

Density Based Traffic Control in Addition With Power Generation

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Abstract-The aim of this study is to solve traffic congestion which is a severe problem in many modern cities all over the world. In this study, we adapt the approach to take data , input ,image from object , subject ,vehicle and to process the input data by Microcontroller. In addition with traffic control power is also generated using solar panel and speed braker. By using the object sensors the vehicle intensity is determined and the signal is varied based on the count. The ATMEGA 8A controller is programmed with swap code which automatically controls signal based on the traffic intensity. The high sensitive solar panel is used for power generation and also acts as roof for vehicles. Piezo electric based speed breaker is implemented which acts as other source for speed control and power generation.

Keywords: ATMEGA 8A microcontroller, IR sensor, vibrating sensor, DC motor, Battery.

I INTRODUCTION

The economy growth in India is being increasing due to its massive . It is seeing terrible road congestion problems in its cities. Infrastructure growth is slow as compared to the growth in number of vehicles, due to space and cost constraints .Also, Indian traffic is non lane based and chaotic. It needs a traffic control solutions, which are different from the developed Countries. Intelligent management of traffic flows can reduce the negative impact of congestion. In recent years, wireless networks are widely used in the road transport as they provide more cost effective options . Technologies like ZigBee, RFID and GSM can be used in traffic control to provide cost effective solutions. RFID is a wireless technology that uses radio frequency electro magnetic energy to carry information between the RFID tag and RFID reader. Some RFID systems will only work within the range inches or centimeters, while others may work for couple of meters. Other than these techniques more sensor type techniques are introduced but these ideas can be implemented to smaller areas. Other than this is that these RFID signals may be interrupted by other signals so that the input cannot be received properly by the receiver. And in normally implemented system there is no facility for the two wheelers who are staged and suffered during rainy and peak hours.The whole paper is divided into two sections where the first section discuss about

the control of the density based on the traffic intensity and the section II discuss about the power generation using solar panel and speed breaker system which is used for the street light and also for the traffic signal. If it is implemented in a city more than several thousands of vehicles crosses in a day so that more amount of power is generated where it is completely saved can be used for the near by hospitals, schools etc., Another upgrade can also be done in this paper that the saved electrical energy can be used for the E-charging of vehicles which reduces the pollution in the surrounding.

II EXISTING SYSTEM



Fig.1 Current implementation.

In the growing cities like India due to the rapid increase in economic growth automobiles are increasing in a vertical manner. Due to this increase of population density traffic level arises which produces unbearable crises to the daily life. To reduce this stagnant of vehicles in the traffic junction various papers and ideas are introduced. But still now the traffic level remains to be same. In the existing system RFID technique was introduced for the intelligent traffic control. This technique uses unique RFID for each person driving the vehicle. By means of detecting the RFID level the traffic density level can be analysed . According to this the green signal is opened and the vehicles are allowed to pass. For emergency vehicles such as ambulance or fire service vehicles separate zig bee transmitter is provided to indicate so that the signal is opened and the traffic is cleared on the path .It doesn't include any sensors for the object detection and analisation of the object. The zigbee transmitter and receiver is fixed in each end of the signal

which calculates the intensity of the traffic. The disadvantage in the existing system is that zigbee uses 2.4 GHz radio frequency for the transmitting and receiving of the RFID number from the individual. Since many range of frequency are present in the air it mixes or creates interruption in radio signal so that the transmitted signal cannot be received properly. The implementation and the maintenance of the zigbee is difficult compared to its accessibility.

input received from the sensor and provides output with higher precedence. There are three levels of sensor which would provide output based on the intensity range. When the sensor's output level decrease from high to medium and low it is provided with lower precedence and thus remaining three sides are compared. If a situation arises where equal intensity is confined on two or more sides then loop will be created among them so that for a particular instance a loop will be created and it follows a order.

III PROPOSED METHOD

The proposed method comprises of two sections. The first section deals with the control of the traffic intensity based on the vehicle count and the next section proposes a efficient way for generating the electricity in simple manner. The first method controls the traffic by means of using the object sensor. Normally the object sensor is IR sensor which detects the object up to the range of 15m.

There are three IR sensor placed at certain interval of distance between them. When the vehicle passes across the sensor the count is increased and it is sent to the microcontroller. The microcontroller compares the various counts from the signal and provides green response to the signal where the traffic density is maximum.

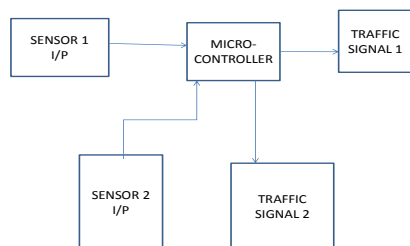


Fig 2. Block For Density Control

Since three sensors are placed at each side of the signal it reads the signal level as LOW, MEDIUM and HIGH. If the Traffic level is filled up to 25% the status is shown as LOW, if the traffic is filled up to 50% the system status is shown as MEDIUM, similarly if the traffic is filled above 75% the status is shown as HIGH. The Microcontroller alternates the signal and Provides status according to the intensity of the vehicles present in the traffic signal.

3.1 Working Methodology

The working model of the existing system is overcome with an advantage that the traffic signal is varied according to the intensity of the vehicles. When vehicle arrives in the junction the IR sensor provides signal to the microcontroller. The program loaded in the ATMEGA8-A controller compares the

3.2 Atmega 8A Microcontroller

In this paper ATMEGA 8A controller is used for the loading program. AVR family consists of various versions and particularly 8A selected because of its high end performance with low input. In this port B is absent and it consist of 32*8 general purpose working register. The operation performed by this microcontroller is fully static. We can write/erase cycles of about 10,000 flash or 1,00,000 flash by using EEPROM.

It consist of real time counter with separate oscillator In order to count the number of vehicles the following count will be stored in 1kbyte internal SRAM.

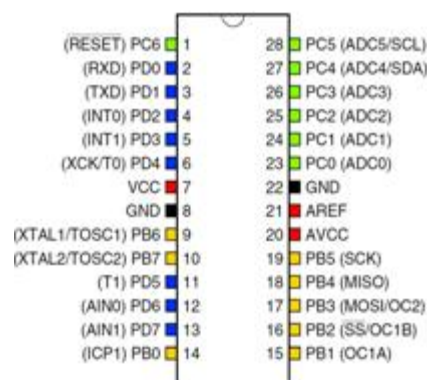


Fig 3. Pin configuration of ATMEGA 8A

The operating voltage of the ATMEGA is 2.2-5.5 volts where the consuming input is low compared to other. It is performing with advanced RISC architecture with non-volatile memory segments. It allows 130 instructions which is normally high compared to other and it comprises of 16 bit address with 8 bit data. The data retention of the ATMEGA 8A is 20 years at 85°C and 100 years at 25°C. The peripheral features includes two 8-bit Timer/Counters with Separate pre scalar, one Compare Mode One 16-bit Timer/Counter with Separate Pre scalar, Compare Mode, and Capture Mode. One of the special features of controller is Power-on Reset and Programmable Brown-out Detection with Internally Calibrated RC Oscillator. It can be varied with five sleep modes like Idle, ADC Noise Reduction, Power-save, Power-down, and Standby.

3.3 IR Sensor

IR sensor can acts as an object sensor . An linear IR sensor can cover the distance from few meter to hundred kilometer. It consist of both transmitter and receiver unit which are combined with the help of microcontroller. In this we are using three IR sensor will be placed at each sideBased on the indication of MEDIUM,LOW and HIGH on the each side of the road the microcontroller will take the final decision. Then the microcontroller will apply the signal based upon the density. The unit measured by this technique are ppm.

3.4 Power Generation

The second section of the proposed paper deals with the generation of electricity using the piezo electric effect and solar panel. The solar panel present at each individual street light is collected and constructed as roof for each side. This solar panel roof not only used for the generation of the electricity but also acts as the roof which protects two wheelers during the rainy time. The collected power from the solar panel at all sides of the traffic signal is stored in the battery through ground wire connections. In major cities like Bangalore and Chennai the vehicles move at rapid manner after the opening of the green breaker where it rotates when the spring is pressed due movement of vehicle over it. Due to that the speed breaker is pressed many times so that the DC motor below it rotates due to the Piezo electric effect and Power is generated which is stored in the battery.

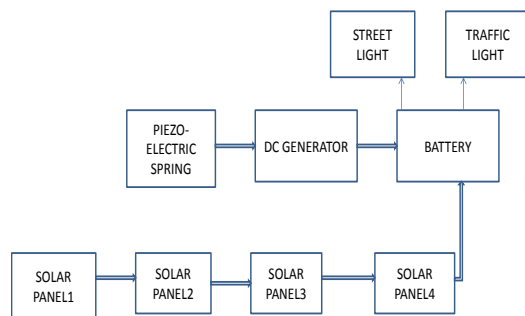


Fig 4. Block Diagram For Power Generation

3.5 solar pannel

Lightning of street Led's using solar panel is in existing system. But at current situation separate solar panel is provided for each led. In this paper we propose a efficient system where separate led's are collected together and constructed as roof at every four sides of traffic junction. It is laid up to certain distance app~60m.By means of laying this roof, it is not only used to generate the power through solar cells and also it acts as a roof for the two wheelers who would wait at the traffic junction during the signal time. It would protect them during the rainy days and peak hour where more irritation means of grouping the solar panels more amount of power is generated compared to isolated position of the panels .The power generated from this solar panel roof is collected in battery and provided to street lights and traffic signal(Microcontroller system).Thus no other external power is required for this traffic control system. Even at a absence of external power street light and traffic control system can be operated efficiently through this generated power.

3.6 Speed Breaker System

The speed breaker system normally operates in the basic principle of piezo- electric effect. A piezoelectric sensor is a device that uses the piezoelectric effect to measure pressure, acceleration force by converting them to an electrical charge. sensors Piezoelectric have proven to be versatile tools for the measurement of various processes. They are used for quality assurance, process control and for research and development in many different industries.

3.7 Battery

The power collected from the speed breaker and solar panel is stored in a DC battery through underground cables. Then it is provided to street lights and microcontroller. Here on considering the total output generated the battery is used .If the generated power seems to be excess for the existing requirement then it is utilized for other sectors near by traffic signal such as hospitals ,shops etc

IV CONCLUSION

In this paper traffic signal will be generated based upon the density. Here the system consist of object sensor and the microcontroller the sensor will sense the vehicle count and given to the microcontroller then the controller will alter the signal based upon the count. After generating the signal the controller will reset the count to null. Then in addition with this we are generating the power based on two things. First one is based upon the solar panel and next is based upon the speed brake controller. The following power is stored in battery which may used in street light, industries and other applications etc.

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