

AUTHENTICATION SYSTEM USING

2D COLOR BARCODE

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ABSTRACT

The propose coming up with mechanism of 2D Color Barcode for mobile application. Color elements are used more for its aesthetic value than as a means to encrypt a lot of data. Additionally by exploiting the spectral diversity offered by the cyan, magenta, and yellow print colorant channels normally used for color printing and therefore the complementary red, green and blue channels, severally, used for capturing color images. Specifically, to use this spectral diversity to understand a three-fold increase within the data rate by encoding independent data within the C, M, and Y print colorant channels and decrypting the data from the complementary R, G, and B channels captured via a mobile camera. Here used interference cancellation algorithmic rule based on a physically-motivated mathematical model for the print and capture processes. Explain the implementation of online authentication system that the web service is very important. It provides the data details in developing security in online authentication system using mobile OTP with 2d Color Barcode. the security is an important issue for any online authentication application which will be implemented by various web technologies and gap between world and virtual world may be filled up. 2d Color Barcode is store OTP as password. Android mobile phone can use the application to scan 2d Color Barcode image which might be already send to the user email account by server. The user goes to online transaction in a website. This mechanism applied for 2DCBLogin (2D Color Barcode Login), one of the leading 2 factor authentication programs, which balances security with convenience successfully. The system combines the standard username and password with a time sensitive, one time password. In contrast to this advanced security, users could conveniently login by scanning a code with their smartphone. Though the scanning feature of the 2DCBLogin system is limited to smart phone owners, users can also login through the normal ID and password method. The 2DCBLogin system illustrates the modern development of 2 factor authentication that well increases the security of online transactions. Encourage more analysis cyber-security to foster consumer confidence and growth in online markets

Keywords- 2D Color Barcode, OTP, Interference Cancellation, Approval request, Authentication.

I. INTRODUCTION

In a world where have a tendency to be fast moving towards e-commerce and business is happening over internet, security is an area of major concern for all kinds of application because of nature of HTTP, which poses certain security pitfalls. Technology, language and API make for interesting discussions, but application security is a

topic which remains one of the most talked about. There has always race between Implementers and Hackers. Whenever start any project usually think about its functional necessities, target, segment, etc. There has always been a need to think seriously regarding Security needs as well. Similarly, undertake development and QA, the main thrust is on feature implementation and practical (Functional) testing. Security breach or breakdown of system due to security problems can directly and indirectly result in loss of new business opportunity, loss in existing business, loss of quality, losing competitive edge over the challenger, and all these ultimately result in monetary losses. One of the recent examples is the failure of online pre-ordering system of one of the world biggest telecom service provider. The online system has been down for few days because of security problems leaving a financial impact, and most importantly an impact on credibility. Now a days overcome all those problem about security 2DColor Barcode Application are used .This provide more security using authentication system , verification, validation, ASCII Conversion ,interference , encoding ,recognition and decoding . By using all those security aspect are developing most secure 2DColor Barcode application.

A. Why chosen 2D color barcode

As a Barcodes are capable of representing the data clearly and effectively which optical machine-readable representations of data. Barcodes are enable automated work processes while not human intervention, and are widely deployed because they are quick and correct, eliminate many errors and often save time and money.

Barcodes in broad has two dimensions. The first one referred to as one-dimensional (1D) barcodes; represent data by the width and spacing between parallel lines. The number of digital info stored in 1D barcodes is restricted and these bars are less error-free. Data rate can be simply increased by increasing the quantity of barcode digits or by laying out various (multiple) barcodes.

This approach has many negative effects, however, such as enlarged barcode areas, many complex reading operations, and increased printing prices. Again if one or bars in the code is lost whole barcode becomes unreadable. For this reason, the barcode technology has been deploying geometric patterns in two dimensions: such barcodes are stated to as bi-dimensional (2D) codes. In that 2D codes increase the data space available by storing information in two dimensions (2D), whereas 1D code contains data in one dimension only. Similar like in 2D color barcode they provide higher capacity of storage and also security. These says a lot of and a lot of applications need a way longer code to secret writing larger quantity of data tips just like the price, product name, manufacturer, practically, and expiration date of a product. Therefore the 2D barcodes were designed to hold considerably lot of data than its 1D barcode.

B. How it is work in (2D barcode) inr project

Barcodes are wide used from some years that perform the required role of accessing info. However, the normal one-dimensional bar codes have data storage density. A scanner, like a charge coupled device (CCD) scanner, is mostly utilized in industries to scan a 2D color barcode. The analysis of camera phones might modification the current standing. Resolution limits, Misrepresentation, out of focus blurring, and noise with illumination selection iatrogenic by the phone camera square measure the killers of direct use of most existing 2D color barcode for mobile phones.

In our application there are two way of process are done.

1) *Online based:* The use of electronic services is important issue in daily life and currently authentication crucial requirement. Hence security is provided by every system However the current service is based on normal OTP based. Here cannot be done system in a public is secure form. In order to overcome such a weaknesses and inconvenience of security card, the propose authentication system use two-dimensional color barcodes (2D color Barcode) instead of security card Two dimensional(2D) Barcode is simple, correct for requested system and automatic data collection method. In barcode system the data will be send quicker and secured, which will increase the speed of internet means increasing the user friendless. The propose authentication system for online authentication in which can provide greater security and convenience by using mobile OTP in 2D color barcode. The server generates an OTP pin in encoded form of 2D color barcode format and this Barcode can send to user via mail , then user use our mobile application to read the code. After that use to a mobile phone application can decode this OTP code and give the value to user. Then user enters the generated OTP code, to complete the transfer process In proposed system, when OTP code match with server generated code then system authenticate user.

2) *Offline based:* In this offline way of process have to use system in scanning form , in which system can scan a barcode and give the information to the user. For example shopping malls, whenever in big shopping malls there is a system like a prize in barcode format, customer do not know the real prize of particular item. So by using this application can scan the barcode and give the real prize to client.

II.LITERATURE SURVEY

Douglas Chai, over the past few years, 2D barcodes have gained popularity as one of the key pervasive technologies for mobile applications on smartphones. They will be used as shortcuts to uniform resource locator links; a way to store contact information for simple transfer; admission tickets or boarding passes; and tokens for retrieving digital data, like public transportation timetables or recent produce production information, either directly from the barcode itself or through a networked database server.1 Most mobile applications use black and-white 2D barcodes (such as QR codes or Data Matrix) that carry only a restricted amount of encoded data.[6].

Akash Bhalerao, online banking is one of the foremost vital tasks performed by web user. On-line banking is most crucial system within which the net user uses daily life. The user list of the online banking system has been increased in half-moon of 2009, the largely user who used the service per day was 26,410,000. The amount of dealings went on the far side 20 trillion 950 million. Most of the standard banks are providing new offer in online banking system with peace of mind[1].

Vijaya Lakshmi, a 2D color barcode can hold much more information in comparison to a binary barcode. 2D barcode is gaining popularity for mobile applications. When used together with camera phones, the 2D barcode can offer a link between the digital and the real world. Barcodes hence, serve as an more and more vital connection between physical and electronic portions, or versions, of documents itself [2].

Aryachandran S., 2D barcodes improve the working of single dimensional barcode by providing higher rate. Here the data is encoded in both height and breadth of barcode. Nearly 30 different types of barcodes are known. These some are normally used like data matrix code, shot code, Visual code etc. The 2D barcodes can be wide divided into two categories: Index-based barcodes and database two dimensional (2D) Barcodes. The

type index-based 2D barcodes take under consideration the reading limitations of those inbuilt cameras. Currently allow us to move to important and popular 2D barcodes [3].

Jonathan M. McCune, here now discusses related work in using camera-equipped mobile phones to recognize barcodes. Many projects exist that request to permit camera-equipped mobile phones to move with physical objects through the utilization of 2D barcodes. Rohs and Gfeller developed their own 2D code explicitly to be used with mobile phones, action their ability to be scan from electronic screens and printed paper. Researchers functioning on the CoolTown project at H.P. Labs proposed tagging electronics around the house with barcodes to be scan by camera phones or PDAs so further data concerning the tagged device could be simply retrieved [4].

Hiroko Kato, camera phones have permeated into our everyday lives, the 2D barcode has attracted researchers and developers as a cost-effective present computing tool. A variety of 2D barcodes and their applications are developed. Nevertheless, they need not been wide used. This can be very true when developing a 2D barcode for mobile devices [5].

III. EXISTING SYSTEM

A barcode is an device (machine)-readable illustration of knowledge about the item to that it's connected. It's used for tagging objects with items and trailing information for automating sales and inventory trailing tasks. Originally barcodes represented data by varied the widths and spacing of parallel lines, noted as linear or one-dimensional (1D). When they turned into rectangles, dots, hexagons and completely different geometric patterns in two-dimensions (2D). Common samples of 2-D barcodes include QR (Quick Response) code ,Aztec code, data matrix, HCCB etc. These are used for the aim of facilitating access to on-line info regarding product and services published in print media. The URLs (Universal Resource Locator) for the online data will even be embedded within the print and upon decryption, allow the users to access the knowledge. A color barcode framework for mobile applications by exploiting the spectral diversity afforded by the C,M, and Y print colorant channels typically used for color printing and also the complementary red , green , and blue channels, severally, used for capturing color pictures. Specifically, have a tendency to use this spectral diversity to understand a three-fold increase inside the speed by encoding independent data among the C, M, and Y print colorant channels and decoding the knowledge (data) from the complementary R, G, and B channels captured via a mobile camera. To mitigate the impact of cross channel interference among the print colorant and capture color channels, have a tendency to develop an algorithmic rule for interference cancellation supported a physically-motivated Mathematical model for the print and capture processes.

C. Interference Cancellation Algorithm:

This Interference cancellation allows optimizing the information storage, addressing the requirement for prime density 2d barcodes. Different from totally different color 2d barcode, a framework planned throughout this paper encodes info square measure as freelance barcodes in C M Y printing channels and doesn't cipher knowledge at intervals the color values of individual blocks. this method not alone permits a physical model-based interference approach for rising the cryptography, but jointly permits re-use of style of optimizations and enhancements developed for monochrome barcodes. Thus, as associate example, adaptive thresholding ways in which agitate variations at intervals the illumination level and error correction secret writing schemes developed

for correcting typical errors encountered in barcode applications unit directly applicable to individual colorant channels among our planned framework. additionally, the planned framework's approach of secret writing severally at intervals the colorant layers to boot provides higher strength to inter-colorant misregistration in printing compared with typical approach so cryptography in color, which can be terribly sensitive to misregistration. Investigational results demonstrate that the planned framework is effective to boot as durable to cryptography errors as a result of cross channel interference and thus the following barcodes provide rattling performance. Two methods of interference cancellation algorithm is:

D. One Time Password:

The one time password (OTP) may be a password that's valid for only one time. one time password avoid a short coming back that are related to traditional or static password, the foremost important shortcoming being self-addressed by OTP. The weakness of one time password system is to generate new password for every transaction and is predicated on 2 important factors: (1) a PIN to unlock the OTP generator, (2) the OTP smart card itself. Within the server aspect, an authentication server can check the validity of password by sharing a similar algorithm and keys. There is several software or devices can be used to generate the One Time Password, for example mobile phones. The authentication process starts by the users in the form of enter his user name. The OTP is send to user by SMS. Then receiving SMS by user and kind one time password in browser. The AS cross check whether OTP is correct or not and redirects the browser back to server supplier and user log in. one time password has carried greater benefits as for PKI which isn't needed by deployment drivers, smart card reader, PC s/w. OTP is simply provided for identification and authentication, whereas PKI provides addition of encoding and signature. The one time password is being a password based on authentication is vulnerable to man within the middle attack in phishing scams.

IV. PROPOSED SYSTEM

This system is use for any authentication system also as for scanning barcode i.e this system as work as two way process.

1) *The first way of process is online based:*

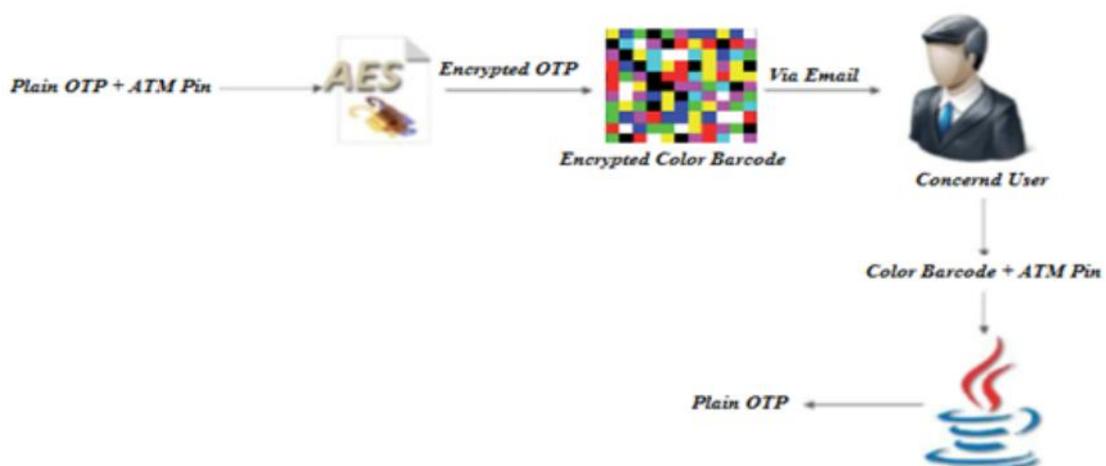


Figure 1: Online Process of System

For example, the utilization of electronic banking services is very important issue in everyday life and presently online banking crucial requirement. Therefore security is provided by every bank but this service is based on card system, however this system isn't user suitable in a very modern age thus online banking is most popular situation in current time. If there is emergency scenario to do online banking, the online banking can't be done public it must secure. So as to overcome such a weaknesses and inconvenience of security card, our propose authentication system use two-dimensional color barcodes (2D color Barcode) rather than security card. Two dimensional Barcode is simple, correct for requested system and automatic data collection technique. In barcode system the data will be sending quicker and secured that may increase the speed of internet means that increasing the user friendless. In our system have a tendency to propose authentication system for online banking which may offer greater security and convenience by mobile OTP with the 2d color barcode one among the 2d barcode adopted by current international and national standard. The bank generates the 2d color barcode using the users entered transfer information's, the customer then use mobile to scan the code and send via mail id. Then our mobile application scans the barcode method. In proposed system registered user have authority for requesting the OTP, the register user can deliver the suitable OTP with the help of 2d Color Barcode, and also the OTP are encrypted into the 2d Color Barcode by encoding rule .The user had to register his /her mobile IMEI no to Bank. The bank server can send the encrypted OTP to the register IMEI number. The register IMEI number mobile should be a smart phone and phone Operating System (OS) should be android based mostly. When 2D Color Barcode send from server is decrypted by using the 2D Color Barcode reader on user phone. The 2D Color Barcode has time interval of 1 minute for decoding of 2d Color Barcode and fetching acceptable OTP to the user.

2) *Offline system:* Offline system used for mall application in that here system can scan 2D barcode present in print format and give the proper value give to the client after scanning this barcode.

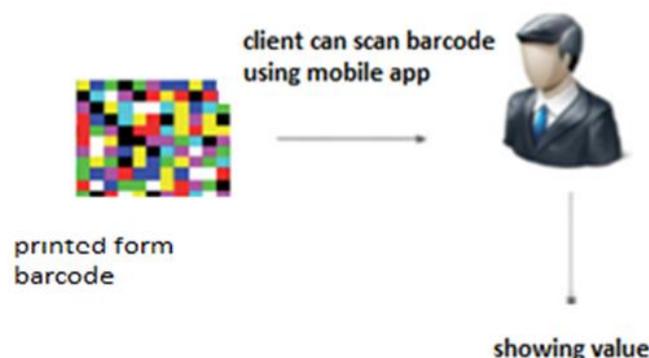


Figure 2: Offline Process of System

Proposed System needs determine what criteria a system or changed system must meet. Requirements Analysis and Definition is that the initial stage within the systems engineering and software development method. This stage breaks down functional and non-functional needs to a basic design view to produce a transparent system

development process framework. A thorough requirement analysis process involves numerous entities, as well as business, stakeholders and technology requirements.

E. Algorithm

1) Algorithm for developing 2D Color Barcode:

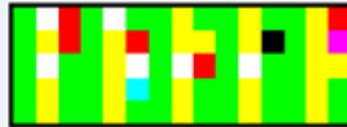


Figure 3: 2D Color Barcode

Following Steps are used for develop 2D color barcode:

- a) Create String of information ie. (1LCDINTEX500015.5) (Sr No., ProductType, Make, Price, Size)
- b) Convert this string to Binary Stream
- c) Generate Block of 3 Bits
- d) Assign color with respect to block bits
- e) Arrange Block in Tabular form shown in Image attached.

2) *Decoding Algorithm:* Once here tend to find all the finder pattern's components and perform the desired corrections, successive step is to decrypt the 2D barcode. To maximize information capability within a given house, the info space of our color 2D barcode doesn't embody format info like the amount of data cells. Thus, before the 2D barcode reading, here tend to should reckon the number of information cells. This decoding process takes the subsequent steps.

- a) *Calculating the amount of knowledge cell:* The size of the checker borders' or temporal arrangement pattern's black-and-white cells correspond to the dimensions of knowledge cells, so here can calculate cell size by measurement black-and-white cells of each the vertical and horizontal checker borders. Note that the color reference cells area unit read as "white" as a result of here're victimization the binarized image for these computations. Here additionally use the temporal arrangement patterns to calculate the center of every cell and modify it once the formula detects image distortion or changes in cell pitch.
- b) *Retrieving color values:* For this step, the algorithm applies a color-value sampling operation to the color image, starting by retrieving every color's price from the corresponding color reference cell.
- c) *Reading the values:* Supported the values of the color reference cells obtained in the previous step, the rule will detect information cell color. Then, it decodes the two dimensional (2D) barcode and retrieves the encoded data, just by remapping every cell's color to its individual information. Associate in nursing algorithmic flow diagram between our barcode recognition and detection algorithms.
- 3) *Finder Pattern Recognition:* Because here have to design our example 2D barcode to be used with smartphones, here developed the popularity recognition algorithmic program for the kinds of pictures such phones can capture. Once the phone captures an image, the algorithmic program locates the finder pattern via the subsequent steps.

- a) *Thresholding & binarizing the captured image:* Thresholding converts the reconstructed coloured image to a binarized image (that is, a black-and-white one), that facilitates the symbol's detection and correction. This method removes the impact of color, as well as the colors within the reference cells, effort simply the black-and-white check boarders. Previous work conducted thresholding in 2 completely different ways: employing a changed adaptive thresholding method 2, 3 and using Associate in nursing empirical thresholding worth obtained from experiments.
- b) *Finding the L-shaped guide bar:* The ratio of the longest bar to the second longest of the L-shaped guide bar is fastened at 2:1, and also the size of the tiniest bar of the L-shaped guide bar is equivalent to two information cells. Once the rule finds a most continuous region of binarized "black" cells, it calculates the co-ordinates of the four corners and uses them to live the bar sizes. Each bar's relative size and also the four corners coordinates change the calculation of the L-shaped guide bar's orientation.
- c) *Correcting the image orientation:* An angle's tangent is that the quantitative relation of the alternative side's length to the adjacent side's length. The algorithmic rule will get the lengths of the alternative facet h and therefore the adjacent facet w via the coordinates of each ends of the longest bar. Therefore here will calculate the orientation angle Q between the image's x-axis and therefore the base of the longest bar as $Q = \arctan(h/w)$. Correcting for Q can correct the captured image's orientation error.
- d) *Correcting image distortion:* Projective mapping (also referred to as perspective transformation⁴) may be a quadrilaterals to-quadrilaterals mapping that may be performed once the rule locates the four corresponding points.

V. SYSTEM OVERVIEW

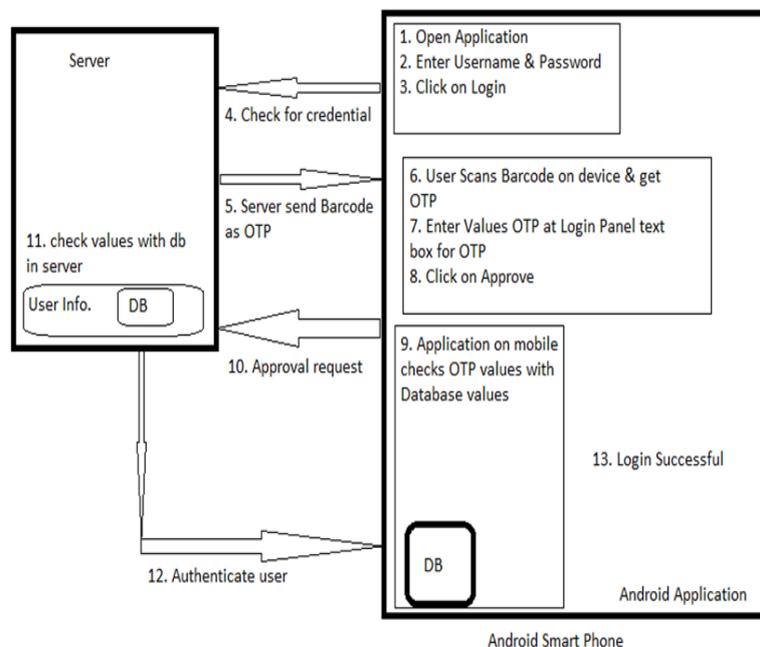


Figure 4: Working of System

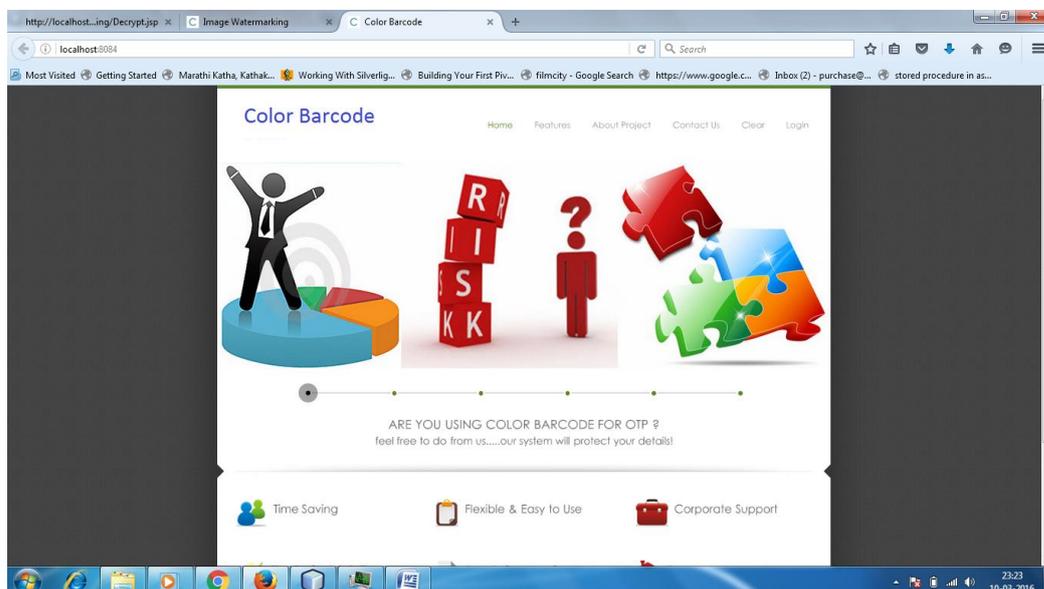
Following steps are working of system:

- 4) *Open Application:* At a starting stage open the application for registration and further processing.
- 5) *Enter the Username and password:* After opening the application here enter the username and password for logging purpose.
- 6) *Click on Login:* After filling information here click on login.
- 7) *Check for credential:* Check the process are in correct form or not.
- 8) *Server send Barcode:* After that server generate automatic barcode with data send via mail id to user using OTP method.
- 9) *Users scan barcode on device & get OTP:* User scan barcode using system for authentication process.
- 10) *Enter the values at login panel text box on Approve:* After a scanning a particular barcode here get secure code for authentication purpose these values are insert in identification box for authentication.
- 11) *Click on approval:* For users are correct or not here check this process by approval.
- 12) *Application on mobile checks OTP values with database values:* When user sending secure code sending via mail these secure code are matched with server generated code.
- 13) *Approval request:* After a scanning particular barcode user send approval request to server for verifying process.
- 14) *Check values with db server:* If scan code are matched with our server generated code then authentication process are done means here authenticate our user. Means approval user or client.
- 15) *Authenticate user:* When server generated code are matched with user sending code and send an approval request to server then here authenticate our user.
- 16) *Login successful:* After completing all process here authenticate our user then user login process are successfully done.

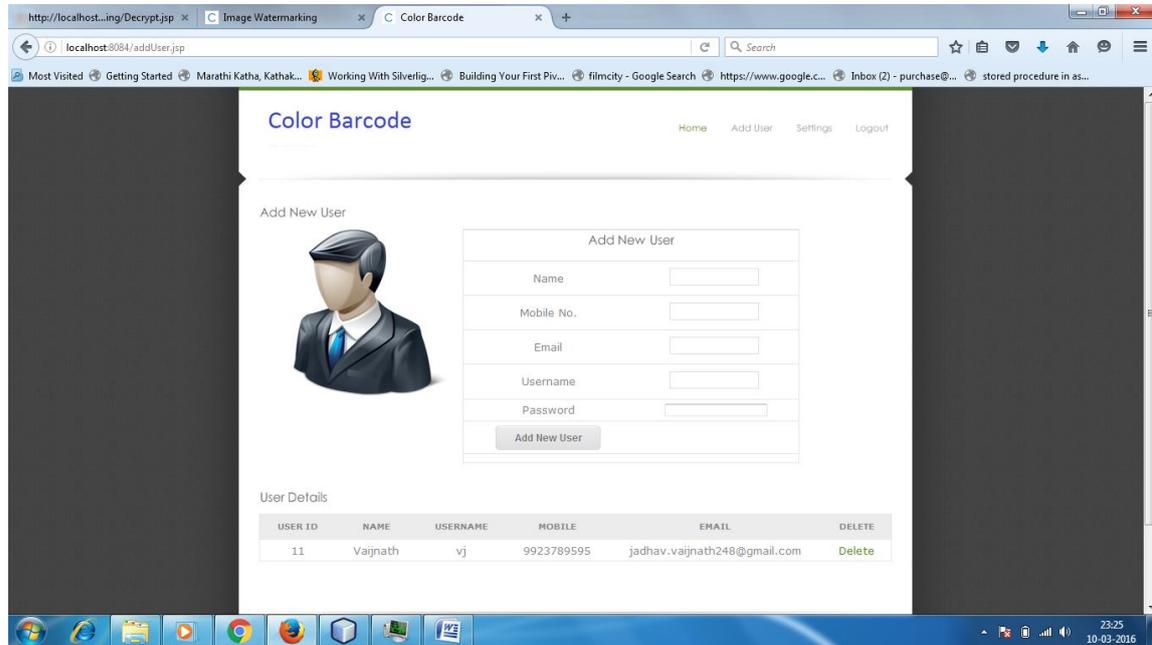
VI. EXPERIMENTAL RESULTS

F. Snapshot:

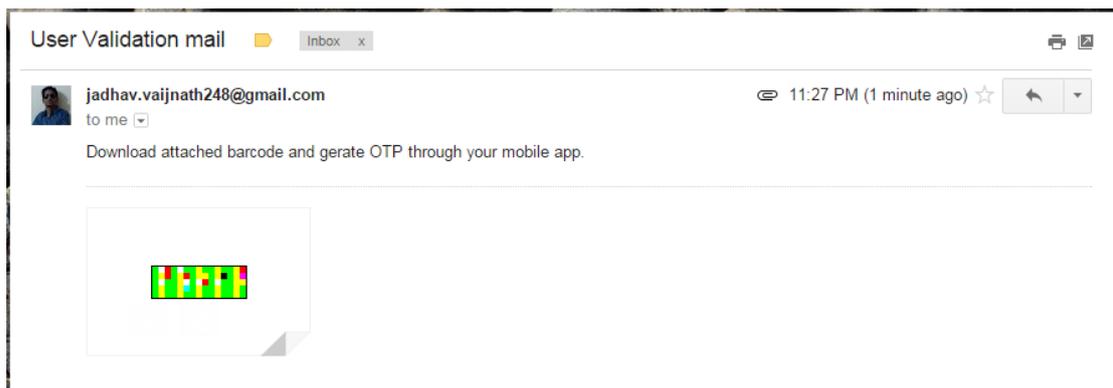
- 1) It is the homepage of system as well as where user account is being create and user can login as admin. It shows various features such as information about project, Contact details, user login and admin login.



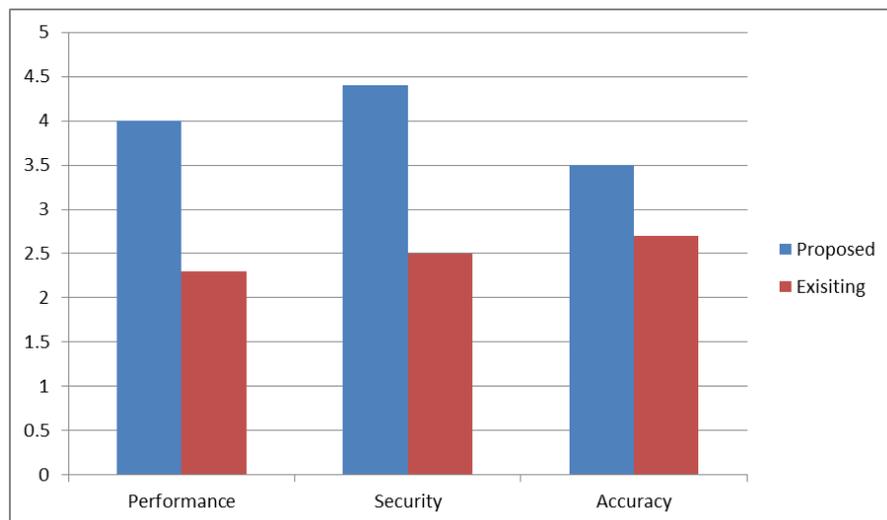
2) Here in these user can create new user account for that it requires user name,password,mobile number. This user account is used in android application which scans barcode. It is also required for providing barcode to the user.



3) It can show the server can send the barcode to user email id. These barcode is use in application to decode the barcode for extracting information from that barcode.



4) *Bar-Chart:*



Here is comparison between existing system or propose system. Which shows that the 2D Color Barcode System gives higher performance in security, accuracy than the existing system.

VII. CONCLUSION

The framework proposed provides an effective technique for extending monochrome barcodes to color barcode. Here color code buildings provide three times the data rates of their monochrome counterparts, exploiting the spectral diversity provided by color printing and capture systems together with model-based interference cancellation that mitigates inter-channel coupling given by the physical characteristics of the devices. Although, bit error rates and so info capabilities vary across the three ensuing channels, the error rates are in ranges that are without delay handled by the error correction coding selections available for monochrome barcodes.

As info technologies like smart mobiles phones develop, the threat of hacking grows in conjunction. a lot of specifically, online account verification is a growing hot issue due to many well publicized hacking incidents of enormous Korean firms. Here discussed account authentication strategies and also the connected hardware as well as software. Out-dated and unsecure strategies of authentication include the static one issue ID and password. In contrast, modern strategies involve dynamic elements such OTP (One Time Password) systems that are normally employed in the market. Though dynamic OTP systems offer much more security than one factor authentication, the complexity renders it a problem to use. For example, a user has to install the application and type the OTP key for each verification. Nowadays people need an authentication technique with both security and as easy use. to deal with this demand, here suggest the 2DCBLogin system. The distinctive aspect of the 2DCBLogin system is that it permits automatic login with the help of the scanning of a 2D color code by a smart phone. Inside the color Barcode developed by the secure web site is an OTP key. By scanning the code, the smart phone stores the 2d code and transmits the mobile number, IP address and also the OTP Key to the server system. Upon verification of this info, the server automatically logs the user in. Thus, the 2DCBLogin system provides simple of use also as strong security. even if the 2DCBLogin technique requires a smart mobile phone, the market applications. Encourage any analysis into the development of user verification technologies within net security systems, particularly since online security systems play a major role within the growth of online markets.

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REFERENCES

- [1] Roshan J.Varma,Shweta U.Pawar,Jaydeepkumar V.Girase, Namrata S.Gaidhani,"A Survey on Authentication System using 2D Color Barcode".
- [2] Akash M.Bhalerao, Abhijeet P.Pandhare, Akash H.Bhogade, Amit C.Mane," Secure Banking System Using Android application".
- [3] Soma. V.Vijaya Lakshmi. P," Per-Colorant-Channel High Capacity Color Barcodes: An Interference Cancellation Framework".
- [4] Aryachandran S, Jyothi R L, "Secure Color QR Codes".
- [5] Jonathan M. McCune, Adrian Perrig, Michael K.Reiter," Seeing-Is-Believing: Using Camera Phones For Human-Verifiable Authentication".
- [6] H. Kato, Keng T. Tan, and D. Chai, "Novel colour selection scheme for 2D barcode".
- [7] Keng T. Tan Douglas Chai, Hiroko Kato, and Siong Khai Ong, "Designing a Color Barcode for Mobile Applications".
- [8] Soonduck Yoo, Seung-jung Shin and Dae-hyun Ryu, "An Innovative Two Factor Authentication Method: The QRLogin System".
- [9] O Bulan, H. Blasinski, and G. Sharma, "Color QR codes: Increased capacity via per- channel data encoding and interference cancellation".
- [10] O. Bulan and G. Sharma, "High capacity color barcodes: Per channel data encoding via orientation modulation in elliptical dot arrays".
- [11] S. J. Simske, J. S. Aronoff, and M. Sturgill, "Revenge of the physical mobile color barcode solutions to security challenges".
- [12] B. Oztan and G. Sharma, "Per-separation clustered-dot color halftone watermarks: Separation estimation based on spatial frequency content".
- [13] G. Sharma and H. J. Trussell, "Digital color imaging".
- [14] H. Bagherinia and R. Manduchi, "A theory of color barcodes".