Locking and Unlocking of Vehicles parked at No-parking zone through traffic police server using IoT

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Abstract. As the inhabitants upturns day by day the amount of automobiles are also getting amplified. This tips to traffic congestion as well as some mishaps. When an individual parks the automobile on no-parking zone, the road becomes constricted then causes traffic congestion in that specific place. In this eventful world individuals persistently park their vehicles at no-parking area. Massive amount of transportation forces are directed to find the unlawfully parked automobiles then punish the illegally parked owner, yet it is an ineffective technique to get rid of unlawful parking. In this suggested method, vehicle which are parked at no-parking zone will be inaccessible and unlocked through traffic police server using an IOT device.

Keywords: No-Parking, Traffic police server, Detection Methods, Locking and Unlocking System, IOT device, Node MCU

1. Overview

The leaving nullification stands by the development of leaving the automobile at the un-approved spots or leaving in a narrowed zone. The contemporary condition at tremendous cities and inner-city zones is the reliably making human tenants comparatively as the measure of automobiles. This creates the trip plus essential on behalf of staggered-stopping places. Free stopping remains the greatest bizarre sort of ending in India. As it turned out that the folks expected to halt out and about yet there are no unfilled spots, the folks drive from place to place seeking after for the space. Predominantly in the cosmopolitan zone this problem advances in context on the gigantic amount of automobiles with not a great deal of the extent of the car parks spot.

In this novel era, contemporary improvement has enhanced the strategy of existing and with a bona fide consumption of progression, it is feasible to make a nearness where the whole thing can be bored significantly additional satisfactorily with the benefit of advancement. Automobile departure heap up involves robotization similarly some supplementary arena to assure safety and comfort. Through the
gigantic improvement of masses and developing extent of automobiles it has wound up being hard to track down acceptable zone for automobile leaving at free spots.

This does not leftover our essentialness however besides lose our huge interval. Therefore, automated automobile leaving arrangement plus unapproved leaving identifier has been a prerequisite for a long period. In this journal, we planned an idea that can recognize the automobiles at illegal or regulated region and moreover bolting system is activated to the automobile.

This journal has composed such as in area II, writing study of the various stopping recognition plus governor action methods are introduced. In area III, planned strategy using square outlines plus equipment programming necessities are introduced. In area IV, end result and usage of this framework is depicted. Conclusion plus upcoming improvement are introduced in segment V & VI individually.

2. Literature review

As demonstrated through the investigation, various revelations plus the developments are used for unapproved vehicle leaving location plus regulator allots are passed on.

George Christopher, et.al [1] presented a structure which consist of detection and auto-locking mechanism of a vehicle which has parked at no-parking zone. The Arduino UNO plays the main role to detect and lock the vehicle. RFID reader has been set under the vehicle to detect the RFID tags which are mounted on the road. Once the RFID reader detects the RFID tag, the vehicle owner will gets a notification in vehicle’s dashboard that the vehicle has been parked at no-parking zone with a buzzer alert and 120 seconds will be given to move the car from the no-parking zone. If the vehicle owner fails to move the vehicle, Arduino has been programmed to turn off the vehicle engine using a relay.

Xiang T. R. Kong, et.al [2] proposed a structure coordinated sale and market structure technique on behalf of the parking spot allotment and portion issue. Car owner who neglect to trade their individual parking zone would then be able to lease them towards the juncture. This stage gets isolated parking zones from specialists then deals with certain open parking zones. They initially created the urban stopping the board cloud stage using Internet of Things. Considering this principal structure, parking zones are given among administrators by methods for a cost decent highest trading sequences in addition to chains (PC-TTCCs) framework plus the stage's parking spaces are reallocated by methods for a lopsided O-VCG auction.

Manickam Ramasamy, et.al [3] displayed a thought of an IoT based astute halting structure for colossal stopping region that can be used to successfully manage the halting system by giving information on the nearest halting opening available through the convenient application and thusly decreasing the blockage of halting searchers. In order to viably manage the halting system, a powerful cloud-based splendid halting structure plan using the Internet of Things development is been made to guide the customer to the nearest parking spot open.

Pampa Sadhukhan, et.al [4] proposed a framework which comprises of the accompanying parts. These are stopping meter, a WLAN or on the other hand Wi-Fi coordinated PC/workstation called neighbourhood stopping the executive’s server alongside some Wi-Fi passages (APs) sent inside each stopping office and a focal server for giving stopping accessibility data all through the city what's more, getting parking garage reservation demand from the driver of a vehicle. The system engineering of the proposed e-stopping framework. As indicated by the proposed PM-EP framework, each stopping part is outfitted with a PM which is situated at the centre of the back finish of the parking garage.
Mahendra B M, et.al [5] proposed a work which utilizations of blend of IoT and distributed computing innovation. The target of this work is to structure, dissect and execute "IoT based sensor empowered vehicle stopping framework", this empowers the client to pre hold stopping opening from remote spot with the assistance of versatile application. Confirmation of the substantial booking is consolidated to profit substantial client. This framework is executed utilizing minimal effort IR sensors, Raspberry-Pi model 3b for continuous information assortment, E-Parking versatile application. E-Parking versatile application is created utilizing android studio having baseband rendition of android 4.3.

Supriya Shinde, et.al [6] displayed a framework which is actualizing incorporates principally three sections. One is sensor organize which will persistently give the data about the accessibility of the stopping places. Second piece of the framework will be the preparing the information we are getting from the sensors and furthermore the area of client mentioning for the stopping spots and calculation to discover the closest accessible empty spot. The last and most significant piece of our framework is the client interface which will be the android application. This will be the easy to understand application to discover the stopping place for them.

From the above writing, clearly careful exploration has been starting at currently done by various researchers using various progressions designed for the revelation of unlawfully leaving automobiles plus control methods. There is no structure open on behalf of auto blasting the automobile, if the automobile parked at illegal arena.

3. Proposed technique
In the planned strategy (fig. 1) Node MCU has been utilized as an IOT gadget where it very well may be constrained by Wi-Fi signal. Vehicle’s engine is interconnected with 2-channel relay module, which is also connected with Arduino UNO and Node MCU device.

![Fig.1 Planned block illustration for Locking and Unlocking of an unlawfully parked automobiles at no-parking region through Traffic police server using IoT.](image)

When the vehicle comes into the range of RFID tag, the RFID reader detects the tag and send to warning notification to vehicle’s owner and if the owner fails to move out the automobile within the set 120 seconds time, the automobile gets inaccessible by sacking the power source to main
locomotive with the 2 channel switch. Once the vehicle gets locked, the information will be directed to

**START**

Detection of RFID Tag

Warning notification in vehicle’s dashboard

Timer starts from 1 to 120

Vehicle moved

*yes*

Have a safe journey

*no*

Locking mechanism will be activated

Traffic police server gets a notification

Toggling button for unlocking

Information received by Node MCU and gives the input signal to 2-channel relay

Vehicle Engine turns ON

**STOP**

Fig.2 Stream graph for the proposed framework
The traffic police department server along with the full evidence about the vehicle and location. The traffic police server will get a notification that the particular vehicle has been parked at no-parking zone and it has been auto-locked. The traffic police can unlock the vehicle using the server by toggling the button. Once the button toggled in traffic police server, the information will be sent to the particular vehicle using through the Node MCU. The 2 channel relay will be turned off by the input from Node MCU thus the vehicle gets the power supply and engine will get started. This is how this proposed system works as well.

The drawn stream graph (fig.2) depicts activity of the planned model, it initiates through recognizing a RFID label then proceeds through transferring a notice caution plus 120 seconds warning time will be given. On the off chance that the automobile does not move outside in the given warning time, bolting component will remain actuated and afterward the data will be sent to traffic police webserver through Node MCU. The opening cycle will be done through flipping the catch in rush hour gridlock police web-server where the node MCU gets the data through web association. The 2-channel transfer which is associated with node MCU will gets a sign and turns on the fundamental motor. This is the means by which this framework streams.

![Fig.3 Circuit Illustration](image)

Circuit chart (Fig.3) obviously displays the associations amid Arduino UNO in addition different parts which are LCD, Buzzer, RFID peruser, 2-channel Relay and Node MCU. RFID segment imparts
the signs to Arduino utilizing TX jot where it will be associated by RX jot in Arduino. Jot no.3 and 8 is allocated as contribution toward the transfer and the sign after Arduino. 16 x 2 LCD show is associated through the Arduino at jot no.K1 to K16 separately.

![Car robot model diagram](image)

Fig.4 Car robot model

The vehicle automaton prototype (Fig.4) comprise of Arduino nano associated with an engine drive where 15V force flexibly is set to it. The arduino nano must be customized on behalf of the development of the vehicle prototype. This automobile machine is constrained through utilizing an android device by connecting a bluetooth component in arduino nano. The automated wheels pivoted by guidance set by an android portable. This framework is utilized in the planned prototype to show the bolting instrument by ending the force gracefully to the engine drive utilizing the hand-off.

### 3.1 Hardware Necessities

#### 3.1.1 Node MCU

The Node MCU improvement board is an astounding response for program microcontrollers and be a bit of the Internet of Things (IoT). The Node MCU improvement board, considering ESP8266EX, is a module with a microcontroller, composed Wi-Fi authority, and transmitter. Center point MCU supports a couple of programing tongues, hereafter it is incredibly easy to move programs from any PC over a scaled down scale USB port. Normally, even the most direct machine needs a motor to turn a move or achieves explicit act. Meanwhile engine requests progressively power then a microcontroller jot could customarily deliver, it needed a sort of a button which could get somewhat power, fortify it by making a greater current, which supplementary drives a engine

#### 3.1.2 Arduino UNO panel

The Arduino Uno (Fig. 5) stands a microcontroller panel reliant proceeding the chip ATmega328P microcontroller. The panel is furnished with groups of cutting edge plus straightforward data/return sticks that might be connected with various expansion sheets and various circuits. The panel has 14 modernized jots, 6 straightforward jots, plus programmable over the Arduino IDE through methods for a USB link. It will in general be composed through the USB link or through a 9-volt battery-operated, anyway it awards voltage rate about in the scope of 9 and 15 volts.
3.1.3 Arduino Nano pannel
The Arduino Nano pannel stands for little, bread-board accommodating plus wide-running panel made on Atmega328P, contributes a similar network plus particular of the UNO panel in a diminished structure aspect. The Arduino Nano is capacities utilizing the Arduino (IDE) programming through the Integrated Development Environment shared to every one of the sheets and operating together disconnected and connected.

3.1.4 EM18-RFID Peruser
EM18-RFID peruser stands a unique consistently utilized RFID peruser to peruse 135 KHZ names. It includes little value, little force admission, little arrangement feature and easy to utilize. It can interconnect through a microcontroller in several methods of the dual continued conventions specifically TTL Serial and Wiegand 66 according to the framework proposition. µRFID peruser has an acknowledgment jot that can be used to just perceive a legitimate RFID label.

3.1.5 RFID Labels
Radio-frequency identification (RFID) stands an ability to archives the presence of an item utilizing radio signs. It is utilized for timing games or else resister regulator. RFID isn't a changeover for the barcoding, however a supplement for inaccessible perusing of codes. The innovation is utilized for suddenly perceiving an individual, a pack or a thing.

3.1.6 DC Buzzer
A ringer otherwise beeper is a cautioning segment, normally electrically and characteristically exploited in vehicles, residential apparatuses, for example, a microwave, otherwise game shows. It most normally comprises of a measure of controls or devices connected to a regulator part that administers if and which clip was pressed or a re-arranged time has fizzled, and generally enlightens a light arranged the best possible catch or switch panel plus noises a consideration as a consistent or intermittent humming or signalling.

3.1.7 16x2 LCD
LCD (Liquid Crystal Display) stands an electrical presentation segment plus discoveries in a wide-ranging assortment of uses. A 16x2 LCD show is extremely straightforward part and is as often as
possible utilized in various circuits and gadgets. These parts are picked more than seven sections and extra multi-portion LEDs.

3.1.8 HC-05 Bluetooth
HC-05 segment stands a modest to utilize Bluetooth SPP (Serial Port Protocol) part, planned to clear remote progressive connecting organization. The HC-05 Bluetooth component can be consumed in a Master or Slave structure, creating it an extraordinary goal for remote communication.

3.1.9 L293D Motor Driver
Ordinarily, the most straightforward automaton requests an engine to rotate a wheel or accomplishes specific activity. Since engines requisite additional current formerly the microcontroller jot can traditionally produce, you requisite some sort of a button which can get a little current, reinforce it and create a greater power, which extra energies an engine.

3.2 Software Necessities

3.2.1 Iot Cloud Server
Appropriated figuring stands the on-request convenience of PC structure properties, specifically statistics accumulating (circulated capacity) and making power, lacking direct unique association by the client. The term is frequently used to portray worker farmsteads available to numerous customers over the Internet. Massive fogs, predominant today, often have restrictions scattered over various regions from dominant workers. In case the association with the purchaser is generally close, it may be relegated an edge worker.

3.2.2 Arduino IDE
The Arduino Integrated Development Environment grips a book reassure, a correspondence zone, a word processor, and a toolbar through joysticks for basic services plus a progression of list of options. It is utilized to compose and transfer projects towards the arduino sheets. It upholds C and C++ dialects utilizing a few guidelines of code organizing. It delivers some product archive which gives numerous normal I/O methods. The catalogue will be changed over into a book record in hexadecimal encrypting that is brought into the panel.

4. Result and application
The proposed model is actualized and the yield is appeared in this area. The discovery with bolting fragment ensures the cycle of location of RFID labels and giving the admonition around the illicit stopping with the commencement. The vehicle automaton part is utilized for the development of the vehicle utilizing the engine drive. The bolting instrument is connected by the two sections.

The model comprises of different parts where the segments remain attached. The upper part is appeared (fig. 6), where Arduino UNO is associated through a hand-off, bell plus LCD. The Arduino is controlled by a 12V force gracefully utilizing a versatile battery-operated. As soon as RFID peruser approaches the range of RFID tag, an admonition notice caution will be shown on the LCD which is appeared in fig.8 and 120 seconds commencement will initiate which is modified in the arduino. The commencement will be shown on the LCD. Subsequent 120 seconds of the commencement, arduino will enact the hand-off switch.

The Bluetooth component is attached which is associated through an Arduino nano designed for the development of the automobile machine. Bluetooth component assists with interfacing android mobile with arduino nano (allude fig.4).
Fig. 6 Superior side of the application
The automobile machine can be pushed ahead or in reverse utilizing the android gadget regulator, where arduino nano is modified for the development. At the base side which is appeared in fig. 7, RFID component, compact battery and engine drive have been attached. When the hand-off button is initiated, control gracefully set to the engine driver will be ended and bolting completed to the automobile by this strategy (allude fig.9 and fig 10).
Fig. 9 speaks to the automobile prototype before locking where the engine drive becomes the force flexibly. After the sequence of no-leaving identification and cautioning, the automobile gets bolted by ending the force gracefully to the engine driver utilizing a transfer which is appeared in fig.10 separately. This is the manner by which securing system works this proposed model.
When the locking system done, the data will be sent to traffic police webserver through Node MCU IOT gadget. The Node MCU will be given out web association through wi-fi so it will be associated with traffic police webserver. As it is a forthcoming keen framework venture, each vehicle must have web association with the goal that traffic police webserver can ready to get to the vehicle. The police webserver will gets a notice in the information log (allude fig.11) that the vehicle left at no-leaving zone and it has been bolted.
Fig.10 System after locking

At that point the traffic police can ready to open the vehicle by flipping the catch in rush hour gridlock police webserver’s control log (allude fig.12). When the catch flipped, the data will be sent to the IoT device of the vehicle through the web association. The IoT device will actuate the 2-channel transfer and turns on the vehicle’s engine driver. With the goal that the vehicle has been opened through the traffic police webserver.
Fig. 11 Data logs page of the Traffic police server

Fig. 12 Controller view of the Traffic police server
The proposed system can be utilized to evade the illicit stopping at unapproved stopping zone. By utilizing this framework, illicitly left vehicles can be bolted and opened without the physical nearness of traffic police. This ongoing application can be utilized in the shrewd city undertaking to stay away from gridlock and mishaps.

5. Conclusion
Various progressions are used to perceive the unapproved vehicle leaving acknowledgment and control actions in the overhead survey. The planned construction will keep up a key good ways from unfortunate accidents and traffic stops up. By using this robotized system, unlawful leaving can be adequately kept up a vital good ways from devoid of the nearness of traffic forces or CCTV camera, this structure won't need the physical closeness of a human at no leaving region to create a move in contradiction of unjustly left automobiles. This system offers another response for the making development, for instance, saving time and manual effort and prosperity purposes. People can have an undeniable idea of halting position by their console notice itself. This system limits beneficially plus proposed for business utilization.

6. Future Improvement
In upcoming upgrade, assured progressions can be actualized. After the bolting component, the fine sum can be paid through online in that specific rush hour gridlock police webserver. And furthermore utilizing this traffic police webserver, the police can ready to see the camera which is set outside the vehicle.

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