR) TRANSMITTERS:

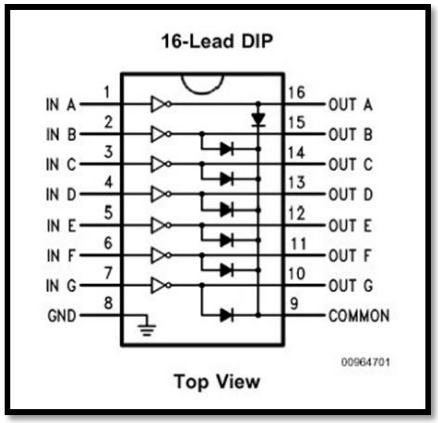
IR transmitter are found in many everyday electronic devices, such as television remote controls. These devices operate in the electromagnetic spectrum's infrared region. An IR transmitter is designed to transmit signals and commands to electronic equipment through infrared waves. without using cords, cables

or wires. Most modern electronic devices are controlled mainly through an IR transmitter, making them remote-control devices. Most IR transmitter devices cannot transmit a signal through walls and floors, but several manufacturers sell extender systems that can be employed to increase the strength and range of an IR transmitter. Linked in with a signal extender, a remote control can be used to turn off a device in one room from several rooms away. In many cases, several components can be linked in with these extender systems to increase the overall strength and range of several IR transmitters at once.

3.RELAY:

The ULN2003 is a monolithic high voltage and high current Darlington transistor arrays. It consists of seven NPN Darlington pairs that features high-voltage outputs with common-cathode clamp diode for switching
inductive loads. The collector-current rating of a single Darlington pair is 500mA. The Darlington pairs may be paralleled for higher current capability In this ULN2003 ,the pins from 1 - 7 are Input pins represented as IN A to IN G and the pins from 10-16 are output pins denoted as OUT A-OUT B. Pin 8 is for ground and pin 9 is common.

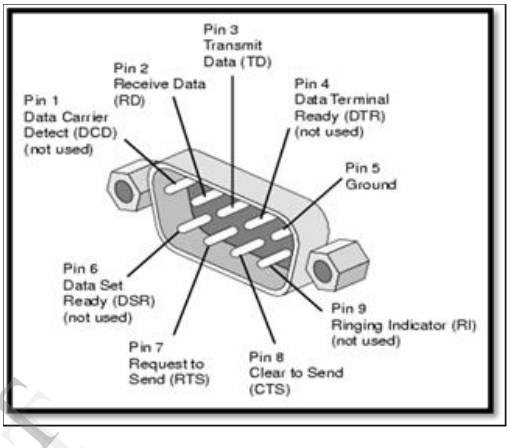
Figure 8: Pindiagram of ULN2003:



4.RS232:

In telecommunications, **RS-232** is the traditional name for a series of standards for serial binary single ended data and control signals connecting between a *DTE* (Data Terminal Equipment) and a *DCE* (Data Circuit-terminating Equipment). The serial port contains an electronic chip called a **U**niversal **A**synchronou **R**eceiver/**T**ransmitter (UART) The RS232 specification governs the physical and electrical characteristics of serial communications. This specification defines several additional signals that are asserted (set to logical 1) for information and control beyond the data signals and signal ground. These signals are the Carrier Detect Signal (CD), asserted by modems to signal a successful connection to another modem, Ring Indicator (RI), asserted by modems to signal the phone ringing, Data Set Ready (DSR), asserted by modems to show their presence, Clear To Send (CTS), asserted by modems if they can receive data, Data Terminal Ready (DTR), asserted by terminals to show their presence, Request To Send (RTS), asserted by terminals if they can receive data.

Figure 9: RS232 port



4.RTS 1307/ds 1307:

The DS1307 serial real-time clock (RTC) is a low power, full binary-coded decimal (BCD) clock/calendar plus 56 bytes of NV SRAM. Address and data are transferred serially through an I2C, bidirectional bus. The clock/calendar provides seconds, minutes, hours, day, date, month, and year information. The clock operates in either the 24-hour or 12-hour format with AM/PM indicator.

5.GSM INTERFACE:

GSM MODEM:

It is a Tri-band GSM/GPRS engine designed for global market. It works on frequencies like EGSM 900 MHz, DCS 1800 MHz and PCS 1900 MHz. This GSM modem is a highly flexible plug and play quad band GSM modem. It consists of a reset button and power can be started automatically or manually. It can be used for direct and asynchronous integration to RS232. It supports features like Voice, Data/Fax, SMS, GPRS and integrated TCP/IP stack. The control is via AT commands (GSM 07.07, 07.05 and enhanced AT commands). AC – DC Power adaptor can be used for DC Voltage: 12V / 1A. Current Consumption in normal operation is 250mA, can rise up to 1A while transmission.GSM modem can be interfaced to RS-232 through D-type 9 pin connector. Serial port baud rate is adjustable from 1200 to 115200 bps (9600 default). The antenna can be either SMA antenna connector and wire antenna.The figure of GSM(SIM 300)is shown below:

Figure 10:GSM MODEM

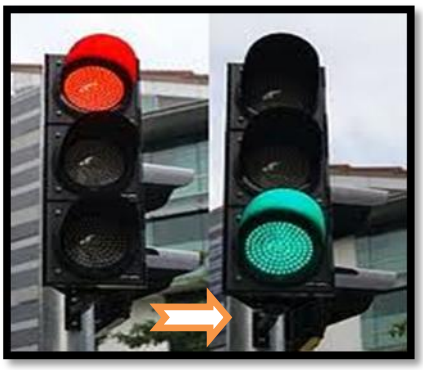
IV.WORKING OF ITBO

The traffic light is situated at a certain distance from the IR system.This IR system contains IR transmitter and IR receiver which are mounted on the either sides of roads respectively. The IR system gets activated whenever any vehicle passes on road between IR transmitter and IR receiver. These sensor signals will be applied to input switching circuit. These input signals from sensors will be in the form of digital signals which corresponds to presence or absence of a vehicle. These digital signals from each lane will be given to the input port of microcontroller, Microcontroller controls the IR system and counts number of vehicles passing on road i.e it will determine the length of vehicle at each lane.. Microcontroller also store vehicles count in its memory at user predefined recording interval on real time basis. Based on different vehicles count, the microcontroller takes decision and updates the traffic light delays This recorded vehicle count data can be used in future to analyze traffic condition at respective traffic lights connected to the system . The on and off time of the four junctions will also be calculated by the microcontroller. Thus based on vehicle count, microcontroller defines different ranges for traffic light delays in order to keep waiting time minimum and updates those accordingly. These signals will be applied to two relay drivers which consist of ULN 2003. These relay drivers are level shifters and current amplifiers. The output of relay driver is applied to Red, Green and Orange LED at each junction. IC 24C61 is used for I^2C interface. One LCD Display will be provided with each signal. LCD Display shown only for prototype mode LCD Display will indicate the time left for the signal to become green i.e. it indicates the time a vehicle has to wait at a particular junction. In practice a good contract LED displays are to be used, which will be visible from a longer distance.

For appropriate analysis, the recorded data can be downloaded to the computer through communication between microcontroller and the computer. Administrator sitting on computer can command system (microcontroller) to download recorded data, update light delays, erase memory, etc. Thus administrator on a central station computer can access traffic conditions on any approachable traffic lights and nearby roads to reduce traffic congestions to an extent. In future this system can be used to inform people about different places traffic condition.

In addition to this when congestion is reported ,then an interrupt is sent to the controller by the sensor and the corresponding alert, LANE BUSY message is sent to the neighbouring junctions. The GSM modem (SIM 300) is used for transmitting and receiving messages on GSM network. The alert message is received on the surrounding junctions using GSM modem (SIM 300). The same information is transmitted to the mobile user which will request for congestion status.In some cases like, when the ambulance at emergency comes to any traffic post in this case , sensors located at a specific distance before the junctions will detect the speed and sound waves of siren at a particular threshold. Based on the speed, sensors will communicate wirelessly with the traffic control system of the two junctions while realizing their routes. On that basis traffic control systems of the two junctions will be able to minimize the traffic flow by inter-communication thus assigning the right time for red and green lights so that it makes red to all other post and makes green in the post where it senses the emergency vehicles so that it can pass quickly. In case of more than one emergency vehicle coming from different directions, the traffic control system will be able to avoid collisions.

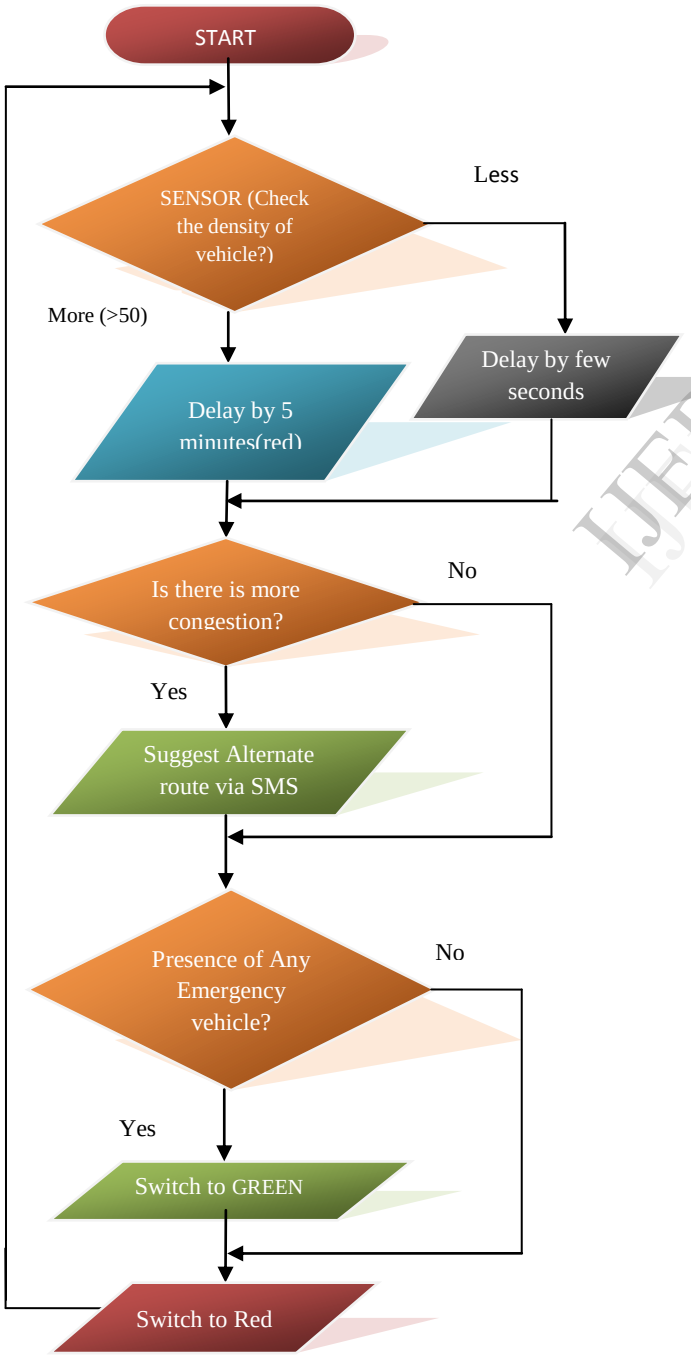
Figure 11:Switches to Green in case of emergency



EMERGENCY STATUS ON: The IR sensor is attached at some distance from traffic signal along each lane.These sensor keep track of amount of traffic along each road.When traffic

signal is changing in normal traffic in one lane,the IR sensor of next lane keeps checking on the amount of traffic in that lane.When traffic becomes too high in that lane,the IR receiver detects the light reflected back from the vehicle and the emergency status of that lane becomes ON and the time duration of green signal of that lane is increased upto 30 secs to get rid off from the heavy traffic.Same process is carried on for the all the lanes. The flowchart of this model is given below

FLOW CHART



V.ADVANTAGES

The traffic light system that had been developed presents several advantages. Since the waiting time of the vehicles for the lights to change is optimal, the emission of carbon monoxide from the vehicles is reduced. This will give a positive effect to the greenhouse effect towards the environment. The traffic light system will also save the motorists' time and reduce their frustration while waiting for the lights to change since it helps in reducing congestion at the traffic intersections.

- Less waiting time.
- Simple architecture and less expensive.
- Efficient operation during emergency mode.
- Traffic alerts via message using GSM technology.
- Fuels can be used efficiently.
- User friendly and Eco-friendly.

VI.CONCLUSION

Thus, the Intelluctual Transfer Beam Organiser can be used more effectively which replaces the conventional traffic light controller The information about congestion on road or possible alternate routes can also be informed to car drivers on demand on his/her GSM mobile phone. In short, this project is a real-time, GSM enabled and intellectual Traffic Light Controller

.

REFERENCES

[1] Pappis, C.P. and Mamdani, E.H., "A Fuzzy Logic Controller for a Traffic Junction", IEEE Transactions on Systems, Man and Cybernetics, 1977, pp 707-717.

[2] Wen and Yang, "A dynamic and automatic traffic light control system for solving the road congestion problem" WIT Transactions on the Built Environment (Urban Transport). Vol. 89 , 2006, pp 307-316.

[3] Chen and Yang, "Minimization of travel time and weighted number of stops in a traffic-light network". Transportation Research B. Vol. 34, 2000, pp 241-253.

[4]Sheu, "A composite traffic flow modeling approach for incident-responsive network traffic assignment", Physica A. Vol. 367. 2006, pp. 461-478.

[5] Abu-Lebdeh, G. and Ahmed, K., "Assessment of operational advantages of intelligent traffic control in congested conditions", Presented at the 9th ITS World Congress, Chicago, October 2002.

[6] Wangermann and Stengel, "Principled negotiation between intelligent agents: a model for air traffic management", Journal of Artificial Intelligent in Engineering. Vol. 12. 1998, pp. 177-187.

[7] Roberto Horowitz, Pravin Varaiya "Control Design of an Automated Highway System",Proceedings of the IEEE, 2005

[8] Xia and Shao, "Modelling of traffic flow and air pollution emission with application to Hong Kong Island", Journal of Environmental Modelling & Software. Vol. 20, 2005. pp 1175-1188.

[9] Elisabeth ILIE-ZUDOR "The RFID Technology and Its Current Applications", MITIP

[10] Chong hua Li "Automatic Vehicle Identification System based on RFID", Anti Counterfeiting Security and Identification in Communication (ASID),
[11] A. Chattaraj, S. Chakrabarti, S. Bansal, S. Halder and A. Chandra "An Intelligent TrafficControl System using RFID", IEEE Potentials, vol. 28, no. 3.

[12] Roy Want "An Introduction to RFID technology", Journal IEEE Pervasive ComputingVolume 5 Issue 1, January 2006, pp-105-1

[13] Ramón Martínez "Smart control system for LEDs traffic-lights based on PLC". Dpt. de Señales, Sistemas y Radiocomunicaciones. Universidad Politécnica de Madrid ETSI de Telecommunication.Ciudad Universitia s/n.28040 Madrid SPAIN

[14] István Varga. "Design of an Intelligent TrafficControl System". Balázs Kulcsár, István Varga, SZTAKI, Hungary

[15] Multiple Traffic Control Using Wireless Sensor and Density Measuring Camera Amrita Rai and Govind Singh Patel. Sensors & Transducers JournalVol. 94, Issue 7, July 2008, pp. 126-132

[16] W. Wen & C. L. Yang. "A dynamic and automatic traffic lightcontrol system for solving the road congestion problem".

[17] Cihan Karakuzu. "Fuzzy logic based smart traffic light simulator design and hardware implementation". Kocaeli University, Engineering Faculty, Electronics & Tell. Eng. Department, 41070 Veziroglu Yerleskesi, Izmit-Kocaeli, Turkey

[18] Erwin Normanyo , Neville Dodoo-Quartey and Adetunde Isaac "Telemetric Control Of Traffic Lights Intersections Aspect Ratio In Ghana"ARPN Journal of Engineering and Applied Sciences

[19] SAMBIT DASH and MUKESH Kumar "Relay Based Traffic Control System Using Infrared Pair Detectors".

[20] SHRUTHI K R & VINODHA. K "Priority Based Traffic Lights Controller Using Wireless Sensor Networks" International Journal of Electronics Signals and Systems (IJESS) ISSN: 2231- 5969, Vol-1 Iss-4, 2012

AUTHORS:

First Author: S.Suganya , III Year student ,Department of Electronics and Communication Engineering,Alpha College of Engineering, Chennai,TamilNadu,India.
E-mail Id:suganya.swamynathan@gmail.com.

Second Author: C.Swetha , III Year sudent,Department of Electronics and Communication Engineering,Alpha College of Engineering,Chennai,TamilNadu,India.
E-mail Id:swthchandrasekar8@gmail.com.

Third Author: V.Shobana , III Year student,Department of Electronics and Communication Engineering,Alpha College of Engineering, Chennai,TamilNadu,India

Fourth Author: S. Sivaranjini ,III Year student,Department of Electronics and Communication Engineering,Alpha College of Engineering, Chennai,TamilNadu,India.

Fifth Author: B.PradeepRaja,Assistant Professor, Department of Electronics and Communication Engineering,Alpha College of Engineering, Chennai,TamilNadu,India.