Avoidance of Unauthorized Vehicle Parking using IoT
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Abstract:
In this new era, everywhere we can see that modern technology has changed the way of living. With proper use of technology, it is possible to build a world where everything can be accomplished more easily with the help of technology. In this modern world, with the rapid growth of population vehicle traffic has become a part of our day to day life. Moreover, unauthorized vehicle has also increased. Thus our proposed system aims to ensure proper management of vehicles in the public places such as educational institute, office etc. in order to prevent unauthorized vehicle parking and traffic. The features include detection of permitted and non-permitted vehicles on the main gate, detection of unauthorized vehicle parking in the restricted zone thus sending SMS to the authority to take action and taking fine from the vehicle user.

I. INTRODUCTION
The Indian Road rules, also known as the, ‘Rules of the Road Regulation’, came into effect in July 1989 and has remained so, to date. These rules and guidelines list the violations and offences under various categories, along with their sections under the Indian Motor Vehicle Act and corresponding penalties. These rules are relevant to the Indian drivers, while on the road, to make sure of a systematic traffic and a safe drive. Violating, transgressing or disrespecting any of these rules is a serious offence according to the city specific traffic. In recent times, the usage of Radio Frequency Identification (RFID) has become extremely popular for vehicle monitoring on roads in urban areas due to its easy availability and low cost. The RFID tags are usually placed inside the vehicle and RFID readers are placed on roads. The data relating to traffic can be fetched with the help of RFID tags. This data can be used to curb the perpetrators of law. The process that is presented in this paper can be used in context of a city that contrives to install RFID based traffic and vehicular monitoring system. RFID is a contactless and wireless technology that enables the remote identification of objects automatically via radio waves traffic police rules as well as the Indian Motor Vehicle Act.

II. OBJECTIVE
This project presents a study of current applications of Radio Frequency Identification (RFID) for on-road vehicles. RFID has shown a remarkable performance in the state of art Industrial applications.

III. LITERATURE SURVEY

Title
Illegally parked vehicle detection using adaptive dual background model

Abstract
Detecting an illegally parked vehicle in urban scenes of traffic monitoring system becomes more complex task due to occlusions, lighting changes, and other factors. In this paper, a new framework to detect illegally parked vehicle using dual background model subtraction is presented. In our system, the adaptive background model is generated based on statistical information of pixel intensity that robust against lighting condition. Foreground analysis using geometrical properties is then applied in order to filter out false region. Vehicle detection is then integrated to verify the region as vehicle or not. Vehicle detection method is performed based on Scalable Histogram of Oriented Gradient feature and is trained using Support Vector Machine. The robustness and efficiency of the proposed method are tested on i-LIDS datasets. These are also tested using our own dataset, ISLab dataset. The test and evaluation result show that our method is efficient and robust to detect illegally parked vehicle in traffic scenes. Thus, it is very useful for traffic monitoring application system.

Title
Mining Semantic Context Information for Intelligent Video Surveillance of Traffic Scenes

Abstract
Automated visual surveillance systems are attracting extensive interest due to public security. In this paper, we attempt to mine semantic context information including object-specific context information and scene-specific context information (learned from object-specific context information) to build an intelligent system with robust object detection, tracking, and classification and abnormal event detection. By means of object-specific context information, a cotrained classifier, which takes advantage of the multi view information of objects and reduces the number of labeling training samples, is learned to classify objects into pedestrians or vehicles with high object classification performance. For each kind of object, we learn its specific context information (learned on pattern, width distribution, paths, and entry/exist points. Based on this information, it is efficient to improve object detection and tracking and abnormal event detection. Experimental results demonstrate the effectiveness of our semantic context features for multiple real-world traffic scenes.
Title
Detection of Parked Vehicles Using Spatiotemporal Maps

Abstract
This paper presents a video-based approach to detect the presence of parked vehicles in street lanes. Potential applications include the detection of illegally and double-parked vehicles in urban scenarios and incident detection on roads. The technique extracts information from low-level feature points (Harris corners) to create spatiotemporal maps that describe what is happening in the scene. The method neither relies on background subtraction nor performs any form of object tracking. The system has been evaluated using private and public data sets and has proven to be robust against common difficulties found in closed-circuit television video, such as varying illumination, camera vibration, the presence of momentary occlusion by other vehicles, and high noise levels.

IV. EXISTING SYSTEM
With the vast growth of population and increasing amount of vehicles it has become difficult to find sufficient space for vehicle parking in public places. A large number of personnel are deployed to check for unauthorized parking and fine those owners. But owners evade the fine by various illegal means like bribing the personnel, threatening them etc. Towing vans need to manually search for illegally parked vehicles. This system requires large overhead costs in manpower payment, fuel and other physical surveillance.

V. PROPOSED SYSTEM
Here we propose a system that allows for automatic illegal parking detection and alerting. The system consists of integrating an RFID transmitter in every vehicle. RFID receiver circuit is mounted on every area where parking is not prohibited. If a vehicle is parked in an area where parking is not prohibited the RFID transmitter comes in range of the receiver circuit. Once this happens the RFID reader reads the transmitter id and sent the data to the microcontroller. The IR sensor will check the staying time of the vehicle and if the time exceeds then the controller will send vehicle details to the authorities by using GSM module. So, they can directly arrive at the spot. All the details will be displayed in the LCD.

VI. SYSTEM ARCHITECTURE

VII. MODULES
• DETECTION OF VEHICLE WHICH IS PARKED IN UNAUTHORIZED ZONE USING IR SENSOR.
• SENDING NOTIFICATION TO THE AUTHORITY.
• CREATING DATABASE TO STORE THE INFORMATION OF VEHICLES.
• DETECTING THE VEHICLES PARKING IN THE DIFFERENT SLOTS

VIII. HARDWARE REQUIREMENTS
• Power supply
• Microcontroller
• GSM module
• RFID tag / reader
• IR sensor
• LCD

A. POWER SUPPLY

TRANSFORMER 230V/12V:
A transformer is a static electrical device that transfers energy by inductive coupling between its winding circuits. A varying current in the primary winding creates a varying magnetic flux in the transformer’s core and thus a varying magnetic flux through the secondary winding. This varying magnetic flux induces a varying electromotive force (EMF), or "voltage", in the secondary winding.

BRIDGE RECTIFIER
When used in its most common application, for conversion of an alternating current (AC) input into a direct current (DC) output, it is known as a bridge rectifier. A bridge rectifier provides full-wave rectification from a two wire AC input, resulting in lower cost and weight as compared to a rectifier with a 3-wire input from a transformer with a center tapped secondary winding.

5v power supply
• Here is a 5V power supply circuit using LM 7805 IC.
• LM7805 is a famous positive voltage regulator IC comes in three terminal provides fixed 5V DC output.
• This IC has many built in features like internal current limiting, thermal shut down, operating area protection etc.
• The IC will become hot during the operation so it is essential to use a good heat sink.

B. MICRO CONTROLLER
Arduino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can
be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter. Arduino Uno has a number of facilities for communicating with a computer, another Arduino board, or other microcontroller.

Figure 3. Arduino Uno

C. GSM MODEM
- A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem.
- The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves.
- Reading, writing and deleting SMS messages.
- Sending SMS messages.
- Monitoring the signal strength.
- Monitoring the charging status and charge level of the battery.
- Reading, writing and searching phone book entries.

THE GSM NETWORK
- GSM provides recommendations, not requirements. The GSM specifications define the functions and interface requirements in detail but do not address the hardware.
- The reason for this is to limit the designers as little as possible but still to make it possible for the operators to buy equipment from different suppliers.
- The GSM network is divided into three major systems: the switching system (SS), the base station system (BSS), and the operation and support system (OSS).

Figure 4. GSM Modem Application

D. RFID READER AND TAG
- An RFID reader is a device that is used to interrogate an RFID tag.
- The reader has an antenna that emits radio waves; the tag responds by sending back its data.
- An RFID tag is a microchip combined with an antenna in a compact package; the packaging is structured to allow the RFID tag to be attached to an object to be tracked.
- "RFID" stands for Radio Frequency Identification.
- The tag’s antenna picks up signals from an RFID reader or scanner and then returns the signal, usually with some additional data (like a unique serial number or other customized information).
- CONNECTION
  - The RX and TX pins of RFID reader connected to Tx and Rx pins of 8051 Microcontroller respectively.
  - Then the reader senses the data from the Tag and transmits the sensed data to microcontroller via serial port.

MODULE CONNECTION

Figure 5. RFID Tag

E. IR SENSOR
- An infrared sensor is an electronic device that emits in order to sense some aspects of the surroundings.
- An IR sensor can measure the heat of an object as well as detects the motion.
- Usually in the infrared spectrum, all the objects radiate some form of thermal radiations.
- These types of radiations are invisible to our eyes that can be detected by an infrared sensor.
- The emitter is simply an IR LED (Light Emitting Diode) and the detector is simply an IR photodiode which is sensitive to IR light of the same wavelength as that emitted by the IR LED.
- When IR light falls on the photodiode, the resistances and these output voltages, change in proportion to the magnitude of the IR light received.

Figure 6. IR Sensor

F. LCD-INTRODUCTION
- The most commonly used Character based LCDs are based on Hitachi’s HD44780 controller or other which are compatible with HD44580.
- In this tutorial, we will discuss about character based LCDs, their interfacing with various microcontrollers, various interfaces (8-bit/4bit), programming, special stuff and tricks you can do with these simple looking LCDs which can give a new look to your application.
- The most commonly used LCDs found in the market today are 1 Line, 2 Line or 4 Line LCDs which have only 1 controller and
support at most of 80 characters, whereas LCDs supporting more than 80 characters make use of 2 HD44780 controllers.

- Most LCDs with 1 controller has 14 Pins and LCDs with 2 controller has 16 Pins (two pins are extra in both for back-light LED connections).
- LCD MODULE

![Character LCD type HD44780 Pin Diagram](image)

Figure.6. Character LCD type HD44780 Pin Diagram

IX. SOFTWARE REQUIREMENTS

- Embedded C
- ARDUINO IDE / MPLAB IDE

A. EMBEDDED C

- Embedded C is designed to bridge the performance mismatch between Standard C and the embedded hardware and application architecture.
- It extends the C language with the primitives that are needed by signal-processing applications and that are commonly provided by DSP processors.
- The design of the support for fixed-point data types and named address spaces in Embedded C is based on DSP-C. DSPC [1] is an industry-designed extension of C with which experience was gained since 1998 by various DSP manufacturers in their compilers.
- For the development of DSP-C by ACE (the company three of us work for), cooperation was sought with embedded application designers and DSP manufacturers.
- The Embedded C specification extends the C language to support freestanding embedded processors in exploiting the multiple address space functionality, user-defined named address spaces, and direct access to processor and I/O registers.
- These features are common for the small, embedded processors used in most consumer products.
- The features introduced by Embedded C are fixed-point and saturated arithmetic, segmented memory spaces, and hardware I/O addressing.
- The description we present here addresses the extensions from a language-design perspective, as opposed to the programmer or processor architecture perspective.

EMBEDDED C PORTABILITY

- By design, a number of properties in Embedded C are left implementation defined.
- This implies that the portability of Embedded C programs is not always guaranteed.
- Embedded C provides access to the performance features of DSPs.
- As not all processors are equal, not all Embedded C implementations can be equal For example, suppose an application requires 24-bit fixed-point arithmetic and an Embedded C implementation provides only 16 bits because that is the native size of the processor.
- When the algorithm is expressed in Embedded C, it will not produce outputs of the right precision.
- In such a case, there is a mismatch between the requirements of the application and the capabilities of the processor.
- Under no circumstances, including the use of assembly, will the algorithm run efficiently on such a processor.

B. ARDUINO SOFTWARE (IDE)

Get the most current rendition from the download page. We propose you practice the first that introduces straight all that you have to utilize the Arduino Software (IDE), with the drivers. Through the Zip bundle you have to introduce the drivers physically. Choose the components to install

![Arduino Setup Wizard](image)

Figure.7. Arduino Setup Wizard

![Arduino Installation](image)

Figure.7. (a): Arduino Installation
X. CONCLUSION

In this project the implementation of smart plastic disposal system using camera as hardware provides a feasible way to plastics. With the utilization of camera, the proposed framework explores efficient real-time applications. By implementing this system in real-time, non-plastic environment can be achieved.

XI. REFERENCES:


