

QR Code Library on the Base of Software Reuse Approach

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Abstract: Software Reuse is an approach of reuse the previously old concepts or objects into a new environment or situation and represent something new one. This representation easily use for future reference. Software Reuse model was planned, analyzed, and categorized before creating a software so that any changes persist or need to embed any extra feature then that should be introduced easily and with less complexity by using prebuild assets i.e software system is developed such that it can be reused again. The Focus of this paper to analyze how to create QR code library by using new technology like android and by using software reuse approach. How software reuse approach work in QR code library. Certain approaches such as design pattern, Aspect Oriented Integration, Generator Reuse, Object Oriented Programming Structure and Software Reuse Libraries, framework integration etc are keeping in mind while developing software reuse System. This approach increasing productivity, saving time and reducing cost of software development and minimize schedule overruns.

Keywords: QR code, Software Reuse, Android Framework, Barcode.

1. INTRODUCTION

Software is the use of existing assets in some form within the software development process. Software assets are products and by-products of software development life cycle and include software components, test suites, design and documentation. Software Reuse Concept was first introduced in the 1968 at N.A.T.O conference by Doggle McIlroy. Basically this conference was introduced to have focus on Software Crisis; it is referred to as the problem of development of big and reliable software in a cost effective way. A seminal report was introduced in the conference; Mass Produced Components by Douglas McIlroy. Douglas McIlroy of Bell Laboratories proposed a software reuse library which can be used again and again for developing new software [1].

Reuse is most effective when it is practiced systematically. There are various types of software reuse like systematic reuse, Compositional reuse, generative reuse. Systematic reuse is a type of reuse when reuse of assets is planned with well defined processes and life cycles. Reuse can be achieved through different modes. Compositional reuse involves constructing new software products by assembling existing reusable assets, while generative reuse involve the use of application generator to build new applications from high level descriptions. Leveraging is another term related to software reuse that involve the modification of previously developed software for a new product. Leveraging can be advantageous over creating software from scratch in that it require less time and effort. Typically software reuse involve the reuse of portion of code (e.g library subroutine) by other programmers in the same organization. A reusable process can be any information in physical or electronic form which developer may need in the process of creating software. such resources can be reused in new situation. some classes more reusable for creating software library. Reuse occur when a

developer uses a resource developed by another software developer. software reuse may be ad hoc or opportunistic [2].

2. SOFTWARE REUSE APPROACHES

The gap between the rising demands of complex software systems and ability to deliver quality software in a timely and cost effective manner keeps increasing. This has resulted in a great pressure to improve productivity and efficiency of software development. Software reuse approaches are the best way to achieve promised potential of software reuse.

Many approaches has been taken into mind while creating software reuse system such as generator reuse, Aspect orientation approach, Cots Integration, Framework Integration, program Libraries, Design Patterns, application product lines, Service Oriented. The Design Pattern represents the generic abstractions that occur across applications and show abstract and concrete objects and interactions. There are various abstract and concrete classes that can be adapted to create application system.

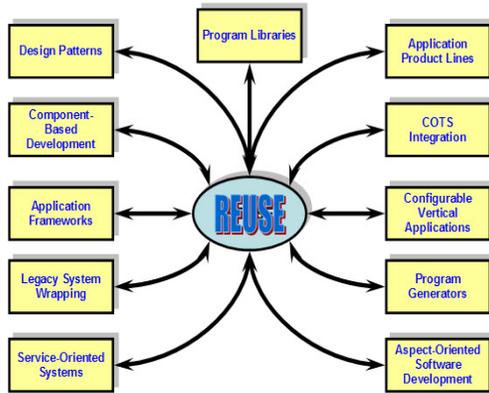


Fig 1- This diagram basically show the various approaches that could be used for creation of software and software components on the base of software reuse

3. QR CODE LIBRARY

A QR("quick response") code is a two dimensional bar code invented by the Japanese corporation Denso Wave.Information is decoded in both vertical and horizontal direction.In this paper we explore the structure and creation process of QR code.QR code is advancement of bar code technology.Any item you purchase these days has bar code on it,you have definitely seen these black stripes on items offered in retail store.The future of barcode is bright and exciting.The 2D barcode different from traditional barcode in its structure and properties because 2D barcode can hold more data than 1D barcode.So the manufacturer can put thousands of characters in a single 2D bar code.2D bar code using an image sensor to capture the image of barcode.QR code store huge amount of data that can be viewed anywhere,any time.QR code play an important role in education.QR code connect the user to the information quickly and easily.[3].

3.1 Structure Of QR Code

They have a matrix format.They can hold up-to 7,089 numeric characters and 4,296 alphanumeric character.They appear as a square grouping of black squares on a white background with three large square on the corner of the code.QR codes,barcodes are all systems for conveying large amount of data in a small format.QR code can contain a URL,Contact info,email address,SMS text message and even geolocation information.QR code are useful for promoting your work because they provide an easy way for public to learn more about your work.



Fig 2-Image of QR code

3.2 How QR Image Created

There are different fonts used for creating QR images.These fonts are used for creating data in the form of QR images.Before the research on fonts of QR code.I studied how barcode is created by using different fonts.QR code is extended version of Barcode.My main motive of research is how much barcode fonts reused in creating QR code code.QR code generator do the work of encoding the information.To read this information user need QR reader application to take a snapshot of the code with their device camera.This application return the decode text or web url.The QR code image Shape vary according to type or amount of data.if we encoding upto 15 alphnumeric character it does not require many pixels it look like image(a),while encoding upto 395 characters require more densely packed matrix it look like image (b).



(a)



(b)

4. PROBLEM FORMULATION

Software Reuse can lead to unbounded improvements in both development productivity and software quality.Reuse is about building software from components.The benefits will be more in case the component reused are bigger and more generalized.In this we formulate how much percentage software reuse concept used for creating QR code Library.Problem definition include various reasons that why we have chosen software reuse concept.I have research on the Library of QR code.No doubt QR code is an extended version of barcode.The fonts that are used for creating Bar code have reused for creating QR code.And I have creating QR code on android based operating system.We also discuss the similarities between QR code and Barcode.In this paper we conclude how much software reuse concept used in creating QR code.I studied how software Reuse concept increase the software productivity and how reuse reduce the software development time.And how it improve software system interoperability.It also reduce software development and maintenance cost.Reuse produces more standardized software.it provide a more powerful competitive advantage.

5. POPULARITY OF QR CODE

Mostly consumers today don't know what a QR code is-according to recent research-79% of consumers don't know what a QR code is,However 81% can identify a QR code.In 2012 most people would not know QR code from a barcode.Most are not even QR qrious.QR code have been spotted on everything from building to business cards , wine bottles to tide bottles and even as tattoos.In this we first research on which devices are most popular for scanning QR code

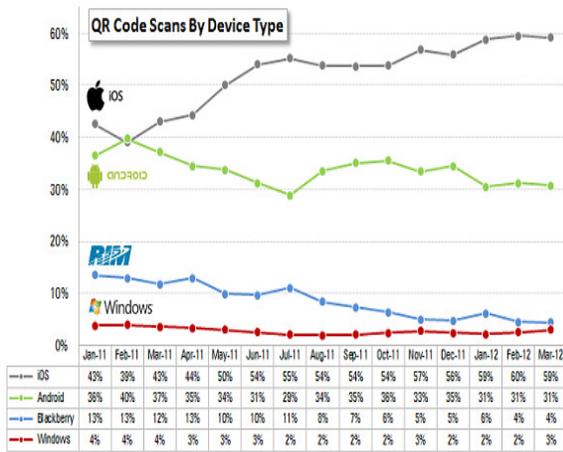


Fig 3-This Diagram show Popularity Of QR code

This Chart show iph are still most popular devices for scanning QR code.while android devices shown some narrow gap as compared to iph.The next graph show how many peoples are aware about QR code.There are many number of peoples aware about QR code.

The third graph how many countries use QR code.The foreign countries mostly use QR code.19% of American consumer have used a QR code.Of the 4 countries analyzed by the study,the US ranked first in QR code use, ahead of the UK(15%),Germany(14%) and France 12%,while on average 15 % of consumers across those countries report having used a QR code,the percentage rises to 27% among 18-34 years old.QR used as a marketing trend.

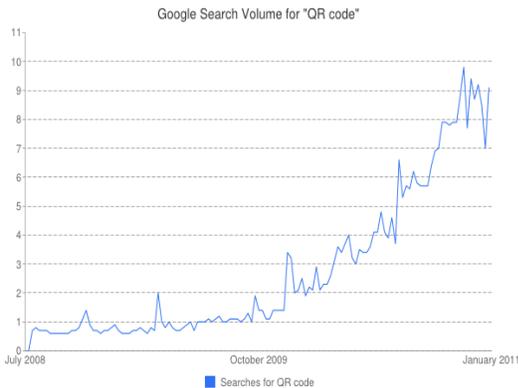


Fig 4-This Graph show how many peoples aware about QR code

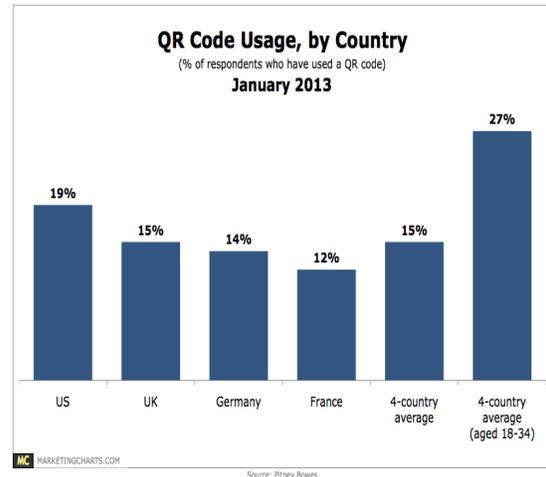


Fig 5-This Graph show how many countries use QR code

6. BARCODE Vs QR CODE

Barcode are seen on almost every product we purchase from grocery items to electronics and household items.Bar codes are one dimensional numeric codes that store upto 20 numeric characters.This allow merchants and suppliers to keep track of inventory both coming into stores and being sold.QR code are two dimensional codes storing data both horizontally or vertically.This allow QR code to hold upto 7,089 characters of data.

QR code Winner In term of data storage:-The data encoded can include numbers,alphanumeric characters symbols,text symbols such as kanji(Japanese language symbols) as well as control codes,because these codes are stored both horizontally and vertically.Infact QR codes can hold text messages,website address,contact information,phone numbers and more.In the bottle of QR code and barcode,QR code are the winner in term of data storage and increased functionality.

| Encoding mode | Maximum capacity |
|---------------|------------------|
| Numeric | 7089 digits |
| Alphanumeric | 4296 characters |
| Binary | 2953 |
| Kanji | 1817 |

Table-1 Data Storage Capacity

Data Restoration:-Occasionally QR codes and bar codes become damaged or they may get dirty.Barcode reader will not be able to scan a damaged or dirty code.QR code can be scanned upto 30% of code words in a QR code can be restored depending upon amount of damage.Finally QR code superior in recovering lost or damage data.

Expert in Scan Position and Speed:-Barcode must be scanned in the correct position.At your local grocery store,the shopkeeper takes the items you wish to purchase and positions the barcode over the scanner.if the shopkeeper does not position the barcode correctly,the item will not scan.But QR code can be scanned from any position.This is due to the three position detection patterns located in three corner of the

code. The reader will locate these three detection patterns and know how to correctly read the code. This feature speeds up the time needed to scan objects.

Structure Appended Feature: The data on a barcode cannot be divided up. A larger QR code can be divided into as many as 16 smaller squares. This feature allows larger QR code to be stretched out on an object. Thus, larger code printed onto a narrow area. QR code located on any object. QR code have flexibility. QR code more reliable.

More Versions and Size Of QR code As compared to Bar Code: QR standard specifies 40 different sizes of the QR code and maximum data capacity will also vary according to size. Bar code have 24 versions including 128 fonts. The UPC (universal product code) was the first barcode symbology widely adopted. UPC as the standard barcode for product marking.

QR different in shape and size than Barcode: Barcode are created by translating the supported characters that should be displayed into combination of narrow and wide bars which are combined into a barcode. To identify the start and end of a barcode special "guard" patterns are used to indicate to the scanner and also identify what type of symbology used.

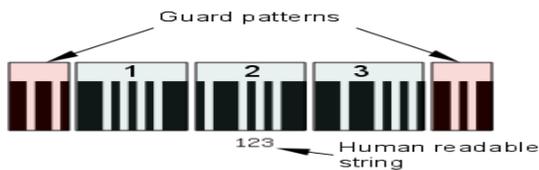


Fig-7

But the QR scanner scan the data from any direction. QR scanner decode the content within the QR code due to three specific squares that are placed in the corner of the symbol.

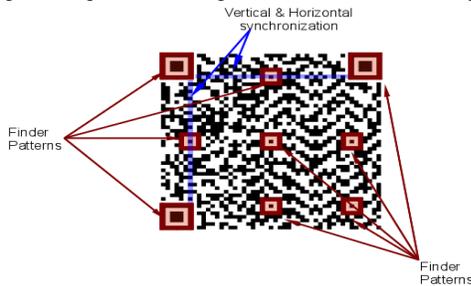


Fig-6

Finally we can say the bar code fully replaced by QR code in future. QR code are powerful because they are software. A software approach is portable, work on any device and work with any data.

7. DISADVANTAGES OF QR CODE:

Lack of Awareness: Not everyone is aware of QR codes. And not everyone take the picture of a matrix because not everyone own a camera phone and cell phones do not include a QR reader, the software must be downloaded and tested. QR code help the user to directly connect the user with the web site that does not properly display on cell phone. Since the implementation of QR code is relatively new concept.

Expensive Smartphone and apps required: User needs to have a smartphone in order to use one. Along with the smartphone they also need a QR code reader application. Not everyone in the world own a smart phone so QR code not available to everyone.

QR code not default provided: QR code reader are not preinstalled on most phones. It is installed by user.

8. EXPERIMENTAL SETUP:

In experimental setup, on the base of software reuse approach I have created a software reuse library for android operating system at application level which is written in java. During software development, the software programmer focuses on those reusable resources that easily adopt the new environment. My main motive in this paper to explain how we make new libraries by reuse pre-build libraries. Mobile learning is a major field of research in education. QR code is a very latest technology in mobile phones. QR code very famous day by day. The idea of creating QR code comes from bar code. There is some limitation of bar code because it does not hold much more data as compared to QR code. I do work on QR code. I have read many research papers on QR code. The implementation of QR code is relatively a new concept. QR code is extensively used in some Asian countries and is finding more and more usage to transfer medium sized information onto mobile phones where the QR codes are interrelated by first taking a photo of the barcode with the mobile and then running a QR decoding program on the cell phone.

9. CONCLUSION

The overall result and the conclusion for the software reuse is that, in today era software reuse plays a very important role for the developers while creating and developing any software or framework. Because whenever any software is developed, it is developed according to the future reference in mind, there may be some advancement or new features that may needs to add in software future, new versions for the software continue to be coming in the market or industry. Now for instance if the developers or organization does not keep in mind the software reuse they had create software with respect to the new features again and again which will result in the wastage of time, wastage of money and also wastage of resources. On the other hand if software reuse concept is keep in mind while developing software then it will save money, save time and resources because the software is designed such that it can meet the future requirements easily and properly with less time and money complexity. Simple examples are mobile platform versions, day to day new language versions, day to day new framework versions etc. Today people uses various software, with respect to time their advance versions are also in the market whether that software belongs to social networking, entertainment related, business related, sports related etc. Now what the developers do with respect to those new versions, do they use to develop it again? No they designed it such that they can use the components of the software again and make it customizable.

10. REFERENCES

- [1] Charles W. Krueger "Software Reuse" <http://www.cin.ufpe.br/~esa2/papers/abstracts/art12.htm>
- [2] Denso (2010b). About 2D Code. Retrieved June 21, 2010, from <http://www.densowave.com/qrcode/aboutqr-e.html>

- [3] Peter Kieseberg, Manuel Leithner, Martin Mulazzani, Lindsay Munroe, Sebastian Schrittwieser, Mayank Sinha, Edgar Weippl, "Qr Code Security" 2010
- [4] Thony, Retrieving Data" <http://www.thonky.com/qr-codetutorial/introduction/#general-overview-of-creating-a-qr-code>"
- [5] So, S. (2008). A Study on the Acceptance of MobilePhones for Teaching and Learning with a group of Preservice teachers in Hong Kong. Journal of Educational Technology
- [6] Johanes Sametinger "Software Engineering with Reuseable Components" Book publish on March 2007
- [7] ID Automation retrieving barcode library" <http://www.idautomation.com/java/font-encoder.html>
- [8] Thonky QR code retrieving data <http://www.thonky.com/qr-code-tutorial/introduction/>
- [9] JISC (2010). JIS X 0510:2004. Retrieved May 15, 2010, from <http://www.jisc.go.jp/app/pager?id=12766> (written in Japanese)
- [10] http://mpa.ub.uni-muenchen.de/41141/1/MPRA_paper_41141.pdf (Feb 2012).