

Near Field Communication (NFC) Based Vehicle Management System

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Abstract:- NFC system is considered as an effective method in order to alleviate traffic congestion and jams, enhance the convenience and safety of travelers, and minimize air pollution and fuel consumption for environmental protection need. NFC system determines whether the vehicles passing are enrolled in the program, alerts enforcers for those that are not, and debits electronically the accounts or the amount in the IC card of registered cars. An Architecture for collecting vehicles toll using Near Field Communication (NFC) is presented in this paper. The NFC Reader reads the information like vehicles no. and automatically sends information to the system. It uses a passive NFC tag as carrier to identify actual Information of NFC card holder. This project will check all the document of the car which will about to cross. The performance of the system is evaluated in VB.NET .The aim of our project is to give speedy transport without any obstruction, To avoid time consumption which has direct impact on fuel consumption, To enable quicker and faster way to handle, maintain and access records of the passenger, To avoid obvious issues with cash transaction, irregularity and incorrect in transaction that is Less prone to corruption Reducing work process time, it Reduces man power, Save time thereby increasing performance.

Keywords: -NFC Reader, NFC tags, ULN2003 IC, MAX232 IC, Near field Communication

1. Introduction

A toll street is an open or private roadway for which an expense is surveyed for section. Tolls are gathered at focuses known as toll corners, toll houses, courts, stations or doors. Reactions of toll streets incorporate the time taken to stop and pay the toll, and the expense of the toll stall administrators up to around 33% of income at times. NFC frameworks minimize both these. Street tolls were collected generally for a particular access or for a particular foundation. These ideas were generally utilized until the most recent century. In any case, the advancement in innovation made it conceivable to execute street tolling approaches in light of various ideas. The distinctive charging ideas are intended to suit diverse necessities in regards to motivation behind the charge, charging arrangement, the system to the charge, levy class separation and so forth. Time Based Charges and Access Fees: In a period based charging administration, a street client needs to pay for a given timeframe in which he may utilize the related framework. For the for all intents and purposes indistinguishable access expenses, the client pays for the entrance to a limited zone for a period or a few days. Motorway and other Infrastructure Tolling: The term tolling is utilized for charging an all around characterized extraordinary and similarly immoderate base, similar to an extension, a passage, a mountain pass, a motorway concession or the entire motorway system of a nation. Traditionally a toll is expected

when a vehicle passes a tolling station, be it a manual boundary controlled toll court or a free-stream multi-path station. Separation or Area Charging: In a separation or territory charging framework idea, vehicles are charged per all out separation driven in a characterized range. Toll streets have been censured as being wasteful in different ways:

- They oblige vehicles to stop and manual toll accumulation squanders time and raise vehicle working expenses.
- Collection expenses can retain up to 33% of incomes and income robbery is thought to be similarly simple.
- Where the tolled streets are less congested than the parallel free streets, the activity preoccupation coming about because of the tolls builds clog out and about framework and lessen its convenience.

Close Field Communication is a programmed ID strategy, depending on putting away and remotely recovering information utilizing gadgets called NFC module or transponders. Close field correspondence, contracted NFC, is a type of contactless correspondence between gadgets like cell phones or tablets, tag and so forth. Contactless correspondence permits a client to wave the NFC tag over a NFC perfect gadget to send data without expecting to touch the gadgets

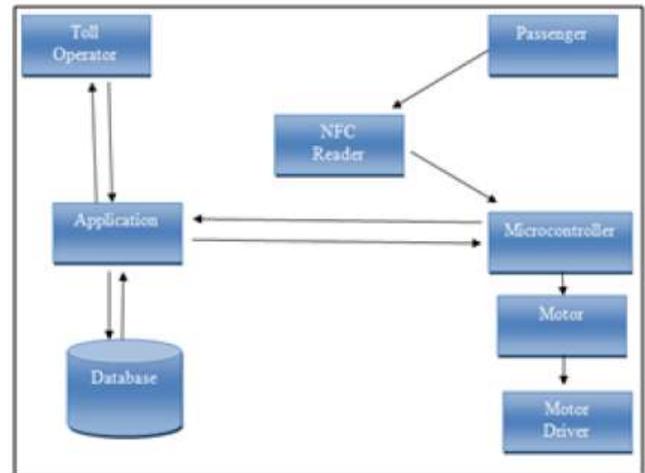
together or experience various strides setting up an association.

NFC Toll Road Payment frameworks will help a considerable measure in lessening the overwhelming clog brought about in the metropolitan urban areas of today. It is one of the most straightforward strategies used to sort out the overwhelming stream of activity. At the point when the auto travels through the toll door on any street, it is demonstrated on the NFC peruser that it has crossed the clearing. The requirement for manual toll based frameworks is totally decreased in this techniques and the tolling framework works through NFC. The framework therefore introduced is entirely practical lessening the time and cost of explorers since the tag can be deciphered from a separation. NFC based framework tracks the general population who pass the toll entryway which is impractical in manual toll door. The database keeps up data, for example, vehicle number, NFC Card holder data, protection number and so on. Toll entryway administrator can deal with the whole framework from the toll stall. Toll administrator has the power to open and also shut the boundary naturally. The toll door administrator can open the toll entryway by snap on an OPEN catch. After finish of the exchange the toll administrator can naturally CLOSE the toll entryway by snap on a CLOSE catch.

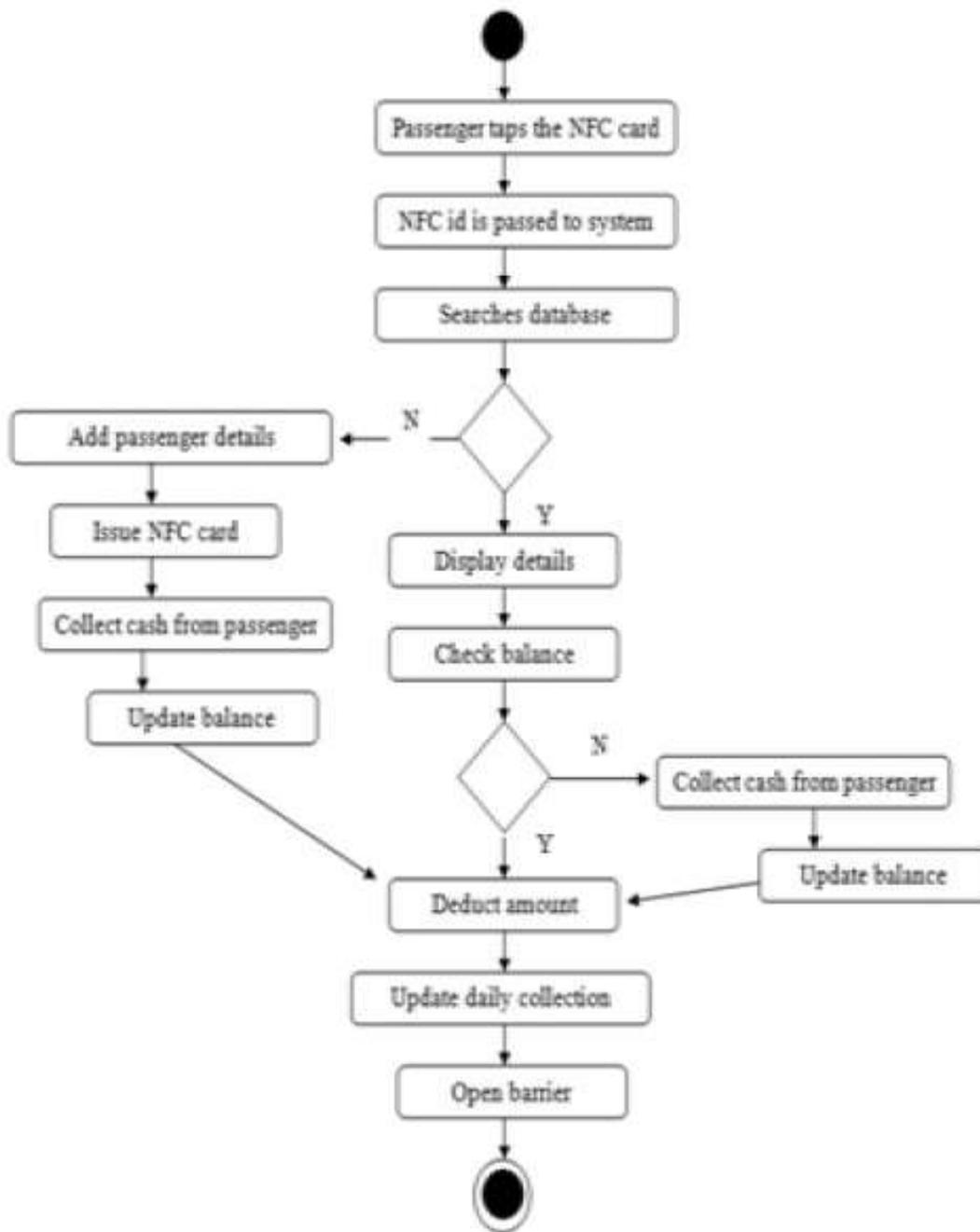
2. SYSTEM OVERVIEW

In our venture we are dispensing with the present issue of tollgate in India. Over all over India at the surveys, we have to sit tight at the tollgate for the taking the ticket that makes us delay for our critical work. As we probably am aware, the heaviest activity clog on expressways happens close toll doors where vehicles make a short stop to pay the toll. So a Near field correspondence (NFC) framework is normally worked to dispense with the automobile overloads. The general population going through this vehicle medium don't require whatever else to get on a parkway, rather the NFC tag conveyed by their vehicle will do everything. A worker going through this medium becomes acquainted with the amount of sum has been paid and the amount of cash is left in the tag. It doesn't require the individual to convey money with him to pay the toll entryway constantly. The long line sitting tight for their turn is diminished, which thusly lessens the utilization of fuel. The NFC toll installment frameworks are truly utilized as

a part of counteracting trespassing on fringes. The product arrangement created can guarantee a smooth running of vehicles with no requirement for further advancement. The product controlling these NFC labels and peruser is anything but difficult to actualize.



This anticipate NFC card is brought close to the peruser, then information (Cards novel serial number) is send from the peruser to the TX pin of MAX-232 unit. Than MAX-232 unit sends this information to the serial port of the PC. Where the Visual Basic (VB) system is running on the PC. Than the VB program takes this remarkable number from the PC serial port, we can likewise utilize a Serial-USB Converter if PC/Laptop does not have a serial port. Than the VB program checks the novel number in a Microsoft Access Database (MS-Access), to get the points of interest for that one of a kind number. In the event that the points of interest exists, subtle elements, for example, User-name, Age, and Address and so on are perused and showed on the PC. The framework administrator, then select the sum that should be subtracted from the database, contingent on the vehicle sort. Next stride, the framework administrator taps on open-catch. This causes an order to be send from PC to the serial port. Than the serial port gives the information to MAX-232 unit, from that point charge goes to the MCU, then MCU advances the information to ULN2003IC. Finally, the transfer is enacted, and the door opens. There are two hand-off, one for opening and one for shutting, the MCU can get information from PC either to open or to close the entryway.



a) AT89S51-Microcontroller:

The AT89S51 is a low-control, elite CMOS 8-bit microcontroller with 8K bytes of in framework programmable Flash memory. The gadget is produced utilizing Atmels highdensity nonvolatile memory innovation and is perfect with the Indus - attempt standard 80C51 direction set and stick out. The on-chip Flash permits the project memory to be

reinvented in-framework or by a customary nonvolatile memory software engineer. By consolidating an adaptable 8-bit CPU with in-framework programmable Flash on a solid chip, the Atmel AT89S51 is an intense microcontroller which gives a very adaptable and savvy answer for some inserted control applications. Stepper Motor:

A stepper engine (or step engine) is a brushless DC electric engine that partitions a full turn into various equivalent strides. The engines position can then be told to move and hold at one of these progressions with no criticism sensor (an open circle controller), the length of the engine is painstakingly estimated to the application. DC brush engines pivot persistently when voltage is connected to their terminals. Stepper engine is known by its imperative property to change over a train of info heartbeats i.e. a square wave beat into a correctly characterized increase in the pole position. Every heartbeat move the pole through a settled edge. The electromagnets are invigorated by an outside control circuit, for example, a microcontroller. To make the engine shaft turn, initial, one electromagnet is given force, which attractively draws in the apparatus' teeth. Engine driver act like the momentum intensifier. It is use for controlling the current in the engine. ULN2003 IC:

ULN2003 is a high voltage and high current Darlington cluster IC. It contains seven open gatherer darlington sets with normal emitters. A darlington pair is a course of action of two bipolar transistors. ULN2003 has a place with the group of ULN200X arrangement of ICs. Distinctive variants of this family interface to various rationale families. ULN2003 is for 5V TTL, CMOS rationale gadgets. These ICs are utilized when driving an extensive variety of burdens and are utilized as transfer drivers, show drivers, line drivers and so forth. ULN2003 is additionally generally utilized while driving Stepper Motors. Allude Stepper Motor interfacing utilizing ULN2003. Every direct or darlington pair in ULN2003 is evaluated at 500mA and can withstand crest current of 600mA. The inputs and yields are given inverse to each other in the pin design. Every driver likewise contains a concealment diode to disperse voltage spikes while driving inductive burdens. MAX 232:

The MAX232 is an integrated circuit that converts signals from an RS-232 serial port to signals suitable for use in TTL compatible digital logic circuits. The MAX232 is a dual driver/receiver and typically converts the RX, TX, CTS and RTS signals. The drivers provide RS-232 voltage level outputs (approx. 7.5 V) from a single + 5 V supply via on-chip charge pumps and external capacitors. This makes it useful for implementing RS-232 in devices that otherwise do not need any voltages outside the 0 V to + 5 V range. FRONT END SOFTWARE

NET Framework:

.NET is layered, secluded, and hierarchal. Every level of the .NET Framework is a layer of deliberation. .NET dialects are the top level and the most dreamy level. The normal dialect runtime is the base level, the slightest disconnected, and nearest to the local environment. This is essential since the regular dialect runtime works intimately with the working environment to oversee .NET applications. The .NET Framework is parceled into modules, each with its own particular unmistakable obligation. At long last, following higher levels demand benefits just from the lower levels, .NET is hierarchal..NET Framework is an overseen situation. The regular dialect runtime screens the execution of .NET applications and gives key administrations. It oversees memory, handles special cases, guarantees that applications are all around carried on, and a great deal more. Dialect interoperability is one objective of .NET. .NET dialects share a typical runtime (the normal dialect runtime, a typical class library), the Framework Class Library (FCL), a typical segment model, and basic sorts. In .NET, the programming dialect is a direction for living. With the exception of inconspicuous contrasts, C, VB.NET, or JScript.NET offer a comparative experience..NET abstracts lower-level administrations, while holding the majority of their adaptability.

b) Windows 7:

The PC vehicle management software will run on Windows 7 and further versions of Windows. Windows 7 is built on the Vista kernel. Windows 7 are faster boot times, new user interfaces and the addition of Internet Explorer 8. The OS is widely available in three retail editions: Windows 7 Home Premium, Professional and Ultimate. BACK END SOFTWARE:

c) Microsoft Access:

MicrosoftAccess is a DBMS from Microsoft that combines the relational Microsoft Jet Database Engine with a graphical user interface and software-development tools. It is a member of the Microsoft Office suite of applications, included in the Professional and higher editions or sold separately. Microsoft Access stores data in its own format based on the Access Jet Database Engine. It can also import or link directly to data stored in other applications and databases. Software developers and data architects can use Microsoft Access to develop application software, and power users can use it to build software applications. Like other Office applications, Access is supported by Visual Basic for Applications (VBA),an objectoriented programming language that can

reference a variety of objects including DAO (Data Access Objects), ActiveX Data Objects, and many other ActiveX components. Visual objects used in forms and reports expose their methods and properties in the VBA programming environment, and VBA code modules may declare and call Windows operating-system functions. ASP.NET web forms can query a Microsoft Access database, retrieve records and display them on the browser. Microsoft Access is used for making a working prototype of our project. In real life when the project is implemented SQL server can be used for handling and storing data.

The following are the reason for using Microsoft Access as a backend:

- Quick and easy to create database systems. It translates directly into a cost-saving for you and it means that turnaround times are usually a matter of a few weeks.
- Microsoft Access produces very user-friendly applications through its comprehensive programming language.
- Microsoft Access produces flexible and adaptable database systems.
- The capabilities of Access are constantly improving now with good web integration.
- Automated backup is easier to perform. Multiple access to data at same time or different time is possible by multiple users.

3. NEAR FIELD COMMUNICATION (NFC)

Near field correspondence (NFC) innovation lets advanced mobile phones and other empowered gadgets speak with different gadgets containing a NFC tag. Whether swiping your advanced mobile phone at the checkout path in the market, waving it over a showcase at a neighborhood gallery, or knocking telephones with a companion to share the most recent diversions, close field innovation gives you a chance to pay, play, and learn effortlessly. NFC isn't an on a very basic level pivotal innovation. Like Bluetooth and Wi-Fi, its a remote radio correspondences standard Near Field Communication, or all the more generally known as NFC, is a subset of RFID that restricts the scope of correspondence to inside 10 centimeters or 4 inches. RFID is the procedure by which things are particularly recognized utilizing radio waves, and NFC is a specific subset inside the group of RFID innovation. In particular, NFC is a branch of High-Frequency (HF) RFID, and both work at the 13.56 MHz recurrence. NFC is intended to be a safe type of information trade, and a

NFC gadget is fit for being both a NFC peruser and a NFC tag. This remarkable element permits NFC gadgets to convey distributed. As a finely sharpened form of HF RFID, close field specialized gadgets have exploited the short perused range confinements of its radio recurrence. Since NFC gadgets must be in close vicinity to each other, as a rule close to a couple of centimeters, it has turned into a prevalent decision for secure correspondence between shopper gadgets, for example, advanced mobile phones. NFC Tags:

NFC labels contain information and are ordinarily perused just, however might be rewriteable. The labels can safely store individual information, for example, charge and Mastercard data, dependability program information, PINs and systems administration contacts, among other data. The NFC Forum characterizes four sorts of labels that give diverse correspondence rates and capacities regarding configurability, memory, security, information maintenance and compose perseverance. Labels right now offer somewhere around 96 and 4,096 bytes of memory. Likewise with nearness card innovation, close field correspondence utilizes attractive impelling between two circle radio wires situated inside each other's close field, viably shaping an air-center transformer. Hypothetical working separation with minimal standard receiving wires: up to 20 cm (down to earth working separation of around 4 cm) Supported information rates: 106, 212 or 424kbit/s (the bit rate 848kbit/s is not agreeable with the standard ISO/IEC 18092) NFC gadgets can get and transmit information in the meantime. In this way, they can check for potential crashes, if the got signal recurrence does not coordinate with the transmitted signs recurrence. NFC Card Reader:

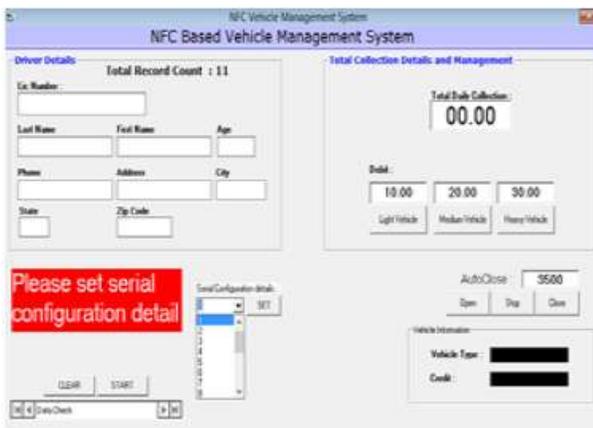
The NFC Reader is a PC-connected contactless shrewd card peruser/essayist created taking into account 13.56 MHz Contactless (RFID) Technology. Agreeable with the ISO/IEC18092 standard for Near Field Communication (NFC), it underpins not just MIFARE and ISO 14443 An and B cards, additionally each of the four sorts of NFC labels. NFC Reader is agreeable with both CCID and PC/SC. Along these lines, it is an attachment and-play USB gadget permitting interoperability with various gadgets and applications. With an entrance rate of up to 424 kbps and a full USB rate of up to 12 Mbps, NFC Reader can likewise read and compose all the more rapidly and proficiently. The nearness working separation of NFC Reader is up to 5 cm, contingent upon the kind of contactless tag being used. The NFC Reader is perfect for both secure individual personality check and online smaller scale installment exchanges. Different utilizations of the NFC Reader incorporate access

control, e-installment, e-ticketing for occasions and mass travel, toll street admission accumulation and system confirmation. The NFC Reader accompanies a discretionary stand to hold the shrewd card peruser at an ideal point, with the goal that clients can tap contactless cards or NFC-empowered Card onto the NFC Reader Easily.



4. RESULT ANALYSIS

Setting a serial port



Reading unique number on NFC card



Deduction of Amount



CONCLUSION

The concept of the NFC system is practically implemented in this paper based on Atmel AT89S51 Micro controller, NFC reader, NFC card and NFC Toll Road Payment systems have really helped a lot in reducing the heavy congestion caused in the metropolitan cities of today. The need for manual toll based systems is completely reduced in this methods and the tolling system works through NFC. The system thus installed

is quite expedient reducing the time and cost of travelers since the tag can be deciphered from a distance. Although our searching method can reduce human loading, there is an important.

REFERENCES

- [1] Nikhil Mohan, SavitaPatil, "Near Field Communication (NFC) based Electronic Toll Collection System" Available at: <http://www.irdindia.in/journalijraet/pdf/vol2iss4/10.pdf>
- [2] WY. Shieh, WH. Lee, S.L. Tung, B.S. Jeng, and C.H. Liu, Analysis of the optimum configuration of roadside units and onboard units in dedicated shortrange communication systems, IEEE Trans. Intel!. Transp.Systems, vol. 7, no. 4, pp. 565-571,2006.
- [3] P. Farida , D. Vishnuvardhan," Design of NFC Based Vehicle Parking System Using Smartphone" Available at: <http://www.ijsr.net/archive/v4i3/SUB152174.pdf>
- [4] www.nfc-ready.eu
- [5] goldengate.org/tolls/tolltipsforvisitors.php