

# A Smart City using Iot with an Adoptive Lighting Technology

Shanthamma K  
M.Tech Student

Digital Communication and  
Networking  
GSSSIETW, MYSURU

Sanket N Shettar  
Assistant Professor  
Dept of ECE  
GSSSIETW, MYSURU

B Saravana Vikram  
Project Manager-Hardware  
KAYNES TECHNOLOGY,  
MYSURU

**Abstract-Reducing energy demand in the residential and industrial sectors is an important challenge worldwide. Electrical energy is one of the most essential for considering in any area like residential, industrial and commercial purpose and reducing energy consumption is also one of the goal in these areas. So here we go to implementing. A smart city using IoT with an Adaptive lighting technology. Here different types of sensors are used to control the intensity of light and also here we implements a accident monitoring system. From this type of system we can save power and also monitor the road accidents activities then emergency services are provided to their location. This proposed system helps to save the power as well as give the safety and security to public. From this system we can cut the municipal waste up to 50% to 70% and this energy is utilized for other purposes across the nation.**

**Keywords-Raspberry Pi 3 models B, LDR sensor, PIR sensor, Camera, Panic button, Buzzer, Relay, LEDs.**

## I. INTRODUCTION

We consider any applications like indoor or outdoor system Electrical energy performs the major role The large amount of energy is consumed in many countries due to lighting the streets nearly 13 hours without any purpose on the road. So we go to implements a IoT based technology. Light Dependent Resistor (LDR) sensor for detect the light intensity. Passive Infrared (PIR) sensor is used to detect the vehicle or obstacles movements based on that the corresponding LEDs becomes ON and OFF[1].A camera and panic button is addition to system it captures the events found on the road like accidents,hassament ,theft etc.These information are stored in cloud account. Who is in emergency at that time he presses this button, recorded video is sends to emergency services like hospitals,police.This type of system helps to save the power and also detect the crimes and provides a emergency services to their location [2].It helps to cut the municipal wastage up to 50% to 70%and it is useful other purpose across the nation [3].

Smart lighting system is a lighting technology, its designed for energy efficiency. This may includes high efficiency fixtures and automated control that can be adjustments based on condition such as occupancy and availability of the day light. It is one of the good way to achieves minimizes the energy consumption and also it helps to utilizes a natural light from the sun and then eliminating man made lighting. One of the key concept involved in smart lighting system means is light will be automatically turned OFF when person leave a room or place [4].

Adaptive Street light is also lighting technology that is designed for adaptive condition such as environment condition. Based on environments conditions like rainy, cloudy it automatically adjusts the intensity of light means make a intensity of light to brighter[5].

## II. WHY WE NEED OF SMART ADAPTIVE LIGHTING SYSTEM

Basically smart adoptive lighting system is one of the strategies to save electrical energy. It is completely automated system operated by itself so it eliminates the man power and also save time. Depends on vehicle movement light will be on and off. Depends upon the sunlight the light will be turned on and off and can be controlled, so we can save more energy in various seasons. It gives the better quality of life to people and public. Previously existing system dependent on time, not adoptive, man power is required, so we overcome from all these problems we need adoptive street lighting system[6].

## III. HOW IT IS DIFFERENT FROM EXISTING SYSTEM

This system is integrated with IoT with an adoptive lighting technology so it control the intensity of light according into environmental condition means adopted itself [7]. Detection of vehicle movements the light will be turned ON and OFF from this technology we can reduce the power consumption[8]. It monitors the road accidents activities and provides the emergency services to their location. Previously proposed system depends on time as well as it requires the man power to operation [9]. Some proposed system uses GSM technology [10].it is only authorised by one user .So using this type of system, we overcome problem of already existing system[11]. It is energy efficient, reliable, minimizes cost and also detect the crimes gives safety and security us or public [12].

IV. ARCHITECTURE OF PROPOSED SYSTEM

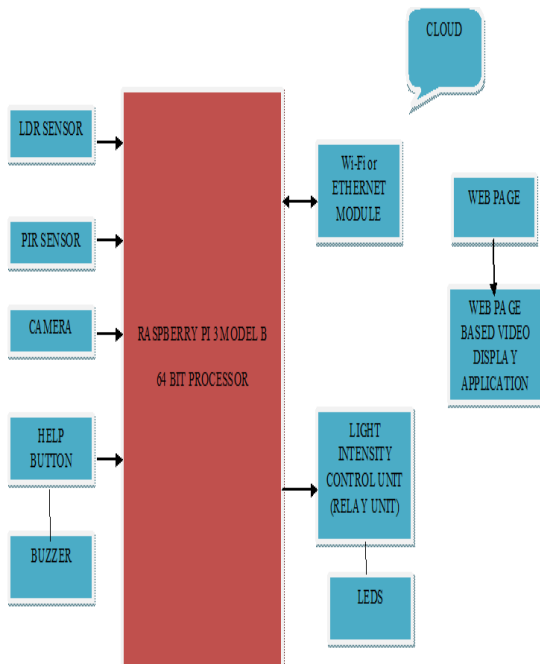


Fig.1. Architecture of proposed system

The proposed architecture consists of Raspberry Pi processor, LDR sensor, PIR sensor, Camera, Help button, buzzer and LEDs. The Raspberry Pi a third generation processor of the Raspberry Pi. It has inbuilt camera port, HDMI video port, audio port, Wi-Fi module so here we using advanced processor it eliminates the complexity[11]. LDR control the intensity of light according to variation of the resistance value. Based on this variation LDR becomes ON and OFF. PIR sensor capable of measuring the infrared light emitting from object in its point of view and at the same time camera start to recording when vehicles leaves from that place light will be OFF and then camera stop the recording. Same process is repeated for each sensor. When person is in emergency he presses that button immediately capture video is stored in cloud management and sends to drop box through internet.

V. IMPLEMENTATION OF THE PROPOSED SYSTEM

A. Circuit designed for LDR operation

Here LDR is operated at 12V but we regulated the output of 5V at 1.5A current because raspberry pi operated with this range. Here potentiometer is used that acts as voltage divider and measure the intensity of light. When intensity is low ,it senses the signal from processor after relay swings to High or Low. When intensity is high it divides the voltage into 2.5V and then we get above 2.5V transistor become ON .Here positive voltage is necessary to turn ON transistor. Corresponding this signal the relay becomes swings the output high or low.

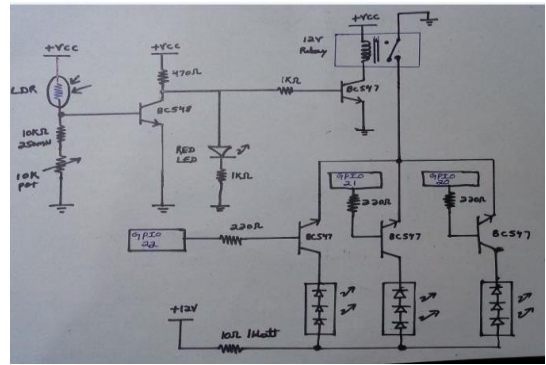


Fig. 2. Designed circuit diagram of LDR operation

B. Flowchart for Implementation

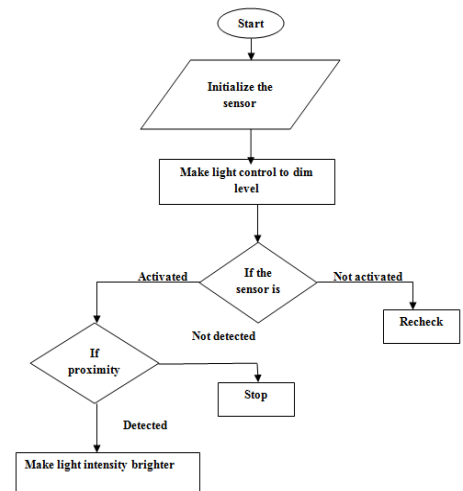


Fig. 3. Algorithm for LDR operation

VI. RESULT

Step 1: Initial setup of the system



Fig. 4. Initial setup of the system

The initial set up of the system .Here processor has 4 USB port, HDMI (High Definition Multimedia Interface) port, VGA (Video Graphics Array) port, Micro USB power supply. Here 2 port are used for Keyboard and mouse interface connection.USBs are interface to processor and power on the supply as shown in figure 4.

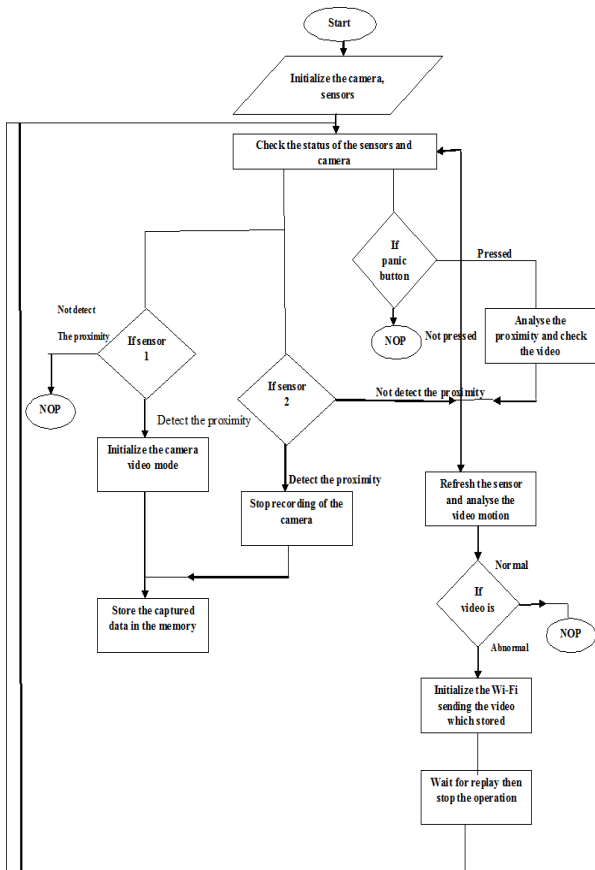
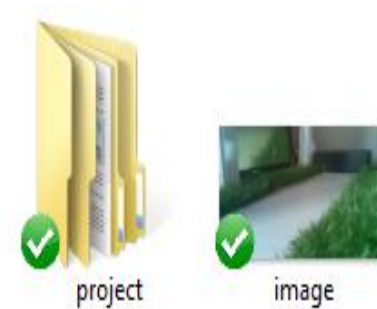


Fig. 5. Alogarithm for Accident monitoring system



(a)



(b)



(c)

Fig. 7 (a)Drop box (b)Folder in drop box (c) Video displayed in drop box

Step 2: Run the program



Fig. 6. Model of the system

Step 3: Result stored in cloud

Drop box is open source access means any one can access the information .Here recorded video stored in cloud .This video is seen through drop box. Videos are stored in separate folder in H246 video format.

A. Significances Of Adaptive Lighting Technology

- Reduces the power consumption
- Less cost
- Less maintains.
- It helps to easily achieves energy efficiency.
- It completely eliminates the man power to turned on and off the light.
- It reduces the CO2 emission.
- It provides safety and security to public.

VII. CONCLUSION

Many systems are implemented, related to street light control but they have some drawback like less reliable, high

cost, difficult to maintain and complicity is high. so overcome from this problems we can go to this implementation.

Here light intensity is controlled based on the natural sunlight detection. To control the street lights according to vehicles proximity movements. To develop a system to monitor road accidents activities and to quickly reach the emergency services to the location. Implementation of this type of system we provide safety and security to people.

#### VIII. FUTURE SCOPE

we can further add a GPRS and GSM module to track exact location and give the message alert, to the nearest emergency service in case of accident.

#### REFERENCES

- [1] Archana. G, Aishwarya N, Anitha J "Intelligent Street Light System" International Journal of Recent Advances in Engineering & Technology, Vol-3, Issue-4, 2015.
- [2] AkshayBalachandran, Murali Siva, V. Parthasarathi, Surya and Shriram K. Vasudevan "An Innovation in the Field of Street Lighting System with Cost and Energy Efficiency" Indian Journal of Science and Technology, Vol-8, August 2015.
- [3] DeepanshuKhandelwal, Bijo M Thomas, KritikaMehndiratta, Nitin Kumar "Sensor Based Automatic Street Lighting system" International Journal of Education and Science Research Review Volume-2, Issue-2 April- 2015 .
- [4] IsahAbdulazeez Watson, OshomahAbdulaiBrammah, Alexander Omoregie " Design and Implementation of an Automatic Street Light Control System" International Journal of Emerging Technology and Advanced Engineering, Volume 5, Issue 3, March 2015
- [5] KapseSagar Sudhakar1, AbhaleAmol Anil2, Kudakechetan Ashok3, ShirsathShravan Bhaskar4 "Automatic Street Light Control System" International Journal of Emerging Technology and Advanced Engineering"Volume 3, Issue 5, May 2013 .
- [6] Mustafsaad, AbdalhalimFarij, Ahamed Salah "Automatic Street Light Control System Using Microcontroller" Mathematical method and Optimization Technique in Engineering, 2015.
- [7] Fuji Y., Yoshiura N., Takita A., Ohta N., "Smart street light system with energy saving function based on the sensor network", Proceedings of The Fourth International Conference on Future Energy Systems, 2013, pp.271-272.
- [8] P.-Y.Chen,Y.-H.Liu,Y.-T.Yau,and H.-C.Lee,"Developmentofan energy efficient street light driving system," in Proc. IEEE Int. Conf. Sustain.EnergyTechnol.,Nov.24-27,2008,pp.761-764.
- [9] R. Caponetto, G. Dongola, L. Fortuna, N. Riscica, and D. Zufacchi, "Power consumption reduction in a remote controlled street lighting system," in Proc. Int. Symp. Power Electron.Elect. Drives, Autom. Motion, Jun. 11-13, 2008, pp. 428-433.
- [10] W. Yue, S. Changhong, Z. Xianghong, and Y. Wei, "Design of new intelligent street light control system," in Proc. 8th IEEE Int. Conf. Control Autom., Jun. 9-11, 2010, pp. 1423-1427.
- [11] K. S. Sudhakar, A. A. Anil, K. C. Ashok and S. S. Bhaskar, Automatic Street Light Control System, International Journal of Emerging Technology and Advanced Engineering, Vol. 3, May 2013.
- [12] Soledad Escolar, JesúsCarretero, Maria-Cristina Marinescu and Stefano Chessa "Estimating Energy Savings in Smart Street Lighting byUsing an Adaptive Control System", 2012.