

Real-time Wireless Vehicle Access Tracking and Automatic Parking System

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Abstract

In this conventional method only by taking ticket we can park the vehicles wherever space is available. In this new technology, ISCAPS (Inventive Shrewd Car Parking System) consolidated with valet parking development orchestrated in this application. Based on the survey as of now no one used microcontroller for both vehicle access and automatic parking system in single application. In the proposed method an intelligent real time vehicle access and automatic parking system has been designed using microcontroller AT89C52, GPS and GSM. For this new Field Communication (NFC) was utilized so that users who wants to park their vehicle in the parking are can park easily without any problem. The result shows that it is very easy to access and use it in our day to day life. In this man power in the parking are will be reduced and maintenance cost is also very low.

Keywords: Global positioning system (GPS), Inventive Smart Car Parking System (ISCAPS), Microcontroller, Near field communication (NFC)

1. Introduction

The leaving business has consistently been around as far back as the measure of car increments out and about. A wide range of stopping framework is accessible for Malaysian drivers. To just name a couple of the ordinarily observed stopping frameworks are the meters stopping framework, ticket stopping framework, occasional pass stopping framework and so on. As the years passes by, the stopping business demonstrates to be consistently Tested in every coming year [1,2]. As the enthusiasm for vehicle leave constructs, the structures of vehicle leaves are getting progressively conservative & confused. As a result of the high building and upkeep cost, development of Mechanical vehicle leave and entangled arranging, amazed vehicle leave are as yet being utilized in any occasion, when better development would intended for over 80 years. In Malaysia still they have not decided to present current vehicle leave system in business spots parking areas. The best arrangement sooner rather than later is to enhance staggered stopping, by improving existing accommodations. The normal issue looked by drivers can't get a parking area when they land at a vehicle leave. This might be brought about by a wide range of elements, for example, the driver being late, top hour driving, vehicle leave remodel and so forth. Accordingly, the e-Valet capacity is intended to keep away from these snags and improve the drivers stopping experience. Much the same as how a common valet administration functions, the Valet parking system ensures that the person driving the vehicle has to park the vehicle and leave the parking lot this is the issues in parking garage. In order to guarantee leaving structure accessibility, the person driving

the vehicle has to reserve a parking garage with the Inventive Shrewd Car Parking System (ISCAPS) flexible applications early. Customers will be given a fleeting ticket that had an institutionalized label engraved on it when present Ticket Parking System used with the amazed halting structure. Exactly if the client wants to leave, the individual has to pay the commitment at the automatic compensation station. Exactly when portion is free, client will recuperate the vehicle at the zone left previously and reaches the way out. The season pass ought to be given into the machine and switch is hefted empowering them to leave to the exit. The great part of the time touring client uses a standard ticket (Radio frequency identification card issued by the organization) that has to be paid in a month to month premise or prepaid strategy. As opposed to urging the pass back to the machine at the leave and getting a pass at the way out, person driving the vehicle has to tap the incidental go at the Radio frequency identification at the entry and way out to enter the parking and leave. Few stunned vehicle leave recently installed sensors at every parking structure and shows the amount of open vehicle leaves where the client is herding to. In actuality it gives the driver a superior capacity than know east from west of where to scan for a vehicle leave. As it was physical, it had numerous blunders in the bill generation process. Later then a structure called, Inventive Shrewd Car Parking System (ISCAPS) [3], is suggested so that the probability of e-valet is utilized by the client in order to save the ending opening utilizing an android application programme through advanced mobile phone. Rather than utilizing ordinary month to month ticket or card, it utilizes Near Field Communication (NFC) [4]. This framework has path in & way out sensors to distinguish the internal vehicle. The showcases in LCD are utilized to show the amount of open free halting openings at the section. The exceptionally created Recognition System for License Plate comprises of RFID (Radio recurrence Identification) based acknowledgment [5]. RFID is a programmed secure and convenient identifier which recognizes the articles naturally. The following part utilized in the event of burglary. By utilizing this we can follow our vehicle area by utilizing the GPS in the framework. This gives the area of the vehicle alongside latitudinal and longitudinal qualities. With this method the vehicles can be tracked and parked automatically in the parking lot.

Materials and methods:

I carried out this work in arduino lab at ashoka institute of engineering and technology from August 2019 to December 2019.

2. Existing Method

With the present Ticket Parking System utilized with the staggered stopping framework, clients will be given a brief ticket that had a scanner tag engraved on it. At the point when the client wishes to leave the structure, the person needs to pay the obligation at the automatic pay station. At the point when installment is cleared, the client will recover the vehicle at the area left before and reaches the way-out. At the way-out, the season pass ought to be given into the machine and switch is hefted empowering them to leave to the exit [6].

3. Proposed Method

The option is an as often as possible visiting client utilizes an occasional that is normally paid in a month to month premise or prepaid strategy. Instead of getting a pass and giving the pass back to the machine at the exit, the person driving the vehicle simply needs to tap the infrequent ticket. Some stunned vehicle leave recently installed sensors [7-9] at each leaving territory and grandstands the amount of available vehicle leaves at the heading where the customer is driving towards. This without a doubt the drivers has a superior ability to read a compass of where to search for a vehicle leave. In any case, drivers still invest energy adjusting at the

floor for looking the accessible vehicle leave that was shown. At the moment, about of the general open having their very own stand-out vehicle, robbery is going on in deficiency spots like vehicle driving, leaving, and so forth. The security of a vehicle mostly considered for open transit. The vehicle following and security framework set in the vehicle is to seek after the spot & shooting the motor engine of the vehicle. The zone of the vehicle saw utilizing Global structure adaptable correspondence & Global Positioning framework [9-11]. These two structures consistently watch a movement and pass on the condition of the vehicle on demand. Precisely when the break-in obvious, reliable individual will pass a short message to the microcontroller, by then microcontroller issue the control sign to stop the motor engine. Certified solitary has to pass the PIN to controller to open the portal & restart the vehicle [12]. This is logically checked, strong & straight forwardness. The block diagram as shown in figure.1.

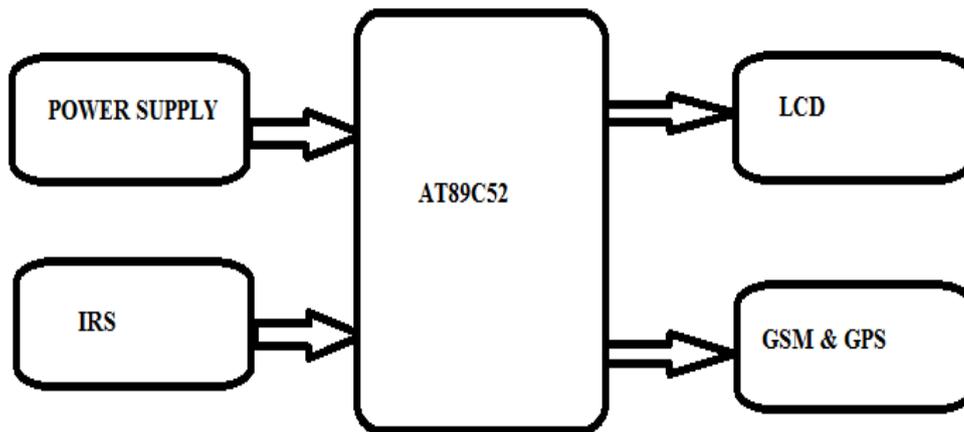


Figure 1. Block Diagram

3.1. Power supply

It is a source to a wellspring of power. A gadget or framework that plans electrical or different sorts of vitality of gathering loads or to a yield weight is called as power supply unit (PSU)1. The open Voltage signal from the mains will be 230V/50Hz which is an ac Voltage, at any rate the prerequisite will be dc Voltage with adequacy of +12V & +5V for different programmes.

3.2. LCD (Liquid Crystal Display)

Propelled show is finding wide spread out use substitution LEDs. LCD screen involves 2 lines comprises of sixteen characters each. Each character involves 5x8 cross lattices. Separation on show depends upon the workplace gives messages territory unit and Voltage appeared in one or two lines. In this manner, factor Voltage 0-V_{dd} has been applied on the stick set apart as V_{EE} [2].

3.3. GSM (Global System for Mobile Communication)

Overall System for Mobile framework may be a phone mastermind, which surmises that PDAs connect with it by finding cells inside the minute neighborhood. The idea of GSM was developed at Bell Laboratories in 1970. It is widely used mobile communication system in the world. GSM is an open and digital cellular

technology used for transmitting mobile voice and data services operates at the 850MHz, 900MHz, 1800MHz and 1900MHz frequency bands. GSM system was developed as a digital system using time division multiple access (TDMA) technique for communication purpose [13-15]. A GSM digitizes and reduces the data, then sends it down through a channel with two different streams of client data, each in its own particular time slot. The digital system has an ability to carry 64 kbps to 120 Mbps of data rates. TDMA technique relies on assigning different time slots to each user on the same frequency. It can easily adapt to data transmission and voice communication and can carry 64kbps to 120Mbps of data rate.

3.4. Global Positioning System (GPS)

The SKG13BL is a finished GPS motor module that choices super affectability, radical low power and little type factor. The GPS sign is applied to the radio wire contribution of unit, and an entire sequential data message with position, rate and time information is presented at the sequential interface with NMEA convention or custom convention. It's upheld the elite choices of the MediaTek MT3337 single-chip structure, Its – 165dBm interest affectability expands situating inclusion into spot like urban ravines and thick foliage climate any place the GPS wasn't potential previously [13-15]. the little kind issue and low power utilization fabricate the unit easy to incorporate into transportable gadget like PNDs, cell phones, cameras and vehicle route frameworks.

3.5. Microcontroller (AT89C52)

The AT89C52 is a low-power, high-performance CMOS 8-bit microcomputer with 8Kbytes of Flash programmable and erasable read only memory (PEROM). The device is manufactured using Atmel's high-density nonvolatile memory technology. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. the Atmel AT89C52 is a powerful microcomputer which provides a highly-flexible and cost-effective solution to many embedded control applications. AT89C52 provides the following standard features: 8Kbytes of Flash, 256 bytes of RAM, 32 I/O lines, three 16-bit timer/counters, a six-vector two-level interrupt architecture, a full-duplex serial port, on-chip oscillator, and clock circuitry. In addition, the AT89C52 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The Idle Modes tops the CPU while allowing the RAM, timer/counters, serial port, and interrupt system to continue functioning. The Power-down mode saves the RAM contents but freezes the oscillator, disabling all other chip functions until the next hardware reset.

4. Algorithm Flowchart

This flowchart clearly explain the working procedure of this proposed system.

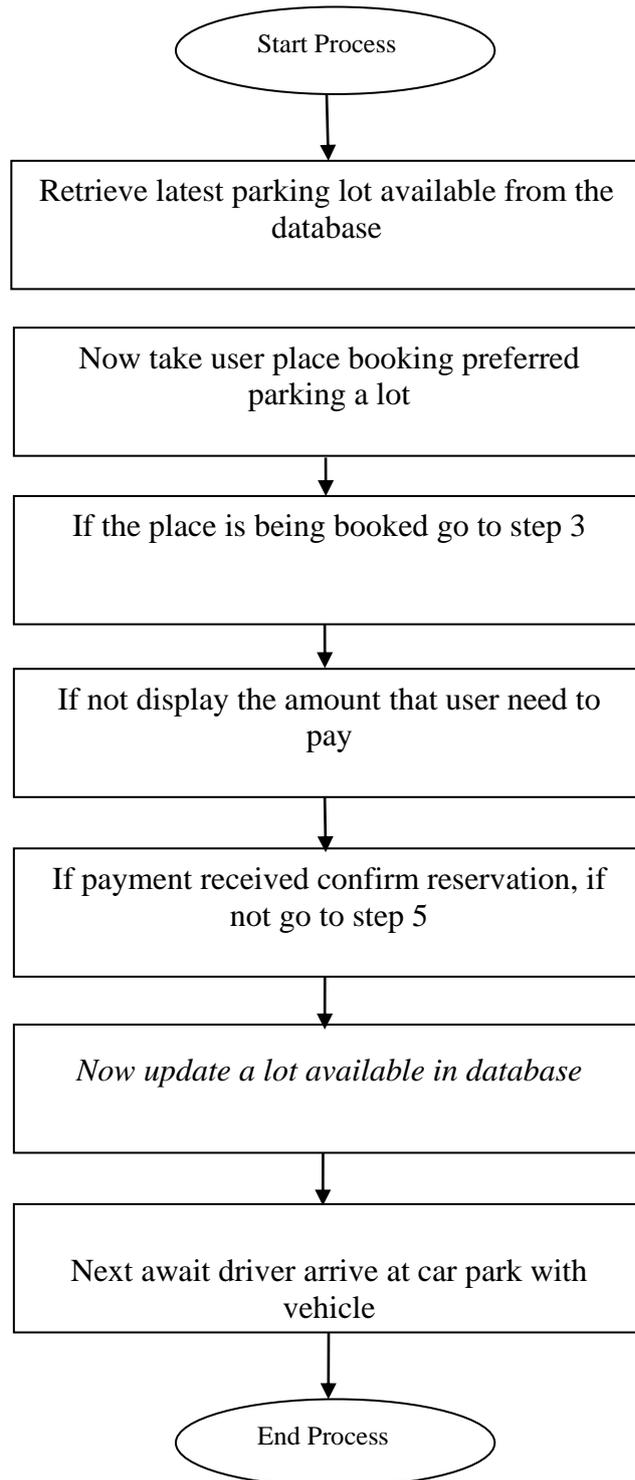


Figure 2. Flowchart of the Proposed Model

5. Results and Discussion

In existing methods they used sensors for parking the vehicle in a slot [7 - 9] and some others utilized camera and image analysis for parking the vehicle in correct slot. In this proposed system, initially the free parking lots and filled parking lots

in the parking area will be updated in the database and it will be displayed in the LCD shown in figure.3. So those who ever coming to park the vehicle must first register their mobile number in the system.

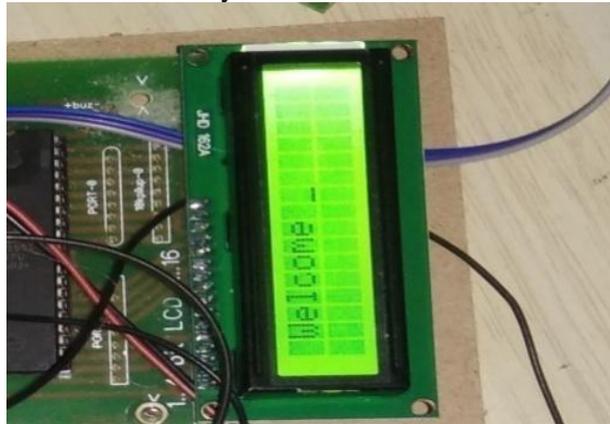


Figure 3. LCD display the message Welcome

Once we registered our mobile number it will display the which are the parking lots available and which are filled in the parking area is shown in figure.4 in this prototype we designed for only three parking slots S1, S2 and S3. Initially It will show as empty in this three slots. If first slot S1 is filled then it will display a message that S1 is full and S2 and S3 is empty is shown in figure.5 and figure.6.



Figure 4. Mobile Number Registration



Figure 5. Available slots



Figure 6. Slot Filled

Once parked the user vehicle will be under surveillance through different technology in that RFID based security system⁵ is one of the conventional method. But in this through GPS and GSM the latitude and longitudinal position of the vehicle will be send to the registered user mobile number. So that we can track our vehicle all the time through GSM and GPS as shown in figure.7

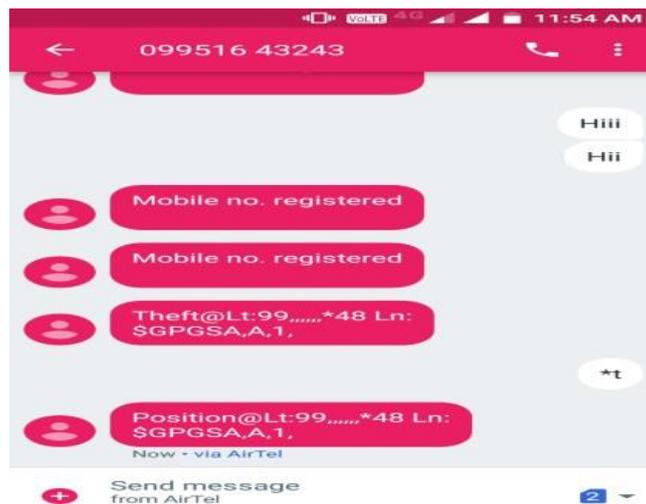


Figure 7. Vehicle is tracked

6. Conclusion

Inventive Shrewd Car Parking System with a most recent NFC innovation is the powerful vehicle leave frameworks that are utilized as upgrades for the present vehicle leave structure by utilizing ticketless system with a broad part, for example, NFC, NFC Kiosk, sensor in pack structure, doled out a ton and internet booking. This advancement gets accommodation & improvement in eco-satisfying perspectives. ISCAPS additionally works as an update structure to remind clients of their vehicle domain by utilizing their telephone tag or NFC card to stand. To make it essentially powerfully pleasing, web based booking has been given to the clients that evaluation toward electronic booking going before their visit to the shopping center. As such, Inventive Shrewd Car Parking System (ISCAPS) passed on greater settlement to client with utilizing less time to leave the vehicle & decline the

impeded in vehicle leave. The vehicle leave moreover would make considerable amount of salary for the organization by less work need in the structure.

Significant statement: this study discover the vehicle tracking and automatic parking system that can be beneficial for multistory buildings, apartments, shopping Malls etc.,. This study will help the researcher to uncover the critical areas of Near Field Communication and GPS that many researchers were not able to explore. Thus a new theory on Automatic parking and vehicle tracking system has been done.

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