Developing Citizen Centric Application for Smart city Services

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Abstract: In today's life the population is increasing. People facing the problems regarding the wastage of electricity and finding the availability of parking area.To understanding these problems, we are implementing two modules. The first module is Automatic Street Light On/Off. Street light is the necessary part of a city's infrastructure; It is flexible-lighting technology Using this technology system can control the power consumptions at the streets and reduce the manpower. LDR, Microcontrollers and Sensors, are used to implement this module. The second module is Smart Parking. The concept of this module is system can detect the available parking space based on image processing technique. This technique will detect the available parking space in parking area without wasting any time in search of the vacant place.

Keywords: Arduino microcontroller, GSM, Sensor, USB cable, SIM shield, Jumper Wires, Bread Board, Camera.

I. INTRODUCTION

In day to day life, People requirements are increasing related their life style. To fulfill the people requirements Internet of things (IOT) is a paradigm which connects everyday objects like smart control. In IOT, The System uses the concept smart city for enhancing the quality of life style. The Internet of Things can connect services with new ways, and trying to transform urban centres in the Smart Cities. The goal of Smart city is one that uses technology to make cities more efficient and that must be of people satisfactory. Current system proposed to develop two modules of smart city, 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. To avoid such wastage of electricity, the current system propose to implement automatic street light which takes automatic decisions for ON/OFF lights and also surrounding light intensity. In this project using flexible-lighting technology system can eliminating manpower and reducing power consumption. The system can be controlled with circuit of specific Sensors, LDR and Microcontrollers during day and night. In this LDR keeps the streetlight off during the day time. 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. Depending upon the light intensity system takes the automatic decision for on/off lights. The system was automatically turned off during the hours of daylight and only operates during the night.

The current system proposes to develop another module is smart parking. As we know that, by increase in population the number of vehicles are also increased. The problem is that searching available parking space is very time consuming. Usually people face this problem in urban areas because number of vehicles is higher as compared to the availability of parking spaces.

To avoid this wastage of time 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 [1].

II. LITERATURE REVIEW

In the previous research study different techniques and methods are used for different application based on different user content.

"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 [3] "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 provides

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[4] "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[2]

"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[6] "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[5] " 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.[8]

"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[7] "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[9] "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[11] "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 [10]

III.IMPLEMENTATION METHOD

A. Automatic Street Lighting
[1] Arduino Microcontroller:
Arduino is an open-source platform. Easy-to-use software and hardware. An arduino board consist micro controller with complementary components that facilitate programming and incorporation into other circuit. Arduino

microcontroller is able to read inputs and display the required output. Its work depends on integrated development environment (IDE).According to user instruction it works. Over the years. It is the brain of more than thousands of projects.

[2] Relay:
In this project, 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. Based on that relay decides whether to on the light or off it. If the streetlight make it on give signal 1 and 0 for off the light.

[3] Light Dependent Resistor (LDR):
LDR is a Light sensor. It is used to detect light intensity. LDR is a variable resistor. If intensity of light changes then LDR resistance changes. If intensity of light falling on LDR is high, LDR will have low resistance. When intensity of light decreases, LDR offer high resistance.

[4] GSM Shield and GSM Technology:
It is used in arduino for making and receiving the voice call. For this purpose GPRS is used. GSM short message SIM shield is also used to send/receive short message service. It is connected to arduino microcontroller. It follows the instruction to send /receive the message or voice calls. Global System for Mobile communication (GSM) is an open technology. Today's mobiles are based on this technology. It is used for digital wireless telephone system (TDMA, GSM, CDMA). It works only 900 MHz or 1800 MHz frequency band.

B. Smart Parking System
The second implementing module is smart parking management system. A parking management system is designed using image processing technique for finding the parking spot in commercial parking areas. This system provides the information about the available parking lots.
Thus the designed system will solve the problem of finding available parking area and reduce the wastage of time in searching the available parking lots.

A. Street Light On/Off System Step:
Step 1: LDR Sensors
With the help of LDR sensor system checks the light intensity.
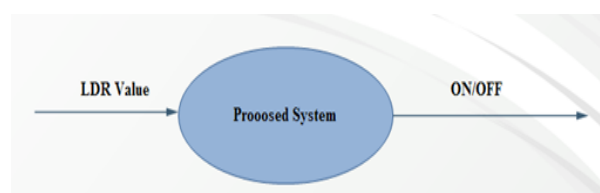

Fig. A: Initial Stage

Step 2: Light ON/OFF
With the help of light intensity microcontroller take decision of light on/off.
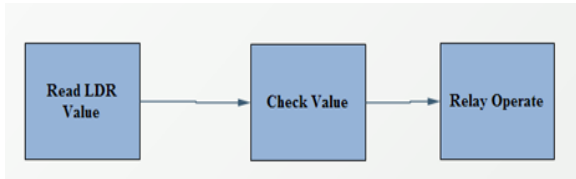
Fig. B: Processing Stage

B. Smart Parking System Step:
Step1: Placing Camera
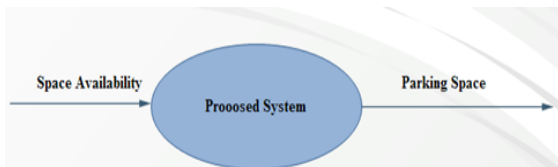With the help of Camera we can check the space availability of parking lots.

Fig. C: Initial Stage

Step2: Available Parking Area Image
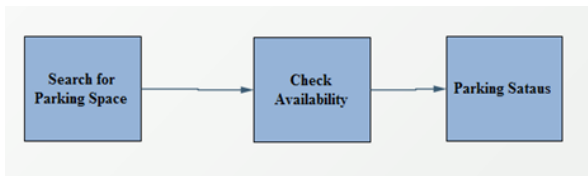According to image user can easily park their vehicle.

Fig. D: Processing Stage

IV. EXPERIMENTAL RESULTS

Our system goal is to remove man power laziness, the aim of implementing automatic street light module is to save the electricity power and implementing smart parking module is to avoid wastages of time for searching space on nearby location as well as to avoid traffic.

A. Automatic Street Light
1. Using Arduino
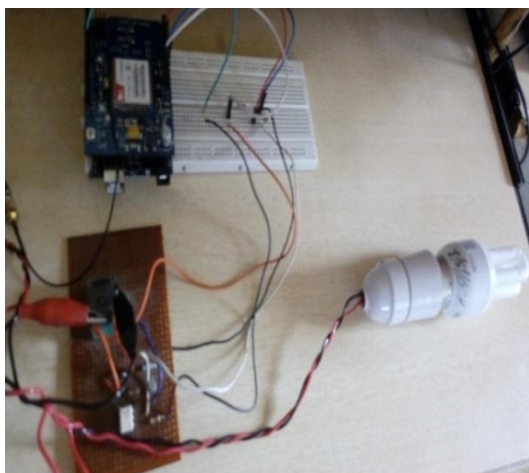Step 1: Give input as a light intensity to LDR

Fig. 1: Connection to LDR Sensor

Step2: Deciding to on or off the street lights using Arduino system

2. Use GSM system for controlling street lights manually
Automatic Street module performs following steps using App
Step1: Login Page
It contains two features Login and New User. A user already exits then it will put his/her username and password to login successfully. If it is not existing then register as new user along with her/his username and password and make successful login.
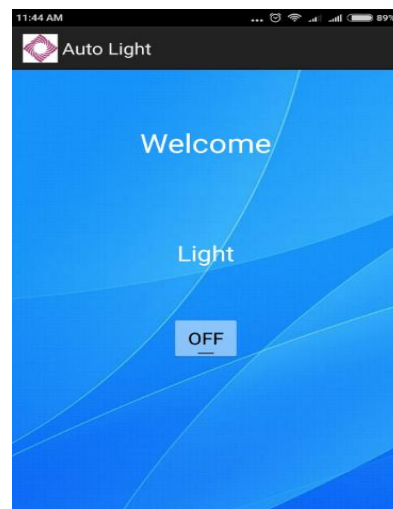
Fig.2: Auto Light App

Step2: Choose Option ON/OFF
One's the user login successfully then he/she can automatically or manually ON/OFF street light based on day/night.
Step3: Manually ON/OFF
According to user need user can ON/OFF using android API.

B. Smart Parking
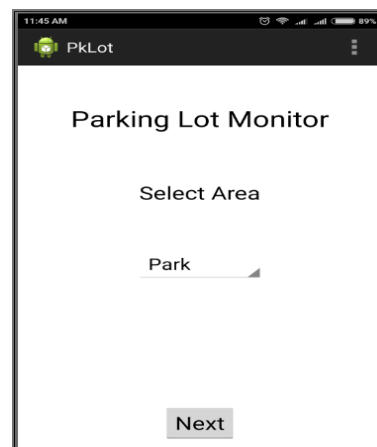Smart Parking module performs following steps using App

Fig3: Parking App

Step1: Select the Area
User wants to park his/her vehicle from current location to nearby location then select the area using app.

Fig.4: Available Parking Lot

Step2: Available Parking Area Image
According to image user can get number of available parking slots. Using this app user will easily Park his/her vehicle.

V. CONCLUSION

For developing city assets the System proposed to implement the concept of smart city. This paper shows the implementation of two modules .First is automatic street light on/off and second is smart parking system using LDR, Relay, microcontroller, GSM module and camera.
The first module is automatic street light on/off. This intelligent system takes automatic decisions for ON/OFF lights. The system was automatically turned off during the hours of daylight and only operates during the night. The street lights will be switched on in the evening before the sun sets and they are switched off the next day morning after there is sufficient light on the roads.

The implemented system is reduces the wastage of electricity. System can eliminating manpower. Second module is smart parking system. Smart parking system help us to find available parking lots using image processing technique. Smart parking will developed using feature extraction method. And The system use classification method for developing smart parking for every type of vehicle. The system reduces time to searching available parking space and reduces traffic congestion.

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BIOGRAPHIES

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