

IOT based Information Framework for Creating Smart City

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ABSTRACT

There is an emerging need for the cities to get smarter in India so that it would tackle the issues related with the large scale urbanization. Smart city can be defined as a city which should be equipped with basic infrastructure to give a decent quality of life.

The system has introduced an intelligent street light system based on light sensor, accident detection system based on noise sensor, air pollution detection system based on gas sensor, traffic density calculation system based on IR sensor. our system is intended to propose a model that can overcome flaws in present system. The conventional street light used presently poss the major disadvantage such as high level of power consumption and low power efficiency so to overcome, LDR sensor is used which would sense day/night and accordingly light will be ON/OFF without requiring the human intervention.[7] Congestion in traffic is a serious problem nowadays. From city to highways, a lot of traffic problem occur everywhere in today world. Bad traffic management leads to wastage of lot of man hours. These frequent traffic problems like traffic jams have lead to rise of need for an efficient traffic management system. This paperintroduce a traffic density calculation system where the IR sensor will count the number of vehicle which cross the signal.[4] Every vehicle has its own emission of gases, but the problem occur when the emission is beyond standardized values. Here the aim is to monitor the pollutants i.e the level of certain gases in environment by using gas sensor.[2] Accidents are one of the cause of fatalities. An important indicator of survival rates after an accident is the time between the accident and when emergency medical personnel are dispatched to accident location. By eliminating the time between when an accident occur and when the first responder are dispatches to the scene decrease the mortality rate,we can save lives.One approach to eliminate this delay is using an accident detection system where the noise sensor will sense the noise in surrounding environment and when the noise reaches the certain threshold the system will display that an accident has occur. [3][6]

Keywords: IOT, Light sensor, Gas sensor, IR sensor, noise sensor.

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I. INTRODUCTION

A well designed street light system should permit vehicle/pedestrians to travel at night with the good visibility, in safety and comfort, while reducing many malfunction that occur at night and enhance the appearance of the neighborhood. In the recent years there has been an increased amount of attention paid to the condition of electrical distribution system, including those supplying the street light. The consequences of these incidents range from pedestrians reporting a “tingling” sensation to cases which

have resulted in fatality. The application is designed in such a way that we place the light sensor in all the street light circuits and which are responsible to switch on and off automatically. These light sensors will sense whether it is Day /Night and if it is night the light will be turned on and if it is day the light are turned off.[7]

Traffic congestion has become a significant problem in recent years. The main reason behind it is the increase in the population in smart cities and respective increase in number of vehicles. The traffic jam not only affect the human routine lives but also lead to a rise in cost of transportation.

Therefore an automated traffic density calculation system is required to manage the traffic congestion problem smoothly. This system uses IR sensor where the IR sensor will count the number of vehicle crossing the signal.[4]

Today it is very difficult to find that an accident has occurred and to find the position where the accident has occurred. It's more difficult for the lives of victim until any person know the information and especially if it occurred in remote places. To avoid these, different technologies like use of noise sensor are used where the noise sensor will sense the noise in surrounding environment and if the noise in surrounding environment reaches beyond certain decibel i.e beyond the threshold value, system detect that the accident has occurred and notify the administrator.[2]

The incomplete combustion in the engine of a vehicle lead to the emission of different gases contributing to the increase in the pollution and adversely affecting the environment. Detection of these gases in an important area of work. This emission from vehicle cannot be avoided completely, but definitely can be controlled. As a solution to above problem we aim to built an automated air pollution detection system. A gas sensor is used to detect the level of certain gases in the environment so that the people can take the measure accordingly.

II. BLOCK DIAGRAM OF PROPOSED SYSTEM

The block diagram of proposed system is shown in figure 1. The proposed system consist of microcontroller, four sensor i.e light sensor, gas sensor, IR sensor, Noise sensor, device drivers, signal conditioner, an android application, analog to digital converter, Bluetooth controller.

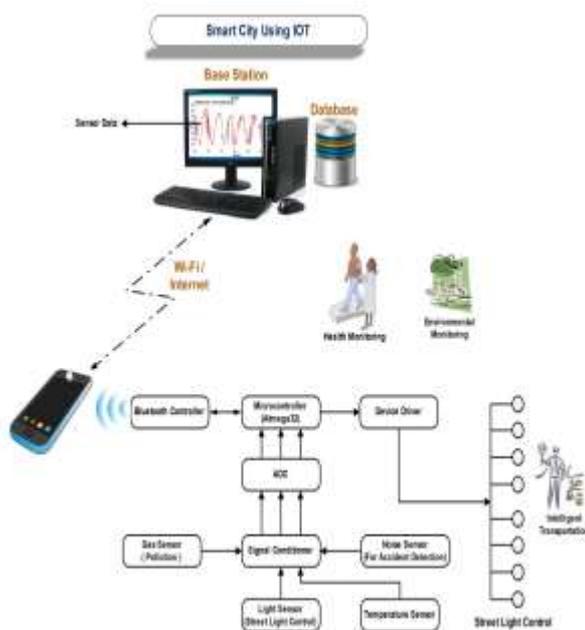


Figure 1: Proposed Architecture

III. WORKING

This system consist of four modules where four sensors are used. These sensors will sense the value in analog form and send it to signal conditioner. The signal conditioner will

send these analog values to the Analog to Digital converter, which will send the digital values to microcontroller. The microcontroller send these values to Bluetooth controller. The Bluetooth controller will send these values to the android app via microcontroller these values are automatically send to the database. These values will be proposed and accordingly instructions will be given to the microcontroller to turn the device driver on/off and display the data on android application. The data in the database will be used for monitoring purpose.

COMPONENTS

MICROCONTROLLER: Microcontroller (AVR) is advance virtual Risk. It has Inbuilt ADC, GCC compilers and lot of open source software support AVR. It has modified Harvard architecture 8-bit RISK.

Microcontroller store and control the value received from analog to digital converter.

DEVICE DRIVER: A driver provides a software interface to hardware devices, enabling operating systems and other computer programs to access hardware functions without needing to know precise details of the hardware being used. Device driver send signal to particular pole to be switched on and off .

ANALOG TO DIGITAL CONVERTER: An analog-to-digital converter (ADC, A/D, AD, or A-to-D) is a system that converts an analog signal, into a digital signal. An ADC may also provide an isolated measurement such as an electronic device that converts an input analog voltage or current to a digital number proportional to the magnitude of the voltage or current.

SIGNAL CONDITIONER: Signal conditioner means manipulating an analog signal in such a way that it meets the requirements of the next stage for further processing. Most common use is in analog-to-digital converters. It is common to have a sensing stage which consists of a sensor, a signal conditioning stage where usually amplification of the signal is done and a processing stage normally carried out by an ADC and a micro-controller.

BLUETOOTH CONTROLLER: HC05 module is easy to use Bluetooth SPP (serial port protocol). It is designed for transparent wireless serial connection setup. Serial port Bluetooth module is fully qualified Bluetooth V2.0+EDR (Enhanced data rate) 3 Mbps modulation with complete 2.4Hz radio transceiver and baseband. Bluetooth has rx and tx which is used for receiving and transmitting the data.

SENSORS

GAS SENSOR: Gas sensor detects the presence of gases in an area. This type of device is important because there are many gases that can be harmful to organic life, such as humans or animals. MQ series The Grove – Gas Sensor (MQ5) module is useful for gas leakage detection. It detect

H₂, LPG, CH₄, CO, natural gas, Alcohol. Due to its high sensitivity and fast response time, measurements can be taken as soon as possible. The sensitivity of the sensor can be adjusted by using the potentiometer. Sensor will sense the value upto 15 cm.

LIGHT SENSOR (LDR): Two cadmiumsulphide (cds) photoconductive cells with spectral responses similar to that of the human eye. The cell resistance falls with increasing light intensity. Applications include smoke detection, automatic lighting control, batch counting and burglar alarm systems. Light sensor will sense the value and accordingly turn on/off. Sensor will sense the value upto 15 cm.

IR SENSOR: An infrared sensor is an electronic device, that emits in order to senses some aspects of surrounding. An IR sensor can measure the heat of an object as well as detect the motion. There will be 3 sensors where in, if the traffic density crosses 1st sensor it will show low density, if the traffic density crosses 2nd sensor will show medium density, and if the traffic density crosses 3rd sensor will show high density. Sensor will sense the value upto 15 cm.

NOISE SENSOR: MIC Sound Sensor. This sensor sense sound through MIC. when it detects sound activity generates output for a preset amount of time. Sensor will sense the value upto 15 cm.

IV. CONCLUSION

This paper describe the modules to a limited range only. In future the range of the modules can be increased and they can be used in real time.

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