Qr-code generator, reader and comparator

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Digital Image Processing project

PROBLEM IT SOLVES

- Control which people have entered to some place and at what time they did it.
- Prevent people entering the rooms without belonging to the university.
- Control people who have been together in some place. (COVID-19)

MOTIVATION

Learn about QR images and new tools to work with them analysing different softwares to see which fit better for our problem.

- Generate
- Compare
- Decode

Join this new knowledge to get a code for our problem in particular.

METHODOLOGY & RESULTS

WE DIVIDE THE CODE IN THREE DIFFERENT PARTS

1. Assign each person a QR code with their personal data inside.
2. Compare the QR of this person with the database and give an access to the person to enter if it finds matching information to allow or deny request.
3. Decode QR to save information. Add data to the matching name (date,time,participation.)

1 GENERATE A QR

```
print("You are going to generate a new QR")
name = input("Introduce your name please: ")
lastname= input("Lastname: ")
contact= input("Email/phone number:")
position = input("Student/teacher/other(specify): ")
newperson = People(name,lastname,contact,position)
```

```
You are going to generate a new QR
Introduce your name please: Yaiza
Lastname: Rubio Chavida
Email/phone number:yaizarubioch@gmail.com

Student/teacher/other(specify): Student
```

The program will generate a new QR code and it will be saved as an image.

```
Great! You have created a new profile:
Name:Yaiza
Lastname:Rubio Chavida
Contact:yaizarubioch@gmail.com
Position:Student
```

Assign each person a QR code with their personal data inside

2

Compare the QR of this person with the database and give an access to the person to enter if it finds matching information.

```
These images are completally different images 18269.250780437043
```

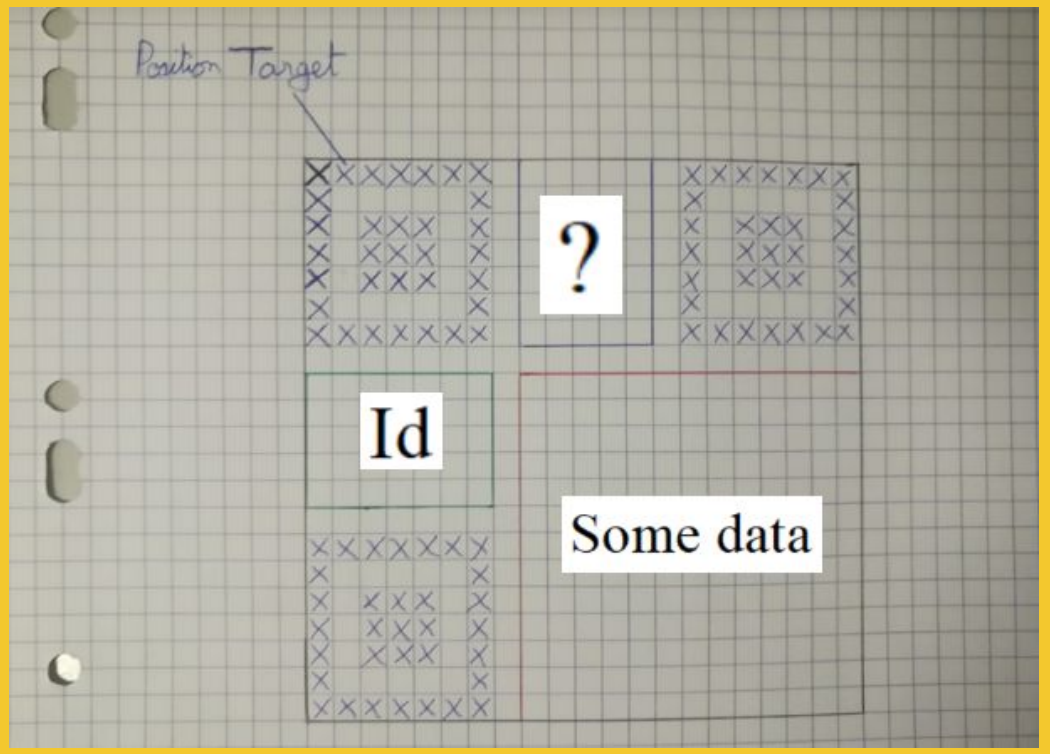
Allow or deny request.

```
Sorry. You don´t have access to this room.
```

3

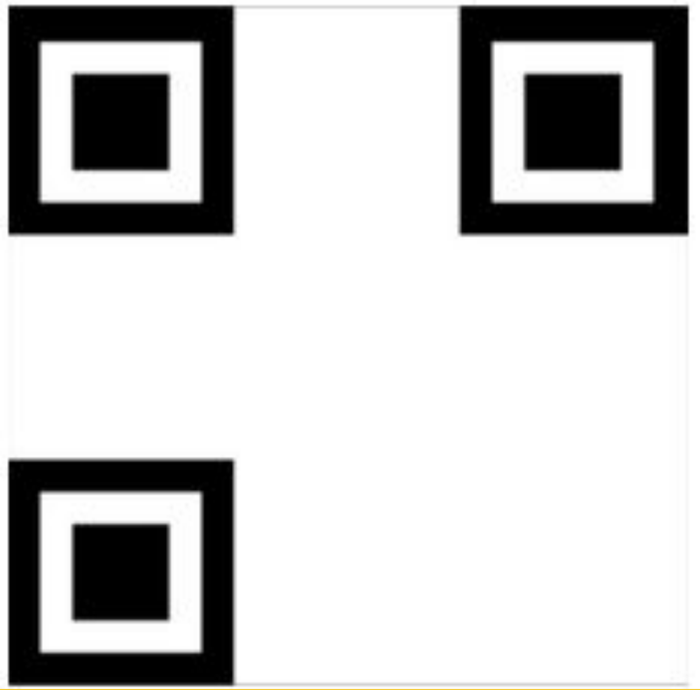
Decode QR to save information. Add data to the matching name (date, time, participation)

4 A try to implement our own QR code system



```
[[1 1 1 1 1 1 1 0 0 0 0 0 0 0 1 1 1 1 1 1 1]
 [1 0 0 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0 0 1]
 [1 0 1 1 1 0 1 0 0 0 0 0 0 0 1 0 1 1 1 0 1]
 [1 0 1 1 1 0 1 0 0 0 0 0 0 0 1 0 1 1 1 0 1]
 [1 0 1 1 1 0 1 0 0 0 0 0 0 0 1 0 1 1 1 0 1]
 [1 0 0 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0 0 1]
 [1 1 1 1 1 1 1 0 0 0 0 0 0 0 1 1 1 1 1 1 1]
 [0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0]
 [0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0]
 [0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0]
 [0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0]
 [0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0]
 [0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0]
 [0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0]
 [1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0]
 [1 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0]
 [1 0 1 1 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0]
 [1 0 1 1 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0]
 [1 0 1 1 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0]
 [1 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0]
 [1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0]]
```

Empty QR Code in python list



Result after drawing with turtle

Result obtained with data loaded on the QR-code

Place unused but we could load more data on it

Some data

A positional target

BACKGROUND

We have looked for different programs that have been tested and we will take them as a reference to learn different things from them .

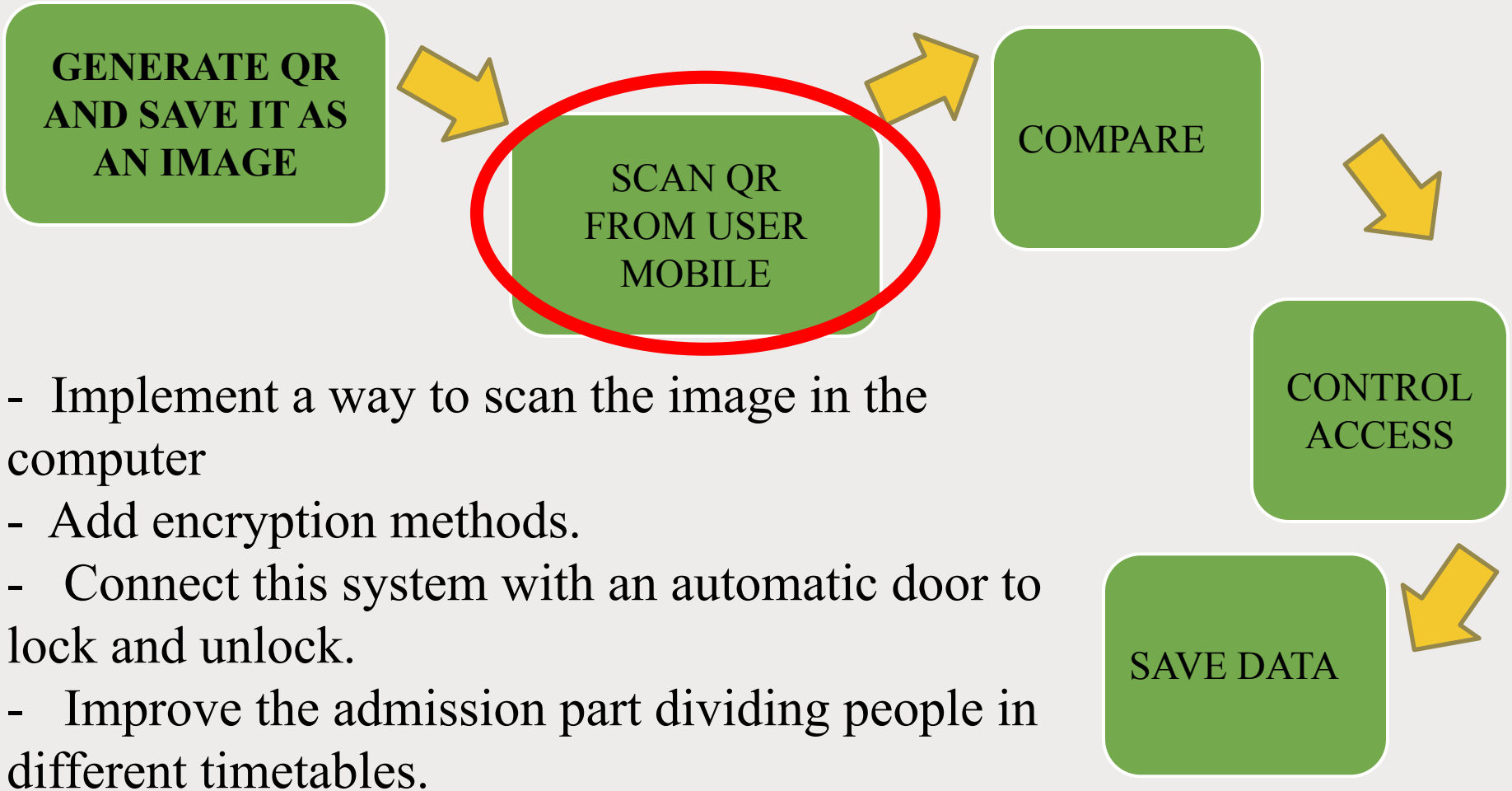
- Different examples in different languages in github . [4]

-Recent report explaining how to read and generate different QR codes using python, qrtools library. [5]

-Zbar library and ways to install it. [2]

- Video that explains the relevant parts of the QR code, its size and discusses how much data a QR-code can hold. [6]

HINTS FOR FUTURE RESEARCH



- Implement a way to scan the image in the computer
- Add encryption methods.
- Connect this system with an automatic door to lock and unlock.
- Improve the admission part dividing people in different timetables.

FINAL CONCLUSIONS

SOME DIFFICULTIES PRESENTED

- Choosing the appropriate environment.
- Analyzing the different functions of libraries.
- A bit of confusion joining different parts.

ACHIEVEMENTS

- Good results.
- Learning objectives achieved.
- Complete system almost done.

REFERENCES

[1] Kalebu Jordan. Become a pro python developeer (2017).
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[2] Adrian Rosebrock. An Open CV barcode and QR code scanner with ZBar.(2018)
https://www.pyimagesearch.com/2018/05/21/an-opencv-barcode-and-qr-code-scanner-with-zbar/

[3] Jae Hwa Chang. An introduction to using QR codes in scholarly journals. (2014)
https://www.researchgate.net/publication/271098121_An_introduction_to_using_QR_codes_in_scholarly_journals

[4] GitHub code(2020)
https://github.com/nayuki/QR-Code-generator

[5] Reading and Generating QR codes in Python using QRtools (2020)
https://www.geeksforgeeks.org/reading-generating-qr-codes-python-using-qrtools/

[6] James. How QR codes are built.(2020)
https://www.youtube.com/watch?v=142TGhaTMtI

THANK YOU