

Embracing Technologies for Development of Smart City

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Abstract— The project Goals to bring smartness in three different aspects of the city such as Density Based Traffic Monitoring, Smart garbage monitoring, and Intensity based street light monitoring. Today world facing waste management issues affects developed countries. The biggest issue with waste management is that the waste bin will be overflowed well in advance in public areas before the next cleaning processes begin. It causes bad smell and ugliness in the surrounding area, and spreads disease in turn. Mounting these smart dustbins keeps the area clean and hygienic. The project's key theme is to build a smart garbage network to ensure effective garbage disposal. This paper provides the municipal corporation with an alert system by testing the near level of the garbage and facilitating its method of disposal. An ultrasonic instrument is connected to control the amount of waste and send the alert when the garbage is filled or the threshold level reaches the municipal office. After the dustbin has been swept the driver confirms the responsibility to clear the garbage. To track Traffic density, we're going to hold the few IR sensors in addition to the road and rely on them the signaling from the sensors will adjust the timing of the traffic signals. The output of the sensors is supplied to a comparator for digitization of the data. Street Light is a system which is used to manage the street light and also aim to save power from unnecessarily usage. This system is automated system which will automatically control operation of street lights using LDR and timers; it will control the light ON and OFF Sequences. Here we using microcontroller for controlling street light operation.

Keywords— IR Sensor, UV Sensors, ARM Microcontroller, LDR, Garbage tanks with sensors, LED Lamps.

I. INTRODUCTION

The greatest need of the hour for developing nation is the path to smart city. We were motivated to conceptualize the project by the saying Cleanliness is next to god and clean city is next to heaven. Everyone is trying to be a global player by achieving smartness. Government of India is trying hard for all round and inclusive growth under leadership of Hon. Narendra Modi. So many schemes are launched like Make in India, Start-up India, and Smart City and so on. But till today 65% of our population is staying in Cities. It's a must make our city smart to implement all other schemes effectively. But in India sense, as we understand, cities are the heart of the country. Therefore, in order for the development to percolate to the grass root level, the focus must be on the progress of the city today, people have been so busy and can't find time to turn the lights when it's not necessary. The present practice is

that after adequate outside light, the lights are switched on at night before sunset, and they are switched off the next morning. But when there is total darkness the real timing is for certain lights to turn on. With this the power will be wasted up to some degree. This paper offers the best energy waste solution possible. It also fully removes manual control of the lighting system. Due to population growth and economic development, worldwide energy demand is rising to the highest possible level, and the availability of energy sources remains severely limited, and thus remains faced with severe energy shortages streetlights are integral part of any developing locality. They are also present on all major roads, and also in the suburbs. From sunset to sunrise every day, except when nobody is around, the streetlights are worked at full force. Every day millions of dollars are spent on these street lights to provide the required electrical energy on a global scale. The cost of fixing modern incandescent light bulbs and replacing them is high. They use a lot of energy to work, and also very high emissions of carbon. All of this results in increased demand for electricity and thus increased carbon emissions from the powerhouses. This activity, along with excessive light pollution, is also harming our environment. An easy and effective solution to this will be to dim the lights during off peak hours. If the lights around it shine in regular (bright) mode are detected, this will save significant energy and thereby reduce streetlights' operating costs. Using IOT (Internet of Things), we can test the status of street light from anywhere on the internet in real time, and if they do, fix problems. In addition, a table top prototype was developed to demonstrate the workings of the design. To restore the ambience, the components used for real-life implementation are replaced accordingly. With those environmental considerations, lighting control systems can play a significant role in reducing the usage of light energy without impeding comfort goals. Power, as stated, is the single most important parameter to be considered when determining the technical systems' environmental effects. Energy-related emissions account for almost 80 percent of air pollution, and they are central to the most significant environmental effects and threats, including climate change, acid deposition, smog and particulates. Lighting is always the highest electrical charge in workplaces, but the energy usage of lighting is small relative to the staff costs. And the ability to resource save is still neglected. According to the study, in 2005 global grid-based electricity consumption for lighting amounted to

approximately 2650 TW, equal to 19% of total global electricity consumption European office buildings devote approximately 50% of their electricity to lighting, while lighting accounts for approximately 20-30% in schools, 15% in factories, 10-15% in schools. Smart lighting control and energy management are the perfect solution for energy savings, especially in public lighting applications. It performs remote on / off dimming and light dimming, which can save energy by 40%, minimize the cost of light repair by 50% and increase the life of the lamp by 25%. The implementation of the device in streetlight control for each lamp would minimize electricity and maintenance costs for street light and increase the quality of street light, In this project “STREET LIGHT WITH REDUCED POWER CONSUMPTION” we are reducing the power consumption by using IR sensors & also we are monitoring the street light working & IR sensor working using LDR. In the older systems street lights will be continuously switched ON during the night time which consumes more power and it is waste also. In order to maintain Swatch Bharat effective elimination of municipal waste is to be done.

II. IMPLEMENTATION OF PROPOSED SYSTEM

Street Light Method: The current system uses power transmission over a single phase thread to streetlight. The system proposed is contains five more components for regulating electricity transmission. At the base of street light, an Infra-Red proximity sensor detects the presence of street light in a specific area around it. The sensor data is sent to the Arm Microcontroller, which forms the brain circuit. The Arm Microcontroller then commands and controls the street light's brightness to switch between dim and bright modes, depending on the need. The sensors and Arm Microcontroller are supplied with a battery eliminator, also powered by a single phase line.

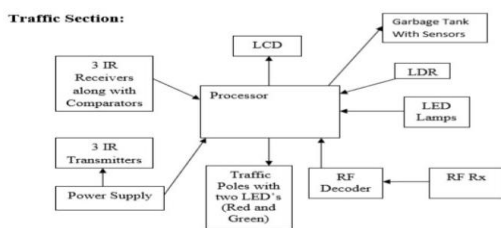


Figure (1) Proposed System

The architecture essentially consists of three operating modes:- OFF mode: shutting off the entire device and charging the batteries when the surrounding area has ample natural light, i.e. daytime. Active mode: The system automatically turns when the natural light falls below a certain amount and the motion sensors are enabled. ON mode: The sensors turn on when pedestrians are present which in turn switches on the LED lights. After a period of time, those lights turn off.

Traffic: IR based system can solve the problem of traffic light control. With this system, by installing IR Sensor at road intersections, we should consider the priority of the different vehicle types and also the road traffic density. IR frequency

detection is a method using the infrared waves to uniquely classify the target. IR Sensors is a tool widely used in various fields of application such as medical research, industry, security, electronic toll collection, access control, etc. The IR transmitter has two main components, IR receiver. Priority concept is implemented using RF TX and Rx unit. RF Rx will be connected to traffic unit with decoder. RF TX with encoder unit will be connected in VIP or Ambulance vehicle. Once the vehicle approaches the traffic signal, the respective signal time is increased, so that the vehicle gets highest priority for moving out of the signal. VIP and Ambulance vehicle will be having a unique code to transmit. At demo time, the unique code of VIP or ambulance vehicle can be changed by using DIP switch.

Vehicle section: The default green signal will be switched on for 5 seconds for particular road. Whenever the first IR receiver on a particular road is blocked, it displays a green signal for 10 seconds. If the second IR receiver is blocked on a given lane, the green signal will be shown for 15 seconds. Whenever an ambulance or VIP vehicle passes through a particular vehicle (here route 2 for demo), a green signal will be given will be displayed for 20 seconds.

III RESULT

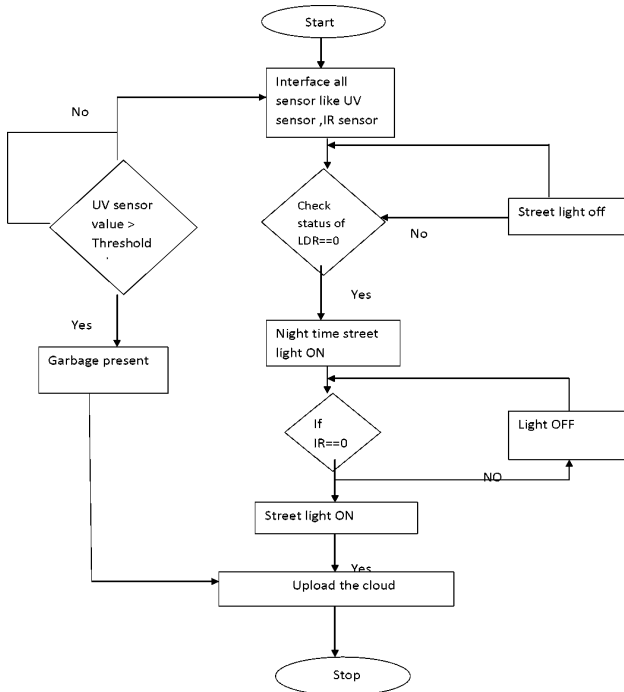
Urbanization is in its rapid growth phase all over the world, with more people opting to live in city lights with more development and prosperity opportunities available. Cities are growing as never before to meet this development and in this phase the idea of smart cities has come into practice. As a small-efficient road-management step, our job is, we can believe that this paper would give people the courage to do a good job on similar subjects. We successfully manufactured and tested embracing technologies for developing smart city module model so we believe with government encouragement that we can transform this model into a product with success.



Figure (2) Working Hardware Model



Figure (3) Display Board



A. Advantages

- Avoids wastage of time due to the traffic. Fully automatic.
- It makes the traffic light easy to access.
- Fails electricity consumption
- Low cost of circuit construction, track maintenance is fine
- Easy convenience to handle.

IV CONCLUSIONS

Using the proposed framework, the model can be fully automated and is therefore aimed at keeping rural / urban areas clean and preventing environmental pollution through the garbage collection framework and saving manpower and resources through automatic street light control. Therefore, as regards the result obtained, it can be inferred that the proposed prototype can be better and play a vital role in projects such as "Swatch Bharat," and in making Indian smart and clean. The framework proposed could be further updated at various design and implementation stages. This project has enormous potential, and because of its inexpensive and cost-effective design, it can be used in many other ways. This can be used by attaching 240V relays for effective use as a home automation controller. This can be used in a float switch in a tank, so that, when the tank is full, the device automatically shuts down the pump, it can be used in combination with a solar panel, making the entire system pleasantly.

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