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# Snapping the Repeated Miscreant Using QR Codes

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**ABSTRACT**

The purpose of this research paper is to make a comparative study and to establish a network of Quick Response (QR) Code driving licenses and snapping the repeated miscreant using QR Codes i.e. safeguard common man's safety by allowing only adept and sincere riders without repeated offences to be there on roads riding their respective vehicles. The QR Codes on a single scanning will link you to a temporary link that will give you the entire identity including the name, address and photograph which shall be upgraded later with fingerprint and signature as well as car details. A database would be connected to the QR Codes easily made online using kaywa.com, Open Source Code, PHP or Google's new QR CODE generator or manual updation of data using SQL using Android Studio and the database will be updated repeatedly whenever a person commits an offence related to breaking traffic or a link will lead to a page where all the database of the driver will be uploaded and a repeated offender will have his driving license seized or a hefty fine imposed or maybe put behind bars if a certain offence limit is crossed. There shall be certain levels which will differentiate a good driver to an irresponsive one.

***Keywords:*** Quick Response (QR) Code, Two Dimensional Bar Code, Recognition, Driving License, Record.

## 1. INTRODUCTION

QR code (abbreviated from Quick Response Code) is the trademark for a type of matrix barcode (or two-dimensional barcode) first designed for the automotive industry in Japan. A barcode is a machine-readable optical label that contains information about the item to which it is attached. A QR code uses four standardized encoding modes (numeric, alphanumeric, byte / binary, and kanji) to efficiently store data; extensions may also be used. The QR Code system became popular outside the automotive industry due to its fast readability and greater storage capacity compared to standard UPC (Universal Product Code) barcodes. Applications include product tracking, item identification, time tracking, document management, and general marketing.

A QR code consists of black modules (square dots) arranged in a square grid on a white background, which can be read by an imaging device (such as a camera, scanner, etc.) and processed using Reed-Solomon error correction until the image can be appropriately interpreted. The required data are then extracted from patterns that are present in both horizontal and vertical components of the image.

The QR code system was invented in 1994 by Toyota Subsidiary Denso Wave. Its purpose was to track vehicles during manufacture; it was designed to allow high-speed component scanning. Although initially used for tracking parts in vehicle manufacturing, QR codes now are used in a much broader context, including both commercial tracking applications and convenience-oriented applications aimed at mobile-phone users (termed mobile tagging). QR codes[1] may be used to display text to the user, to add a vCard contact to the user's device, to open a Universal Resource Identifier (URI), or to compose an e-mail or text message. Users can generate and print their own QR codes for others to scan and use by visiting one of

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several paid and free QR code generating sites or apps. The technology has since become one of the most-used types of two-dimensional barcode. In the 1960s when Japan entered its high economic growth period, supermarkets selling a wide range of commodities from foodstuff to clothing began to spring up in many neighbourhoods.

Hence in order to sell these things without numbing the cashier as in above diagram, came Bar Codes and then due to its disadvantages a development team at DENSO WAVE embarked on the development of a new two-dimensional code, all out of their sincere desire to accommodate users' needs and packing as much information as possible into their codes. Development team was made up of just two members-Masahiro Hara and another member who used positional information to make reading of the code as fast as possible.

## 2. RELATED WORKS

Smart card driving licenses [2] and Radio frequency (RF) ID's are used in India from around 2012 and are about to be implemented in all cities. This system has made the accounting system such as fees and fine automated and transparent. The authorities imposing challans on vehicle drivers/owners will need a card reader/writer to read the information fed in these cards.

Also in other US cities like Washington, Ohio, New York, Michigan and Vermont, RF ID chips are contained within the driving licenses. Personal information stored in these chips could be read from a distance of up to 30 feet. RF ID is especially useful in situations where vast quantities of goods must be moved or tracked, or where tracking of item-specific information is necessary. This technology is a dream comes true for identity thieves and stalkers, and a civil liberties nightmare for Californians concerned about government intrusion and tracking. Hence combing all the advantages of above and eliminating disadvantages, QR Codes do well. Thus:

a) Mass Scale implementation of QR Code tracking can be done and simplicity of this that the average person can now de-code (read) a QR code, without special equipment. You could walk into a place of business, see a QR code on an item, scan it with your smartphone, and immediately have access to a lot of information electronically.

b) QR code can give instant information about the driver compared to RF Id's which don't give information but are used to track vehicles and their production line.

c) One rider will be assigned only one specific QR Code and that code will be stored in Police systems.

d) Hefty fines by police officers and corruption will be reduced as specific instructions will be implemented.

e) An App about the QR Codes shall be reserved for the Police officers with password of varied scales so that offence level can be updated. Thus no specific equipment will be required and maintenance and initial cost for equipment will be less.

QR Codes undoubtedly bring benefits to both consumers and marketers, with an unmatched technological capability to quickly provide more information to a consumer who is interested in the company or brand. The appeal of QR codes to marketers is clear. QR codes are easy to create and implementing a QR code into an advertisement is far less expensive than a company having to develop its own smartphone app. Marketers find value in QR codes because they can be placed just about anywhere people will have time and a reason to take out their smartphone and scan the code. QR codes also offer versatility as they can be enlarged to the size of a billboard or minimized to the size of a stamp. Additionally, QR codes offer the ability to measure consumer activity, as companies using QR codes have the ability to track the number of scans on each code and identify which medium the scan came from—newspaper, magazine, billboard, etc. This is certainly a

benefit to marketers in identifying which mediums they want to continue placing advertisements. In a retail setting, QR codes can be placed on signs within the store directing customers to a checkout, restroom, or specific isle for the product for which they are looking. When shoppers have the opportunity to access this kind of information on their own, it frees up salespeople on the sales floor and can increase productivity. Just one QR code has the ability to instantly bring up internet links, text messages, sound recorders, mp3 downloads, or instructional videos to a user's smartphone. The cost to maintain a QR code is low. Once the QR code is created, companies are left with little else to do besides track the scans.There are few limitations. First is the issue that not all consumers have the capability to scan a QR code, and of those that do, may not necessarily have the knowledge of how to scan a QR code. What many consumers have trouble understanding is that a user cannot simply take a picture of a QR code on their smartphone; they actually need the right application installed on their phone to scan and provide content. The confusion or uncertainty of how QR codes work, and how they are to be scanned is a hurdle that both consumers and marketers must combat together. Educating the consumer is the answer to this limitation. The second limitation to QR code adoption is the lack of uniformity among barcode scanning applications available on each smartphone depending on phone brand and service provider. Some smartphones come with a standard bundle of apps that include a barcode scanning app, while others leave it up to the consumer to download their own apps at their own convenience—a hindrance that can only be overcome if the consumer chooses to download the barcode scanning app themselves.

Lastly, is likely the largest limitation holding back the QR code today—the issue of QR codes bringing consumers to sites or other online content that either contains little to no useful information or bringing them to a website that is not adapted for mobile browsing. If the smartphone user finds that they are receiving either inadequate content or experiencing difficult page navigation on their first few scans, they will most likely remember their bad experience the first time and be hesitant to keep scanning QR codes in the future, even for a product, event, or activity they may find value in. Consumer lack of interest in the message or services QR codes provide is a limitation that all marketers must consider upon fighting low QR code usage rates.

In many countries, QR Codes are ubiquitous. From billboards to Pepsi bottle wrappers, an online item ordered, commercials of companies as well as teams, on posters and buildings, as well as McDonald's wrappers, almost everything contains QR Codes.

The increased usage of camera containing smartphones has further helped the boom that is to take place for QR Codes. The information can be encoded in a QR code symbols is a SMS message, an URL, a phone number, a V-card, or any text and it allows the contents to be decoded at high speed.

## 3. PROBLEM STATEMENT

Imagine an Indian police deprived of knavery and all corruption that normally cops these days are related to a healthy traffic city, with no accidents due to negligence of the driver. These scenarios are ideal and can only be reached using our method of implementation of protocols and guidelines as well as their optimization using QR Codes.

The problem is no system is present where immediate data is available to the police to find repeated and continuous offenders. Plus no specific fine is levied. Every officer collects fine depending on his own free wish and not depending on the level and type of offence. The following can be curtailed if the offence type specifically specifies the amount charged and gives the officer a required amount as benefit from that. This would discourage offenders as now they would not go scot-free and encourage more honesty and work ethic among the policeman. Thus creating a favourable brand image for India.

The inefficiency of the current driving license system represents a significant hazardous burden for the company. On an average, In India alone, the death toll rose to 14 per hour in 2009 as opposed to 13 the

previous year for road accidents. The total number of deaths every year due to road accidents has now passed the 135,000 mark, according to the latest report of National Crime Records Bureau or NCRB. A major reason is inefficient law enforcement and allowing drunken driving. This results in losses worth crores taking everything together for each accident as well as the irreparable loss suffered by the loss of life.

## 4. PROPOSED METHODOLOGY

The project seeks to implement usage of QR Codes, 2D Model of large storage containing large amounts of information in those tiny boxes to access information about a driver with a valid license. This we seek to store using JDBC, Apache and Django python and of course QR code using software and several websites currently allowing the creation of various QR Codes. An app created specially for Policemen will provide a better and safe roads. Along with all the present information in smart card presently used, QR Codes just seeks to extend the applications and reduce the corruption level in the country by having proper track of the offences of the driver and not of the driver himself. Thus independence is maintained as location of driver is kept secret and only drivers with relevant persistent crime history are punished. The QR Codes when scanned through smartphone apps by the cop gives him a link which sends him to a site where all data about the driver is stored. The Policeman can also update data through his normal smartphone and thus does not require the special card reader. The above is the general idea which we first seek to implement by maintaining a database about cars and their drivers in college and number of visitors per day in college premises.

### (A) Operational Phases

The Outline of the project or the workflow or procedure is shown in figure 1.

Phase I – Program preparation. The department's DL database system and prior research literature in the area of database development were reviewed for information applicable to this project.

Phase II – Determine data needs like the full profile and details of the driver, identify data sources, and determine database contents. A sample of licensing and traffic safety administrators and other likely end users of the database were surveyed to determine what types and formats of license process data would be of value to them. Each survey participant was sent a list of data elements currently available on the Pending Application Sub record of the DL Master File. Respondents were asked to rate the potential usefulness of the data items and to identify any additional information available from other sources that they would like to have included in the system.

Phase III – Determine system configuration required to scan QR Codes by the cops and its data processing requirements. Alternative system configurations and data structures were evaluated, and an optimal solution was selected and developed. A determination was also made of the requirements and computer software tools for processing (e.g., matching, cleaning, formatting) the data elements extracted from the source database, creating the desired file configuration, generating output reports, and performing other system functions.

Phase IV – Evaluate user acceptability of proposed database. The likely users of the system surveyed in Phase I were sent a list of the final set of data elements to be included in the system and an outline of the proposed design emanating from the second phase of this project. Each respondent was asked to evaluate the potential usefulness of the system to them and others involved in traffic safety programs and research.

Phase V – Develop system implementation schedule. Tasks necessary to design, create, implement, debug, and evaluate a prototype of the conceptualized system were determined. The personnel, hardware, and software resources necessary to implement the operation of the prototype system and to produce example statistical reports were estimated.

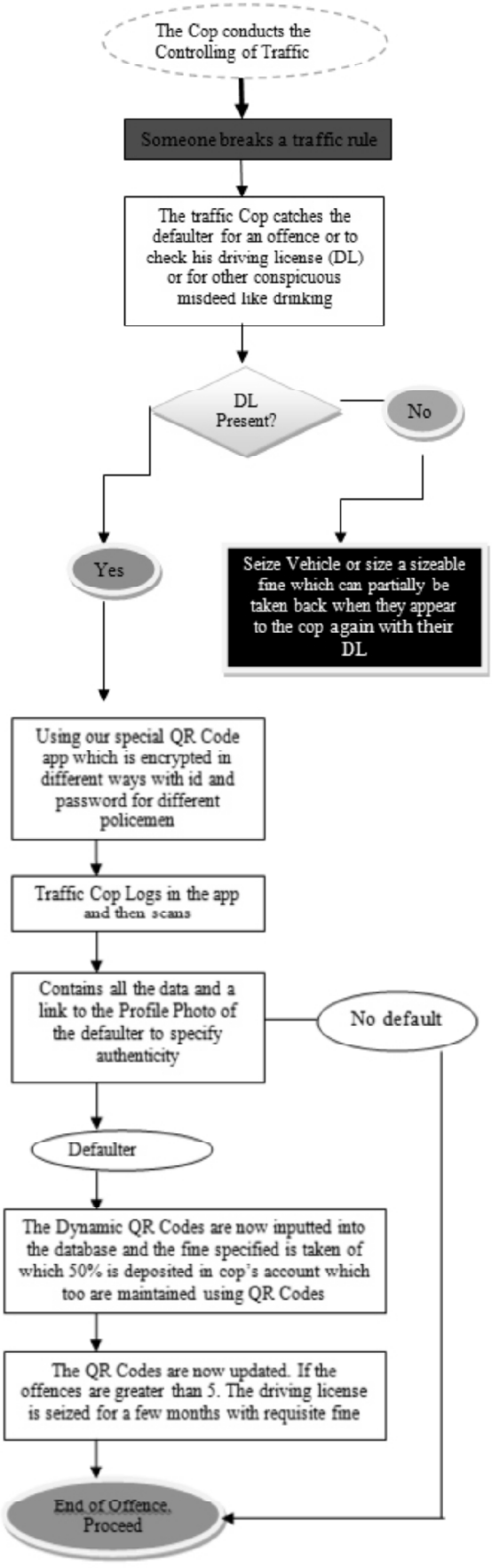


**Figure 1: Overview of Project workflow**

Phase VI – Report preparation. A final report (this one) was produced that documents the work products completed during Phases I – V of this project. The report contains conclusions and recommendations as to whether a prototype system should be developed and implemented[3].

## 5. DISCUSSION AND COMPARISON

QR Codes, barcodes and RFID (radio frequency identification) are all systems for conveying large amounts of data in a small format. They offer speed, labour savings and cost savings, among other benefits. But there are distinct differences between all 3 — and differences in the purposes they are best suited for.

### (A) QR codes

A recent trend among small businesses is the growing use of QR codes. QR codes (pictured below) are similar in one sense to bar codes, in that they contain information which can be read by a QR code reader. QR codes can be scanned and read by a camera-equipped smartphone when you've downloaded a scanner app, such as i-nigma for the iPhone. What this means is that the average person can now de-code (read) a QR code, without special equipment. Walking into a place of business, a QR code if seen on an item, scan it with our smartphone, and immediately have access to a lot of information electronically.

QR codes have been around for years. But in the last 12 months usage has skyrocketed among entrepreneurs as mobile usages has grown. QR Codes are well suited for marketing purposes, among other uses. For example, now it is becoming more common to receive business cards with QR Codes on them. That way, you get access to a lot more information than can fit on a small card. For instance, you might hand out business cards at an event containing a QR code that leads people to a Web page with a special offer for attendees. Or the QR Code on a business card might contain a V-card (digital business card) that you can save without having to manually input the card information.

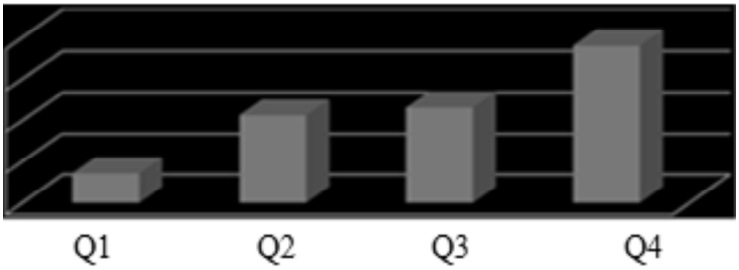


**Figure 2: The Number of QR codes Printed in the Top 100 Magazines (Jan-Dec 2011); Source Data from Nellymoser.com, 2011)**

The number of QR codes printed in the top 100 magazines had increased to 1899, which is an astounding 439 percent growth in the magazine industry alone ("QR Codes in Magazine", 2011).Or you might give out schwag such as a coffee mug, imprinted with a QR code where someone can find out more information about your company. It's not hard to generate a QR code. You can create one for free online. In fact, the Google URL shortener automatically creates one for a Web page each time a URL is shortened. The QR code image above is one I created using the Google URL shortener and it took me all of 2 seconds to create.QR Codes have infinite uses in small businesses, especially for marketing, now that everybody on the planet seems to walk around glued to a smartphone.

### (B) Barcodes

Barcodes[4] have been around for decades. They are versatile with a large variety of uses — especially in retail and manufacturing settings, and in transport and shipping. Barcodes not only are valuable at the point of sale, but also for managing inventory and raw materials internally, so that you know what you have in stock.

Barcodes have become common in shipping, to enable greater accuracy and speed in getting packages delivered. And barcodes are used to manage large filing systems, library books, and a host of other purposes where large numbers of items need to be tracked efficiently. Barcodes are relatively inexpensive, and help drive speed, efficiency and profitability.

### (C) RFID

RFID (radio frequency identification) has likewise been around for decades. However, RFID[5] tends to require more technological hand-holding. RFID involves applying RFID tags[6] to items or boxes or pallets. Tags vary greatly in size, shape and capabilities, but one example is shown is Figure 3. The tag with its small antenna emits a radio frequency signal that is picked up and read by a special wireless RFID reader, conveying information from the tag about the item it is affixed to. RFID is adaptable to many of the same uses that barcodes are good for. But RFID is especially useful in situations where vast quantities of goods must be moved or tracked, or where tracking of item-specific information is necessary. RFID has been mandated by some customers, such as Wal-Mart and the Department of Defense, to track the vast quantities of items they require in their supply chains and to supply much more detailed information. In such situations, RFID may be able to do it more quickly, effectively and efficiently than barcodes.

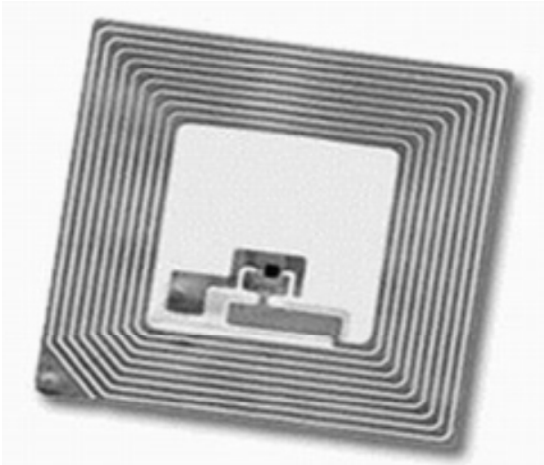

**Figure 3: RFID Tag**

## 6. ANALYSIS

It was only a few years ago when QR codes were among the “buzzwords” in the retail industry. Deemed as a way to digitize traditional media, QR codes were developed to allow retailers with both a physical and online presence to connect the two channels and drive traditional customers towards new opportunities. However, the direct impact of QR codes hasn’t been quite as intended and more innovative retailers are using different methods to connect the two channels. So is the QR code dead? Let’s take a look at the QR code and the future of the technology.

a) QR codes still require a certain level of technological sophistication – A major reason why QR codes have failed to accelerate their slow growth cycle is the amount of effort put into scanning a single QR code. The majority of phones do not come with built-in QR scanners, meaning consumers looking to scan a QR code must seek out and download an application. This process can be confusing and even then some tech-savvy consumers who understand the process simply do not want another app on their phone just for scanning QR codes. In fact, according to Exact Target, 28% of U.S. smartphone and tablet owners said that they don’t scan QR codes because they don’t have an app for scanning or simply don’t know how.

b) QR codes are used for information, an area with emerging competition – A recent study by Responsys showed that 65% of U.S. consumers who have scanned a QR code have done so to obtain additional information, more than any other reason. Through increases in the smartphone and tablet population over the past few years, the number of QR codes scanned has also increased. But as scans have increased, so have new and competitive ways for consumers to obtain information outside of QR codes. Below are a few examples of why QR Code can become obsolete.

c) Near-field communication (NFC) shown in Figure 4 continues to challenge QR usage – QR codes usage is growing, but not as fast as near-field communication (NFC). For traditional marketing, NFC allows information to be transmitted via radio communication between a phone with NFC capabilities and an information "tag", or an unpowered NFC chip (such as a marketing sign which has been "tagged"). This technology is currently built into some phones today and has been deemed as a replacement to the QR code for many years.

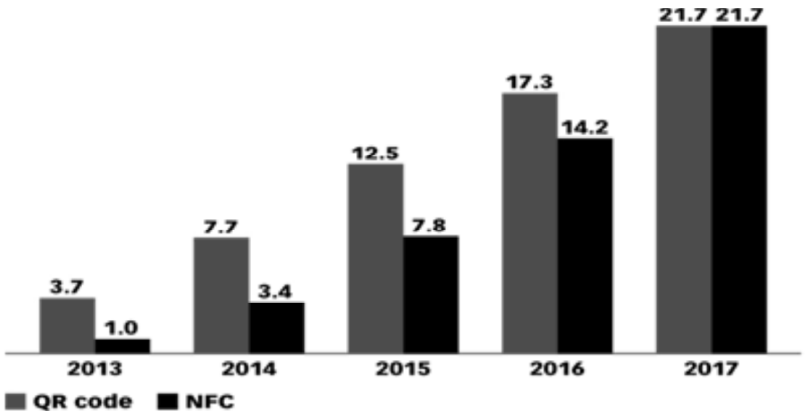


**Figure 4: NFC vs QR Code usage Comparison (Source:Yankee Group, "Mobile Marketing and Commerce Forecast, Dec 2013 as cited in company blog, March 7,2014)**

d) Image-recognition applications are becoming more common – One of the new areas of innovation within mobile retail technology is the ability for images to be recognized and then redirected to a new product page. For example, if a consumer takes a snapshot of a dress they like, they will immediately be redirected to a site which is selling that dress online. This technology is based around complex "learning algorithms" which have been prevalent in other industries but are making their way into retail for the first time.

e) Augmented reality is becoming more realistic for everyone – Although it may seem relatively new, augmented reality has actually existed for several years. As an example, augmented reality in the retail industry would include having consumers view your latest promotional poster with an app or tablet camera and have that poster turn into a video with no further action required. This is much more sophisticated and interactive than QR codes and could become even more powerful with emerging wearable products such as Google Glass.

f) Universal Product Codes (UPCs) may become the new QR codes – Some retailers have realized that UPC codes traditionally used to identify products can have an additional use. There are now apps available which can allow the unique UPCs found on every product or product tag to function in a similar way as a QR code without having to print a specific QR code. This is particularly useful for apparel items such as accessories which have small tags and can be more difficult for image recognition software to identify.

g) Some QR codes end up in places with no Wi-Fi or connectivity on your phone (airplane, subway station). This is an obvious fail.Apple and Android have yet to ship a phone with a QR reader pre-

loaded. This is — and will be — a deal breaker in most cases, given the fact that these two mobile platforms accounted for north of 87.6% of all smart phones sold worldwide in 2012.

The QR code isn't dead quite yet – in fact scans for QR codes have never been higher. However, while it once stood alone in bridging the gap between a physical and online presence, it now competes against newer and more innovative technology in a world where consumers are using their digital devices to acquire information more than ever before. It is likely that the utilization of QR codes will need to change for them to survive, with marketers likely opting to deploy newer and more accessible technology moving forward with their campaigns.

## 7. SIMULATION RESULTS

### (A) Tools

1. Any kind of smartphone with a android version capable of downloading a QR Code reader pre developed.
2. PHP used to make the QR Codes of different version so that we can input our own code
3. Special App made once the project is approved to detect QR Codes with relevant encryption for cops. However for elementary purposes we can use QR Code Reader for android and i-nigma for the i-phone
4. Dynamic QR Codes made using PHP
5. Our proposed driving license with QR Codes implemented on it.

### (B) Parameters

1) Security Module: The security of the QR Codes attributes to the fact that a varied link or data is stored in dynamic QR Codes. There are two different threat models for manipulating QR Codes. First, an attacker may invert any module, changing it either from black to white or the other way round. Second, a more restricted attacker can only change white modules to black and not vice versa.

2) Storage Module: 2D barcode (QR) can store up to 7,089 numbers. The additional storage capacity accommodates a variety of data beyond numbers.

   - Text
   - Hyperlink
   - Telephone number (Phone call)
   - SMS/MMS message
   - Email (Send message)
   - Contact entry (vCard or meCard)
   - Calendar entry (vCalendar)

   Storing a hyperlink presents a myriad of possibilities beyond just loading a web page — play a video, download a mobile app, check-in on Foursquare, update a Twitter status, "Like" a Facebook page, display map directions, and more.

3) Feasibility Study: QR Codes can be easily scanned using QR Code Reader in a ready available smartphone. Hence no special device is needed to attain data and it can be accessed using our normal smartphone. Thus QR Codes are more feasible compared to other data

4) Location Module: Once the barcode image is created, it can be printed on nearly any surface and location — newspapers, TV ads, billboards, temporary tattoos, product packaging, clothing labels, cake frosting, and more. This enables you to drive traffic, interaction, and conversion from anywhere.

2D barcodes excel at bringing non-digital media to life. Bear in mind the location must be easily scannable. Plastic frames and packaging can reflect light. Lighting can cast shadows, and hillsides and subways can kill Wi-Fi access. Consider all contextual factors that could impact the scanning experience.

## 8. CONCLUSION

RFID, barcodes and QR Codes all have their place for different purposes and under different circumstances. As with most technology, the cost to acquire and use it keeps coming down with each passing year. All 3 of these data management systems also have gotten much easier to implement in the past few years. So there's no excuse for not using technology to operate your business more efficiently and effectively — it's just a question of which technology is better for your needs and your budget. Nowadays, the mobile phone with camera embedded is getting more popular and mobile phone is getting more important and practical to recognition QR code symbol. The potential for QR Codes is limitless. The next generation of barcodes will hold even more information – so much that an Internet connection will not even be necessary. So now we might be able to see digital codes almost resembling physical reality.

## 9. PROTOTYPE SCREENSHOT

**Figure 5: Basic Intended Prototype QR Code of a driver**

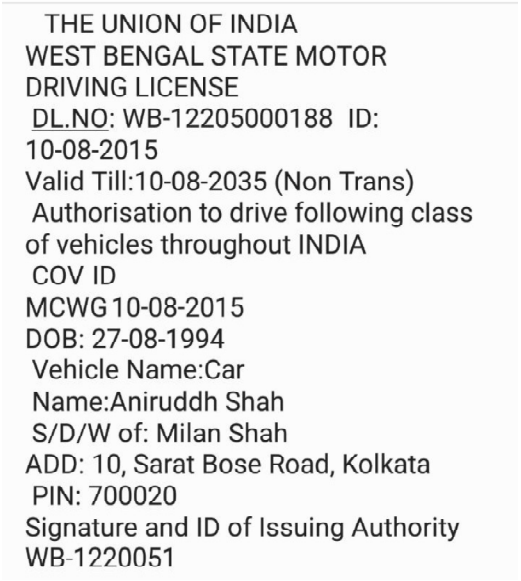


**Figure 6: Result of prototype in a QR Code Reader**

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