Image Extraction from QR Code for attendance with multiple links attached.

A COURSE PROJECT REPORT

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BONAFIDE CERTIFICATE

Certified that this mini project report "**Image Extraction from QR Code for attendance with multiple links attached.**" is the bonafide work of **Joel Sunny (RA2011033010014), Parth Langalia (RA2011033010033), Aryan Shah (RA2011033010007) and Ali Shahwar (RA2011033010024)** who carried out the project work under my supervision.

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ABSTRACT

The attendance system uses QR codes and a server and proposes that: the instructor can do nothing extra beyond presenting the course slides to the students.
Hence, students may register their presence at any time they wish during the class while keeping in mind that registration times are recorded. They believe that the time instructors take to attend may be viewed as a waste of lecture time.

Their system relies on the ability of students to perform that attendance tracking activity on their own devices. However, relying on students' devices and remembering to use the corresponding application can be problematic in specific settings.
If attendance tracking is important, we believe there is a strong reliance on the instructor's involvement. Moreover, in classes using experiential learning where learning is through reflection on doing, the one-on-one interaction between student and instructor during class permits attendance taking to be done at that time, as part of the interaction, rather than before or after class where no real interaction is done.

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1. INTRODUCTION

1.1 Scenario Description

Students experiencing difficulty with their studies don't often identify themselves as students needing support. One indicator of need is a student's grades.Another indicator is attendance in class. In this paper, we describe how we used QR-Codes to help track class attendance. While our existing online card-swiping attendance tracking system was suitable for small class sizes, QR- Codes for attendance tracking proved suitable for larger classes.

Taking attendance using paper and pen was one approach we could have used, but we knew it was slow and prone to errors. In addition, the paper method required a data entry phase to generate reports, which also suffered from similar problems.

Therefore, using pen and paper was ruled out from the beginning.Our main goal was to provide a fast and efficient attendance tracking system.In addition, the system must work in any and all classrooms at SRM University, including its electronic classrooms – those with computers and projectors – and those with no computers.

A further goal was to provide a system that requires minimum hardware and can be maintained at minimum cost. Our new goal is to break the maximum 50-student class size.

To meet the goals, we had the following objectives: Use easily found, inexpensive hardware for the system.Make use of mobile devices to help with the attendance tracking process but do not require using student-owned mobile devices.Use open-source software to minimize development and maintenance costs.

Installation should be fast and simple.Attendance reports should give end users the greatest flexibility for manipulating the collected attendance data.Support both Mac and PC platforms and Android and iOS mobile devices

2. LITERATURE SURVEY

During the past decades, the development of computer performance, availability of storage media, advancement of multimedia technologies, and the development of IoT resulted in large multimedia data. Image and video are considered the most consuming in terms of storage space; however, they contain much useful information. Decades ago, databases were comparatively small in size. The annotation was performed manually using keywords. Conversely, nowadays, databases have become enormous in size, structure, and information.

CBVIR system aims to automate the management, video indexing, and retrieval, which are performed based on the video's spatiotemporal, visual, and semantic contents. With the rapid development of high-tech image acquisition equipment, advanced image acquisition equipment provides effective means and evidence for all kinds of criminal investigation cases.

Our proposed system will be developed to achieve steganographic mechanisms by hiding the QR image(consisting of user data) in the user's photograph (carrier image) such that the QR image will be invisible to the naked eye. The entire system will mainly consist of a QR code generator for generating the QR code image consisting of arbitrary user information, and the CNN network will mainly consist of three sections which are the preparation network, hiding network, and reveal network.

All these networks will collectively form an end-to-end system for encoding and decoding the image.QR Codes were created by the Toyota subsidiary Denso Wave in 1994 and was initially used for tracking inventory in vehicle parts manufacturing. The idea behind the development of the QR code is the limitation of the barcode information capacity (can only hold 20 alphanumeric characters).

While they are developed for tracking parts in vehicle manufacturing, QR codes are now used in many other fields, from commercial tracking to entertainment, in-store product labeling, and in those applications that are aimed at smartphone users. Users may open the URL; receive a text after scanning the QR codes. Using QR code-generating sites or apps, users can generate and print their own QR codes for others to scan and use.

QR Code employs error correction to generate a series of error correction codewords which are added to the data codeword sequence and enable symbols to be read even if it is dirty or damaged. The QR code achieves powerful error-correction capability using Reed-Solomon codes, a widely used mathematical error-correction method. Four error correction levels are available, higher level has a high recovery capability. QR Codes are used for checking attendance rather than taking attendance. With this approach, instructors track attendance using Excel spreadsheets that are forwarded for processing and entry into a database by an administrator. Instructors post QR codes on class doors or select points where students can scan them using their phones to review their absentee rate. The system's benefits are that it eliminates the need for a notice board identifying students' absentee rates and helps keep student data private.

Focused in the conference domain, where check-ins and session tracking are important, it uses a combination of QR codes that each attendee has, typically on their conference badge, and conference support staff having iOS and Android devices running their custom application to scan and track attendees.

3. REQUIREMENTS

3.1 Requirement Analysis

From the given scenario, we draw the following requirements:

1. The QR codes generated for each student can be displayed using a smartphone or printed if the student does not have a smartphone.
2. When students attend classes, the code will be scanned by lecturers using mobile devices such as smartphones and tablets.
3. After submitting the registration form by the student. The required data will be stored on the cloud and generate QR Code.
4. One creates a user id to login into a system manager.
5. Whenever QR Code gets scanned by the system, the system accesses all the data from QR Code and shows it on display.

We need to configure a network design keeping the following requirements in mind.

3.2 Hardware Requirement

The proposed model has been developed using python language with symmetrical and asymmetrical cryptography standards for database encryption/hashing and network infrastructure, and it has been tested as a prototype where promising results are observed regarding the efficiency, speed and security requirements for today's on-line financial services and similar e-commerce systems. The model generates a QR Code that can be used by several clients and can mostly be used for marketing purposes as an individual or an organization.

4. IMPLEMENTATION

1. 

CLIENT SERVER CHAT MODEL
for multiple clients

SERVER

```
import socket
import os
from _thread import *
ServerSideSocket = socket.socket()
host = '127.0.0.1'
port = 2004
ThreadCount = 0
try:
    ServerSideSocket.bind((host, port))
except socket.error as e:
    print(str(e))
print('Socket is listening..')
ServerSideSocket.listen(5)
def multi_threaded_client(connection):
    connection.send(str.encode('Server is working:'))
    while True:
        data = connection.recv(2048)
        response = 'Server message: ' + data.decode('utf-8')
        if not data:
            break
        connection.sendall(str.encode(response))
    connection.close()
while True:
    Client, address = ServerSideSocket.accept()
    print('Connected to: ' + address[0] + ':' + str(address[1]))
    start_new_thread(multi_threaded_client, (Client, ))
    ThreadCount += 1
    print('Thread Number: ' + str(ThreadCount))
ServerSideSocket.close()
```

CLIENTS

```
[2]  pip install pyzbar
     ✓ 1.7s

...  Requirement already satisfied: pyzbar in c:\users\hp\appdata\local\programs\python\python37\lib\site
     Note: you may need to restart the kernel to use updated packages.

     WARNING: You are using pip version 20.1.1; however, version 22.3.1 is available.
     You should consider upgrading via the 'c:\Users\HP\AppData\Local\Programs\Python\Python37\python.exe
```

```
[3]  pip install pillow
     ✓ 0.8s

...  Requirement already satisfied: pillow in c:\users\hp\appdata\local\programs\python\python37\lib\site
     Note: you may need to restart the kernel to use updated packages.

     WARNING: You are using pip version 20.1.1; however, version 22.3.1 is available.
     You should consider upgrading via the 'c:\Users\HP\AppData\Local\Programs\Python\Python37\python.exe
```

```
from pyzbar.pyzbar import decode
from PIL import Image
decocdeQR = decode(Image.open('my_github.png'))
text = (decocdeQR[0].data.decode('ascii'))

import socket
ClientMultiSocket = socket.socket()
host = '127.0.0.1'
port = 2004
print('Waiting for connection response')
try:
    ClientMultiSocket.connect((host, port))
except socket.error as e:
    print(str(e))
res = ClientMultiSocket.recv(1024)
while True:
    Input = input(text)
    ClientMultiSocket.send(str.encode(Input))
    res = ClientMultiSocket.recv(1024)
    print(res.decode('utf-8'))
ClientMultiSocket.close()
```

```
[ ]
```

5. RESULTS AND DISCUSSION

Ultimately, attendance tracking data is stored on our server. We support the creation of a user with corresponding events they wish to track attendance. Users can log in to our system with their user id and password to retrieve real-time Excel reports of who has been tracked at one of their events.

The custom QR Code only works with our system and can be printed on paper or stored as an image on a laptop or mobile device.

Only a user, not an attendee, can access the mobile app required to track attendance. This fact ensures attendees are actually at the event, as their codes are scanned at the same location. Finally, while attendance tracking data is stored on our server, we support having a user scan up to 1000 QR Codes and storing them on their device before bulk uploading them. The reason for this feature is twofold: The first is that it increases the speed at which attendees can be scanned and processed at an event.

Secondly, if the mobile device has difficulty connecting to the network, the user can still process attendees and upload the scanning data later. We believe our current mobile app and the server-based system can be used for tracking attendance in classes of up to 100 people. Moreover, if students attend different events, they do not need to register for subsequent events, as the system does not require an attendee to have a different QR Code.

Our custom QR Codes contain all of the required attendee information. And, unlike the previous versions of our system, there is no time required to register an attendee with the system before they are tracked.

A final issue, which in itself is a feature, is the technique to ensure that an attendee is actually at an event when being tracked. If every attendee has access to a required mobile application, then the potential is there for them to identify themselves at an event when they are not actually there. Using the location of the device is one technique one could use to help determine a device's location, but depending on when the device starts, stops and has Wi-Fi, cellular, or GPS information, the identified location can be inaccurate. With QR Code scanning, students must be at the event or class.

6. CONCLUSION AND FUTURE ENHANCEMENT

The proposed model in this project has been designed to enable the verification and validation steps with several security and networking options during the login process. The model has been implemented by developing a verification system where the second factor is the user's smart/mobile phone device and a pseudo-randomly generated alphanumeric QR code used as the one-time link token sent to the user via e-mail or MMS.

Using a QR code marketing strategy, while simple, will add value to the firm. QR codes give companies an effective way to advertise their products that a printed page or a billboard cannot replicate. QR codes can engage customers much better than traditional printed advertisements. With mobile phones with a camera, the device is getting more popular, and recognition of QR codes based on the mobile phone is getting more essential and practical. From the experiment, the proposed method produced better results than other methods. The recognition test also showed the proposed method is effective for QR Code image recognition based on mobile phones.

The generator can create a QR code, and the client can put it anywhere, and other clients and access it. We recommend a better application to support the process for giant institutes because they need more links. Improper implementation, poor execution, and lack of enough awareness among the users are hurdles toward the advancement of QR codes in mobile marketing. Despite some drawbacks, QR codes can be a resourceful tool for marketers. It's a matter of coming up with simple but strategic techniques. Inventors create the product, but the industrialist creates value out of that invention.

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