

Developing Citizen Centric Application using GSM

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ABSTRACT

As world development goes in increasing order, people requirement related to their lifestyle is increased. Internet of things (IOT) is a paradigm which helps in completing their requirements. In IOT, The System uses the concept smart city for enhancing the quality of life style.

The System proposed to develop two models automatic street light and smart parking. These models are one of the parts in smart city development. Street light is flexible-lighting technology. The System can control the power consumptions at the streets and eliminating manpower. The System propose to implement this model using sensors, LDR and Microcontrollers.

Second model The System proposed to implement is Smart parking, which aims to present an intelligent system for parking space detection based on image processing technique. This technique will detect the exact parking space in parking area without wasting any time in search of the vacant place.

Keywords

LDR, Microcontroller, Sensor.

1. INTRODUCTION

Now a day, as technology development is increased like internet has tremendous growth in current world, people requirement about their life style is also increased. For example, The System can say online shopping, when internet was not live, people were going to shop for their shopping. Now in current trend, people do online shopping for purchasing anything. Smart city plays a vital role in changing such city assets, and to reach people requirements. Development includes schools, libraries, transportation systems, hospitals, power plants, and other community services. The goal of smart city development is to improve city assets by using various technologies to meet people requirement. Some of the smart city concepts are automatic street light and smart parking.

The main input for the growth of any nation is energy. In India, so many types of energies playing a major role. So, The System need to save energy for developing the nation. Street lights are the major requirement in today's life of transportation for safety purposes and avoiding accidents during night. In today's busy life no one bothers to switch it off/on when not required. There are several factors need to be considered in order to design an effective street lighting system such as night-time safety for community members and road users.

In this project The System is eliminating manpower and reducing power consumption. The automatic street lights can be controlled with circuit of specific Sensors, LDR and Microcontrollers during day and night. During daytime there is no requirement of street lights so the LDR keeps the streetlight off. In the project The System is using LDR, which varies according to the amount of light falling on its surface, this give an indication for us whether it is a day/night time. The intelligent system that takes automatic decisions for ON/OFF lights and the system will automatically turned off during the hours of daylight and only operates during the night.

Currently, most of the existing car parks do not have a systematic system. The problem that always occurs at the car park is time being wasted in searching for the available parking spaces. Users will keep on circling the parking area until they found an empty parking spot. This problem usually occurs in urban areas, where number of vehicles is higher as compared to the availability of parking spaces. These ineffective conditions happened because of the lack of implementation in technologies which are available in the market today.

This project proposed to implement a system for parking space detection based on image processing technique. The proposed system captures and processes the image drawn at parking lot and gathers the information of the empty car parking spaces. In this work, a camera is used as a sensor to take photos to show the available space of car parks. The reason why a camera is used is because with an image it can detect the presence of many cars at once. By having this image, the particular car parks vacant can be known and then the processed information was used to guide a driver to an available car park rather than wasting time to find one.

2. RELATED WORK

Chunguo Jing, Dongmei Shu and Deying Gu, were focused on development of "Design of Streetlight Monitoring and Control System Based on Wireless Sensor Networks". In this, wireless sensor network were used for streetlight monitoring and control. System employed use of network processing device (nodes) for sensing of light and then gathered information is used for controlling streetlight ON/OFF.[1]

W. Yue, S. Changhong, Z. Xianghong and Y. Wei, developed "Design of New Intelligent Street Light Control System". The system was designed to reduce energy consumption of outdoor premises and developed a prototype to control street lamps. The system was assisted traffic management.[2]

Chaitanya Amin, AshutoshNerkar, Paridhi Holani, Rahul Kaul, developed a GSM Based Autonomous Street Illumination System for Efficient Power Management. in this research streetlight monitoring and control is done by using wireless sensor networks and GSM. This system provide a remote access for streetlight control and maintenance . It also implemented an intelligent system takes the automatic decisions for (ON/OFF/DIMMING) signals considering surrounding light intensity and time of the day both at the same moment.[3]

M. A. D. Costa, G. H. Costa, A. S. dos Santos, L. Schuch, and J. R. Pinheiro, focused on A high efficiency autonomous street lighting system based on solar energy and LED. In this paper, a new method was suggested for increasing the efficiency of the street lighting system and to preserve the energy by the system with the help of ZIGBEE and sensors. [4]

P.-Y. Chen, Y.-H. Liu, Y.-T. Yau, and H.-C. Lee designed "Development of an energy efficient streetlight driving system". The work focuses mainly on the development of a prototype to be used in a wireless sensor network (WSN). WSN used DALI protocol for developing streetlight driving

system.[5].

Poorva Parkhi¹, Snehal Thakur², Sonakshi Chauhan was implemented RFID-based Parking Management System. RFID system was used to identify the slot availability and is updated periodically into a Web through Internet for a registered user. The user can reserve his parking slot either through website application or Android app.[6]

M. M. Rashid, A. Musa, M. Ataur Rahman, and N. Farahana, A. Farhana was implemented Automatic Parking Management System and Parking Fee Collection Based on Number Plate Recognition. This paper presented a technology for license plate extraction from car images followed by the segmentation of characters and reorganization and also developed parking fee collection system based on number plate information.[7]

Alaparti narmada and Dr. parvataneni sudhakar rao was focused on WSN and IP based parking management system. The paper presented parking assistant system based on wireless sensor network technology. System can also reserve predefined slots for some time duration for authorized users.[8]

Thomas Moranduzzo, Student Member, IEEE, and Farid Melgani, Senior Member, IEEE, worked on “Detecting Cars in UAV Images With a Catalog-Based Approach”. This paper a new method for the automatic detection of cars in unmanned aerial vehicle (UAV) images acquired over urban contexts. In this UAV images are characterized by an high spatial resolution, which makes the detection of cars particularly challenging.[9]

Pala Z., Inanc N. implemented Smart Parking Applications Using RFID Technology. In this paper, a solution had been provided for the problems encountered in parking-lot management systems via RFID technology. RFID labels, RFID readers, computers, barriers and software are used as the main components of the RFID technology.[10]

3. PROPOSED METHODOLOGY

In this project The System propose to develop two modules, the first module is automatic streetlight on/off and second module is smart parking system.

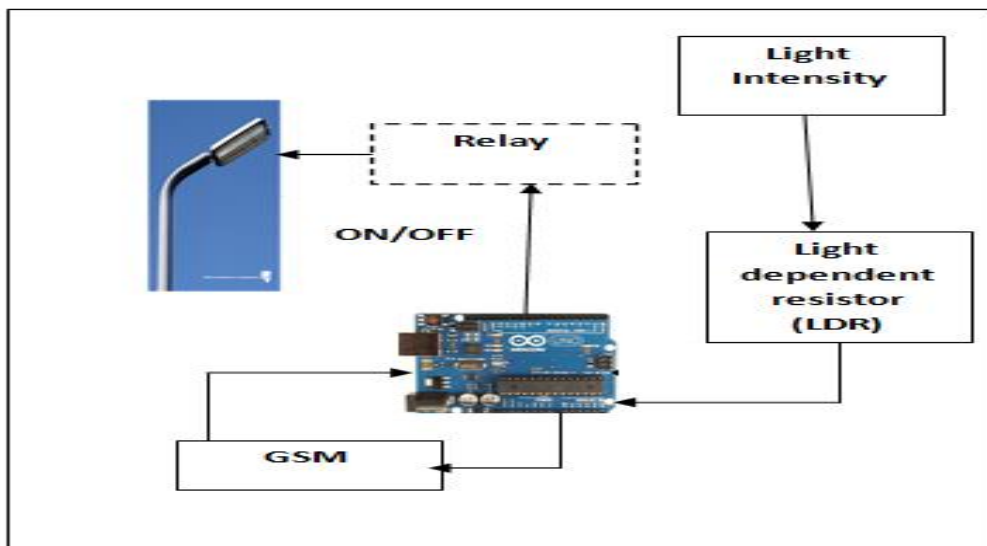


Fig1.Implementation of Street Light

3.1 Automatic Street Lighting

3.1.1 System Architecture

The System has studied different street lighting related papers. Based on that The System have come to the conclusion that, the system developed for street lighting are using zigBee, solar panel. In proposed system street lights are controlled using arduino by sensing light intensity with the help of GSM.

In this project street lights can be controlled by manually or automatically. With the help of GSM. The System can send messages manually. The automatic street lights can be controlled with circuit of specific Sensors, LDR and Microcontrollers (Arduino) during day and night.

The proposed system works as follows:

a) Using Arduino

Step 1: Give input as a light intensity to LDR:

In the project The System is using LDR, which varies according to the amount of light falling on its surface, this give an indication for us whether it is a day/night time.

LDR detects light intensity and give the information about light intensity to Arduino.

Step 2: Deciding to on or off the street lights using Arduino system

Arduino takes the input from LDR and give it to relay. Relay checks whether the input is of day or night. Based on that it decides whether to on the light or off it. 1 signal is given to street light to make it on and 0 signal for getting off the light.

b) Use GSM system for controlling street lights manually

Consider, sometimes due to cloudy nature, the day may look like night. In winter and rainy season also sometimes day ends early. And sometimes street lights are in on mode without any traffic. So, at that time the system can't work automatically. So The System proposed to use GSM module for indication of such sudden events.

The System proposed to develop an Application where the sensor can send message to user about light intensity i.e. whether to on or off using GSM model. And GSM model can also work in reverse system. i.e. if user wants to on or off any street lights at particular location, he can do using GSM module. He just send a message to GSM module and GSM passes message to relay. And relay then convert it to 0 or 1 mode and changes the state of light accordingly.

1) Arduino

Arduino is an open source computer hardware and software. An arduino board consist micro controller with complementary components that facilitate programming and incorporation into other circuit. It is Standard connectors which lets users connect the cpu board to a variety of interchangeable add-onn modules kwon as shields.

2) Relay

Relay is used to provide isolation between low voltage circuitry and high voltage circuitry. Arduino is also used to provide control signal to relay whenever intensity of light falls below a certain level. Control signal is generated from pin 13 of Arduino which is used as a output pin. Transistor is used as a switch here.

3) Light Dependent Resistor (LDR)

Light dependent resistor is used to detect change in light intensity or as a light sensor. LDR is basically a variable resistor. LDR resistance changes with the change in intensity of light. If intensity of light falling on LDR is high, LDR will have low resistance. When intensity of light decreases, LDR offer high resistance. Hence there is a inverse relationship between intensity of light and resistance of LDR. So LDR is used as a light sensor. Arduino UNO board have six analog to digital

converter channels. All analog to digital converters can measure voltage only. These channels can not measure resistance directly. But resistance can be measured indirectly by converting it into voltage form. This is basically call signal conditioning. 10K ohm resistor is used in series with LDR through 5 volt source. This circuit is used to convert resistance into voltage form. Voltage measured across LDR can be measure with the help of analog to digital converter of Arduino. This measured voltage can be converted back into resistance using voltage division formula.

3.2 Smart Parking System

The system is also implementing the smart parking management system. In this project The System is solving the problem of wastage of time in finding the parking spot by using image processing techniques. A parking management system is designed in such a way that it provides the information about the available parking lots. Thus the designed system will completely reduce the time in searching the available parking lots and it could be applied everywhere due to its ease of usage and effectiveness.

3.2.1 System Architecture

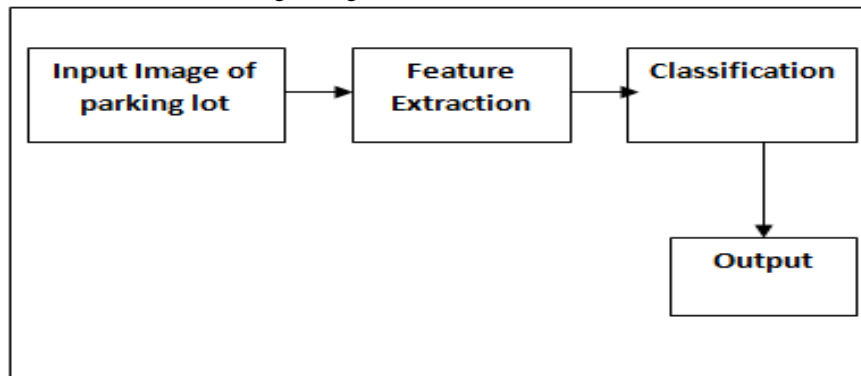


Fig 2. Vehicle Counting Module

Proposed system works as follows:

Step 1: Image capturing of parking lots

The proposed system first captures the images of all parking lots. And store it in database for further use. Images will be useful to find the exact count of vehicles and free parking space.

Step 2: Feature Extraction

This step extracts the count of vehicles with free available spaces. It extracts the data from the captured images like how many vehicles are present at current parking lots. i.e. it gives the count of vehicles.

Step 3: Classification

This step will classify between types of vehicles depending on its type i.e. two wheeler or four wheeler. And give the parking lots information for each type.

Finally, it gives the output as a count of vehicles with free available space.

4. CONCLUSION

For developing city assets and for improving quality of lifestyle The System proposed to implement the concept of smart city. The System proposed to develop two models of the system. First is Automatic Street lighting and second is smart parking.

Automatic street lighting will be developed using LDR,

microcontrollers and GSM module. LDR is used to find the light intensity. GSM module is used for sending messages.

Smart parking will developed using feature extraction method. And The System proposed to use classification method for developing smart parking for every type of vehicle.

5. FUTURE SCOPE

- Reduce the man power and time.
- Monitoring parking activities for multiple zone car park.
- Provide parking availability information to driver.

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