PROJECT PROPOSAL

DESCRIPTION

We would like to generate different QR which will be analyzed by a QR code reader and comparator. Our idea is to assign each person a QR code in a company, university ... These people will have to show their code to our detector to get permission before entering a class / office. Also, the system will save ,each day, a chart with the name of every person who has entered the room.

MOTIVATION

The objective of this idea is to control which people have entered to some place and at what time they did it.

This program can help to prevent people entering the rooms without belonging to the company / university. In this way, only people we want will have access to some place.

Moreover this also can control people who have been together in some place. Now it has special importance due to the COVID-19 pandemic. It can be very useful in the case that some of these people test positive in covid, the detector will help us to know how many people, how much time and when they have been in contact with. The company or the university will warn these people to stay in self-isolation.

WHAT IS A QR

QR code, or quick response code, is a trademark for a type of 2 dimensional barcode. 2 dimensional barcodes are similar to one dimensional barcodes, but can store more information per unit area. It is a module to store information in a dot matrix. This matrix is read by a specific reader and it immediately takes us to an application on the internet and can be a location map, an email, a web page or a person profile (like in our case).

It was created in 1994 by the Japanese company Denso Wave. It has three squares in the corners that allow the reader to detect the position of the code. The goal of the creators was for the code to allow its content to be read at high speed.

The reason why they are more useful than a standard barcode is that they can store (and digitally present) much more data, including url links, geo coordinates, and text. The other key feature of QR Codes is that instead of requiring a chunky hand-held scanner to scan them, many modern cell phones can scan them.

QR code is composed of several areas which are alignment targets, dotted lines, two format areas, and data. One part of the data area is used for error correction and detection.

HOW IT WILL WORK

- We first create a database for each person who has access to the place, the program will generate a new QR code and add it to the database.
- These people will scan the code with their device and it will be saved as an image.
- The program we provided will analyze the image of QR code to get data.
- The program will compare the data with the database and give an access to the person to enter if it finds matching information.
- If the person is in the list, the computer will allow him to enter, if not it will show a negative feedback.
- If the person got the permission to enter, the computer will add data to the matching name (date,time,participation.) This would permit to inform people if they had met someone who is tested positive for coronavirus (inform people who scan QR code at a moment close to the infected people).

METHODOLOGY

First of all we should generate a QR code for each person that has access to the place we are preparing our system. The QR code will get an idea related to a database where we can store the different data. When one person wants to go inside some place, he will have to scan the QR, the program will decide if this person can go inside or not.

To do this, we have organized our ideas in the previous steps, and we looked for some codes that can help us in the development of our idea. We will try all of them, and replace them if some code is not as useful as we expected. Finally, we will get our complete system. We explain these codes in the next point of our proposal.

RELEVANT REFERENCES

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

1. This link tells us how to generate qr codes. It explains how to use python tools to generate QR code from your data: we can generate qrcode from text, url, email, email message... We can also define the size of our qr code.
https://www.geeksforgeeks.org/reading-generating-qr-codes-python-using-qrtools/

2. This link can be useful because it describes the different steps we have to do to generate a QR code and give us an overall of what we have to do. There are also illustrations (screenshot) to see how it is really done in a real code, it can be really useful to have such practical examples.
https://www.pyimagesearch.com/2018/05/21/an-opencv-barcode-and-qr-code-scanner-with-zbar/

3. In this one we also have lots of examples that can help us, it doesn't look very difficult. Like the previous link, it gives us some practical examples of the use of bar code in python through the library pyzbar. It also provides us the way to install the library pyzbar.
https://kalebujordan.com/reading-bar-codes-python/

4. This link is the one with the code of the Barcode Scanner app, maybe it can also help us.
https://github.com/zxing/zxing

5. There is a QR-code generator project in 5 languages in the Github. We are going to use some subfunctions. (This project also provides useful functions to preserve safety rules.)
https://github.com/nayuki/QR-Code-generator

6. There is a youtube link in which gives an explanation of relevant parts of the QR code, its size and discusses how much data a QR-code can hold. The video also provides reading a qr code manually.
https://www.youtube.com/watch?v=142TGhaTMtI

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Digital Image Processing