

Automobile information retrieval with NFC TAGs (Cost effective solution especially for India)

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Abstract- Use NFC tag and Android Application to retrieve information of any automobile

Police have to identify they have to carry giant readers with them every time and it also requires training to do so.

Index Terms- NFC TAG, Identification, Android, Automobile

I. INTRODUCTION

With advancement in technology, new methods for identification and security are being developed. Personnel identification methods (face recognition, finger print scan, biometrics etc.) have advanced exponentially as compared to methods available five years ago. Vehicle identification is also a part of security and necessity especially in countries like India. According to website data.gov.in report, till 2012, total no. of registered vehicles in India was 159491. It is 2015 now, and this count would have increments in hundreds and thousands. In such environment, vehicle identification becomes very important. This is important to reduce vehicle theft, terrorist activities etc. License is one part of identification of the owner of vehicle. But it identifies the driver. It cannot make it sure that the vehicle he/she is driving belongs to him or is registered with government. This makes it easier for terrorists to carry forge licenses.

II. EXISTING METHODS FOR IDENTIFICATION

Currently, there are some methods available for vehicle identification. Many based upon manual identification. Some are automated like RFID based identification. But this method has many pitfalls. First and foremost, RFID readers are required to read RFID tags. And RFC readers need to be installed everywhere to read and complete setup is required to receive information from them then parse the received information.

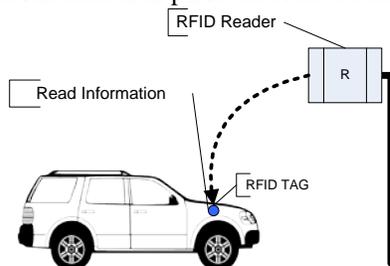


Figure 1: Basic RFID Identification scenario

Another problem is that RFID readers cannot be used by individuals. For example, a normal person cannot use it to identify information of vehicle and the person using it. Also, if



Figure 2: RFID TAG Reader

NFC based available solutions: NFC technology has allowed us contactless information transfer and allows storage of data permanently and retrieval of the same any time we want. These two functionalities can be used for vehicle identification and information. There are some uses already available. For example, Geotab's IOX-NFC reader module enables a company to identify a vehicle's driver, as well as link that individual to details about its operation [1].



Figure 3: Geotab's NFC RFID solution

Another available solution for the same is using NFC smart card and keys which allows identification of the driver. It works in the way that when a person touches his/her NFC card with the vehicle, if he/she is the registered person with the vehicle, the vehicle will mobilize only then.

III. PROBLEMS WITH EXISTING SOLUTIONS

There are many problems with the existing solutions explained. For example, they do not provide ease of use. Where in RFID solution, there is requirement of RFID readers, there in NFC solution there is requirement of NFC card or key or an NFC reader. Another issue is that they are designed for a very specific use, use by companies or use by the owners of vehicles, and cannot be used by other persons if they want. Third problem is the cost of implementation of these solutions especially in India.

IV. REQUIREMENT OF A BETTER SOLUTION

Use case explained for requirement: In India, the streets are flooded with vehicles main of which are Auto Rickshaws. The solution proposed here is not focusing on one specific area but is based upon the observation of that area. The observation is that, Delhi people face problems with Auto Rickshaws. The Auto Rickshaw driver refuses to take passengers to some specific area in the City or overcharge them sometimes. It is very difficult for people to identify which Auto Rickshaw is registered with which region so that they can ask the correct one for visiting that region. There was an announcement from Delhi Government that, special color strips will be pasted on the vehicles for identification of the area to which the vehicle belongs. For example, Blue strip will identify the Noida City region. But this solution is not implemented yet and will not be so much feasible.

Research elaboration for proposal: This solution proposes using NFC tags with the vehicles. These tags are like RFID tags but costs much less and are easy to program and read. NFC tags can be programmed very easily to carry information. The solution is elaborated below:

How NFC tag works and information can be read from them: NFC tags can be programmed with just about any type of information and then can be embedded into almost any type of product. NFC tags can also be locked so that once any data has been written on them, it cannot be altered. For most tags this is a one way process so once the tag is locked it cannot be unlocked. Here encoding and locking are two steps. One NFC tag can be encoded many times until it is finally locked.

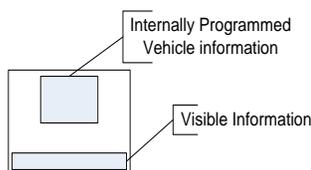
V. IMPLEMENTATION

Components used for sample Implementation includes:

1. NFC TAG (For this test implementation TOPAZ Class 1 512 Tag was used)
2. MySQL Database(For storing information of Vehicle and Owner)
3. NFC Application(Android based)
4. Web Client(Website or application to which NFC application will send request)
5. Web Service/Script(Foe exchange of data between MySQL Database and Web Client)

A. NFC Tag

NFC TAG will be programmed with information of vehicle (Registration Number).



As there are also devices which do not support NFC, so, there will be information printed on the TAG which will visible and used by devices not supporting NFC system as explained in implementation ahead.

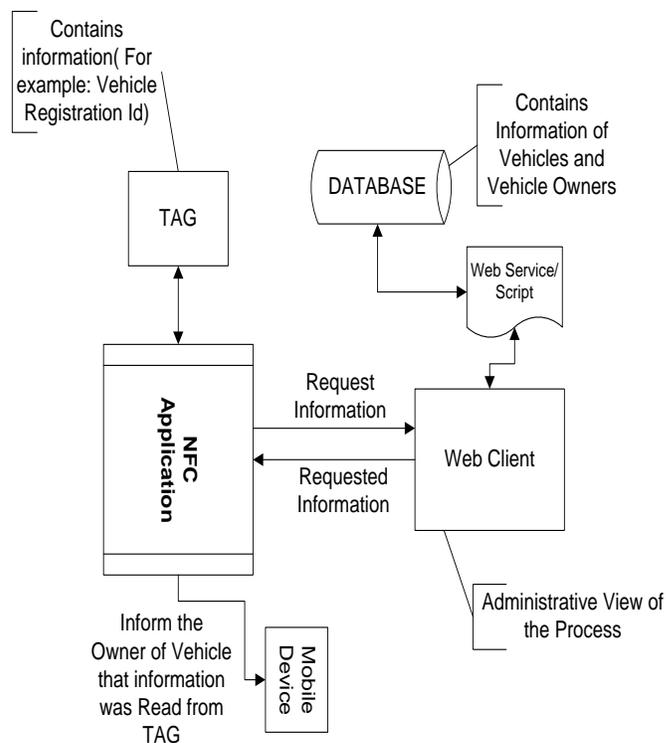
B. MySQL Database

MySQL database contains complete information of Vehicle and Owner of the vehicle. Three Tables are required in Database:

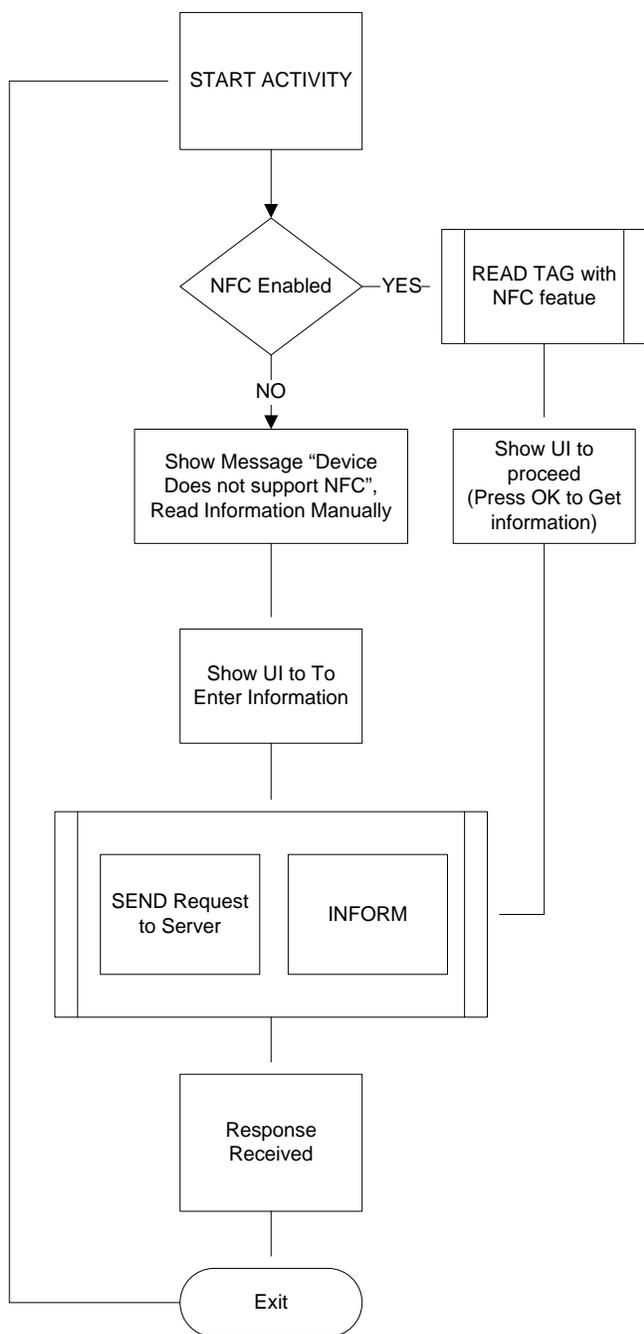
1. Vehicle Table: This table will contain information of vehicle corresponding to registration number
2. Owner Table: This table will contain information of Owner corresponding to registration number of vehicle.
3. Access Record Table: This table will record the activity of access. Whenever a Tag will be read, this table will be updated with information of read (Date Time, Device from which information was read)

C. Android Application

Android Based NFC Application is developed to read the TAG information and perform required tasks. This overall implementation schema is as follows:



Android Application behavior with respect to Device capabilities and TAG information is as explained in following flow chart:



D. Web Client and Web Service

Android Application will send the request to a Web Client. This web client can be windows based web client or a Website

or web page. On receiving the request, this web page or client will send request to the database via web service or script and pass the retrieved information to the application.

VI. BENEFITS OF THIS IMPLEMENTATION

First and foremost benefit of this implementation is that the cost of implementation of this solution is very low as compared to other solutions. Secondly, this solution can be used by not only the companies to retrieve information of their vehicles (as in other solutions) but also by the individuals. For example, in case of suspicious activities, the individual can get complete information of vehicle and its owner and report the same. During this, the owner will also be informed about the activity via a message which will contain information of place and time where the tag was read.

Use Case: In Indian Cities, if all Auto Rickshaws are provided with NFC TAGs then the passengers can get the information of route on which vehicle is allowed to go, information of the driver. And as the driver to drop them to any place on the route. If the driver denies doing so they can complain to the authorities as they have complete information of driver and his route and necessary actions can be taken. All this will require only the use of Android Smart phone, If NFC service is provided and they have the application to read the information they just need to tap on the tag and press Read information. If NFC service is not available then they just have to enter the information provided on the TAG and then they can read the information.

VII. CONCLUSION

Although there are many existing solution for retrieving the information of an automobile but none of them are available for the use of a common person or individual under any circumstances. This proposed solution being an extension of the existing solution is not only less costly but also within the reach of common person to use.

REFERENCES

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