

Automatic Unauthorized Parking Detector

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Abstract— In India, Traffic congestion is one of the key issue due to unauthorized parking in the crowded or Public places. Likewise in the city most of the streets traffic congestion prevailing because of the illegal parking or parking on the roads. It can be resolved by identifying the vehicle parked in authorized area(No Parking) and reporting a notification to the nearby Traffic Police Booth regarding unauthorized parking. Arduino Uno_{[1][2]}, PIR Sensor_{[6][9]}, Proximity Sensor_{[7][4]}, GSM Module SIM 900A_{[3][9]} used in it. Arduino Uno microcontroller can able to control the sensors and the GSM Module . Proximity Sensor detects the objects and electric signal will be passed to Arduino, Then if PIR detects Human presence(moving obstacle) and sends the signal. If PIR fails to detect and Proximity Sensor detects the obstacle then SMS notification will be sent through GSM Module to the nearby Traffic Police Booth. It is used to avoid the traffic congestion to some extent and illegal parking in the public area.

Keywords— Arduino Uno, Proximity Sensor, Passive Infrared (PIR)Sensor, GSM Module (SIM 900A).

I. INTRODUCTION

Programmed Unauthorized Parking Detector utilizing PIR sensor is a framework intended to decrease the Traffic Congestion in many zones. In Present time stopping at the open territories cause the parcel of unsettling influence for the general population. To stay away from that issue and control traffic blockage to some degree. The paper demonstrates the insights concerning making a basic microcontroller based Automation framework utilizing a GSM module_[3], an IR Proximity Sensor_[7] and a PIR sensor_[6]. It gives a call and SMS_[5] to a pre indicated telephone number when any sort of vehicle is found in its span.

A. Arduino Uno

The Arduino UNO_{[2][1]} is an open-source microcontroller board dependent on the Microchip ATmega328P microcontroller and created by Arduino.cc. The board is designed with sets of computerized and simple info/yield (I/O) sticks that might be interfaced to different extension sheets (shields) and different circuits. The board has 14 Digital pins, 6 Analog pins, and programmable with the Arduino IDE (Integrated Development Environment) through a sort B USB link .It can be controlled by a USB link or by an outer 9 volt battery,

however it acknowledges voltages somewhere in the range of 7 and 20 volts. It's Digital I/O Pins: 14 (of which 6 give PWM yield).

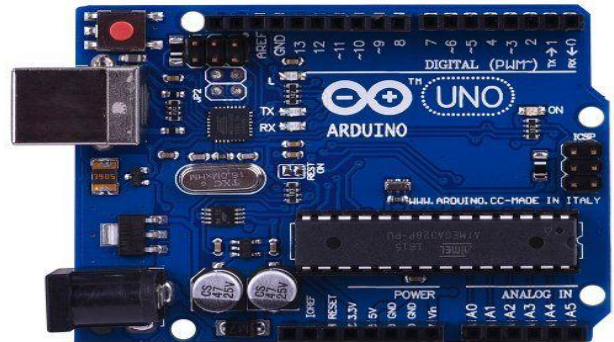


Fig 1.1 Arduino Uno

B. PIR Sensor

PIR sensors_{[6][9]} are utilized to distinguish living being development. PIR is a Passive Infrared sensor, which recognize infrared beams. All living being with a temperature above total zero transmits heat vitality as radiation. These radiations are infrared beam. Human eye can't see these beams on the grounds that these beams are transmitted at infrared wavelength. At the point when any living being comes in scope of PIR sensor_{[6][9]}, it distinguishes warmth of that living being and produces a yield. PIR sensor module does not send any beams for location; its just identifies heat (Infrared). PIR sensor has all out 3 pins: Pin No:1 is of supply stick and it is utilized to associate +5 DC voltages .Pin No:2 is of yield stick and this stick is utilized to gather the yield flag which is gathered by PIR sensor. Pin No:3 is set apart as GND stick. This stick is utilized to give ground to inward circuit of PIR sensor_{[6][9]}.



Fig 1.2 Passive Infrared Sensor

C. GSM Module

Framework for Mobile Communication is an open, computerized cell innovation utilized for transmitting versatile voice and information administrations. A GSM modem_{[3][9]} is a particular kind of modem which acknowledges a SIM card, and works over a membership to a versatile administrator.

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A GSM modem[3][9] associated with a PC, enables the PC to utilize the GSM modem to convey over the portable system. GSM modems can likewise be utilized for sending and accepting SMS and MMS messages. AT directions are utilized to control GSM module. ATD are directions are utilized for calling.

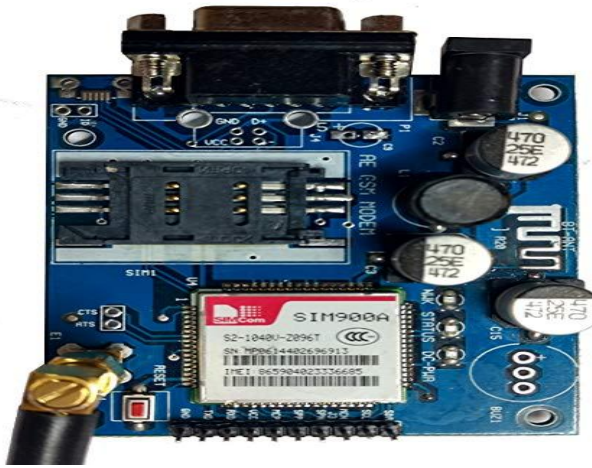


Fig 1.3 GSM Module SIM 900A

D. Proximity Sensor

A vicinity sensor ready to recognize the nearness of adjacent items with no physical contact. A nearness sensor frequently emanates an electromagnetic field or a light emission radiation (infrared, for example), and searches for changes in the field or return flag. The article being detected is frequently alluded to as the closeness sensor's objective. IR Proximity Sensor[4][7] is a multipurpose infrared sensor which can be utilized for deterrent detecting, shading recognition, fire identification, line detecting, and so on and furthermore as an encoder sensor. The sensor gives a computerized yield. The sensor yields a rationale one (+5V) at the computerized yield when an item is set before the sensor and a rationale zero (0V), when there is no article before the sensor. A locally available LED is utilized to show the nearness of an article. The computerized yield can be legitimately associated with an Arduino to peruse the sensor yield. Infrared sensors are very powerless to encompassing light and the Infrared sensor on this sensor is appropriately secured to decrease impact of surrounding light on the sensor.



Fig 1.4 Infrared Proximity Sensor

II. PROPOSED SYSTEM

The main objective of this system is to identify the unauthorized parker who were parked in the authorized area (No Parking) and report them to nearby Traffic Police Booth. Arduino UNO Microcontroller controls the sensors and the GSM Module. Proximity Sensor detects the objects and electric signals will be passed to Arduino, Similarly PIR detects Human presence and sends the signal. If PIR fails to

detect and Proximity Sensor detects then SMS notification will be sent through GSM Module to nearby Traffic Police Booth. It may used to prevent unauthorized parking and to avoid Traffic congestion.

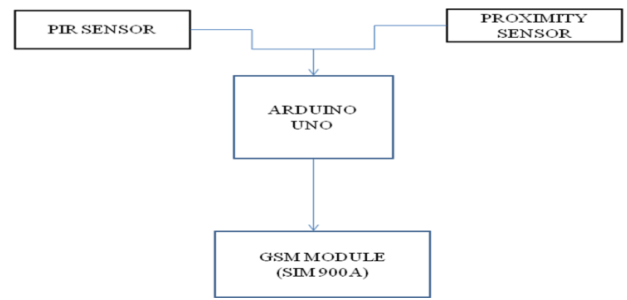


Fig 1.5 Block Diagram

III. DISCUSSION

In IJETT proposed journal, the Arduino is used to control multiple sensor for home automation. By referencing this paper gained the knowledge about the microcontroller and why Arduino is needed and its capability. Arduino is of different version in that Arduino UNO is basic version and felt it will be compatible for the project. It consist of 14 digital pins(6- analog pins) for getting input/producing output and can operate under low voltage. It consist input pins through which sensors can be connected and output of the sensors can be processed based upon the desired application the user working on. Through Arduino.cc software it is possible to upload the code to the board and process the output value(Sensor values) [1][2].In the Study [4], describes about the Automated parking system in the area with parking availability where it has main entry gate and exit gate with RFID tag reader at both the ends which will match the data of RFID tag with its Data stored in its Database. If data does not match it will send the SMS to owner through GSM module. Additionally it also inform regarding the availability of parking lots spaces using Infrared sensor and the Parking fee will be charged before the vehicle leaving the exit gate. But in the proposed system is about the Automated parking system in Public Places(like No Parking area, roads, etc), using PIR sensor, Infrared sensor ,GSM Module and Arduino UNO. Detects the vehicle presence and alert notification will be sent to nearby traffic police booth.In the Study [5] ,describes about the Automated parking system for private areas where it maintain the data of the vehicle parking in that area through RFID reader the data that a RFID tag carries will be matched with stored data. If is not matched then notification in form of SMS will be sent to the owner via GSM Module and alarm will be blown through alarm buzzer. The concept of GSM Module is being analyzed[3] and made an attempt by interfacing it with Arduino Uno and two sensors(PIR and Infrared).The connection and parameters(commands) required to make a call and send a message have been studied(prepared) from it [3].In the Study[10], IOT based smart parking system is about allocating the parking space with use of Infrared sensor and RFID tag and charging the fee by calculating duration of the parking ,payment can be paid through online also. Raspberry Pi(WiFi enabled) is used instead of Arduino Microcontroller ,to connect with network (Online). Infrared sensor have been analyzed from it [10][4][7], Regarding its capability , working and interfacing(connection).

In the Study[9], GSM Based Home Security System Using PIR Sensor is about sending an alert message to the [4][7] owner if human presence is detected inside a locked house. 8051 microcontroller has being used instead of Arduino Uno. PIR Sensor's working , operating mechanism has been studied from it[9][6].

IV. RESULT ANALYSIS

While evaluating the result initially tried with PIR[6][9] and Infrared Sensor interfaced with Arduino UNO[2][1], then programmed in such a way that positive(1=True) value from the sensor yielded a undesired output (Detected the presence of both object and people(moving obstacle)). On the basis of yielded output , now connected GSM Module[3][9] with the Arduino and changed the condition in the code that is , GSM Module will send the notification[5][9]when PIR Sensor value is negative and Infrared Proximity sensor[4][7] value is positive. This condition yielded a desired output but instead of Infrared Proximity Sensor if Inductive traffic Sensor[7] is used the result will be accurate.



Fig 1.6 Output Screenshot.

V. CONCLUSION

We have concluded that by using Automatic Unauthorized Parking detector which is used to prevent unauthorized parking in public areas. If the vehicle is parked then the detection of vehicle is done with the help of proximity sensor [4][7] and alert notification [5][9] is sent to nearby traffic police booth. Thus, it can prevent the traffic congestion in crowded areas or public areas to some extent. It is also possible to allot parking space for vehicle parking in which this method exist already in order to make it simple and further less complex we have come with the idea of detecting vehicle using sensors and reporting them to nearby police booth through GSM module.

VI. FUTURE ENHANCEMENT

We can further enhance the system by using the image processing sensor which accurately detects the image of the vehicle being parked. From this we can trace the vehicle information. So it act as a valid evidence for taking action the against the violator. Then in place of Infrared Proximity sensor [4][7] if Inductive Proximity sensor [7] which detects the metals objects can be used for the detection of vehicle.

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