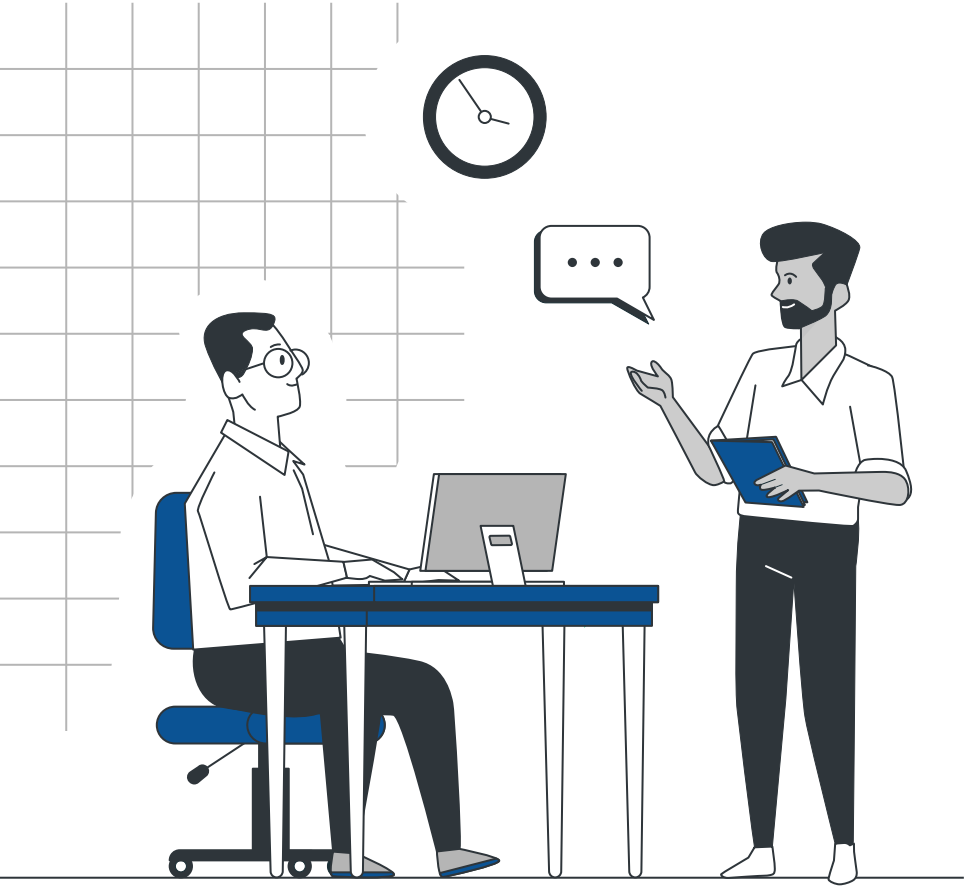


Fabrication Lab 2023

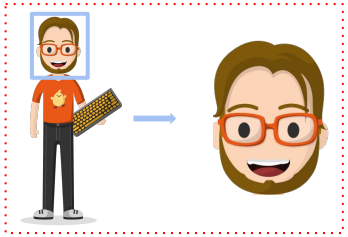
UniLock

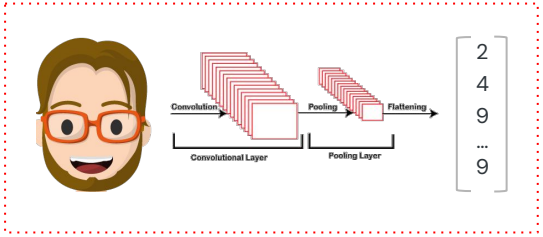
Jacopo Caratti, Nicholas Kaegi

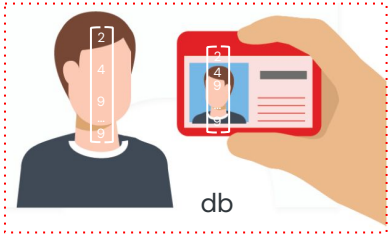
01

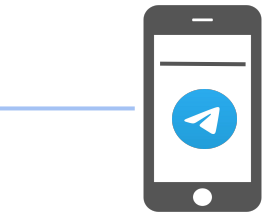
From FaceGuard to UniLock

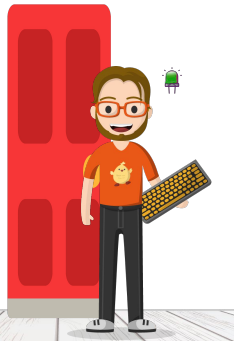
FaceGuard

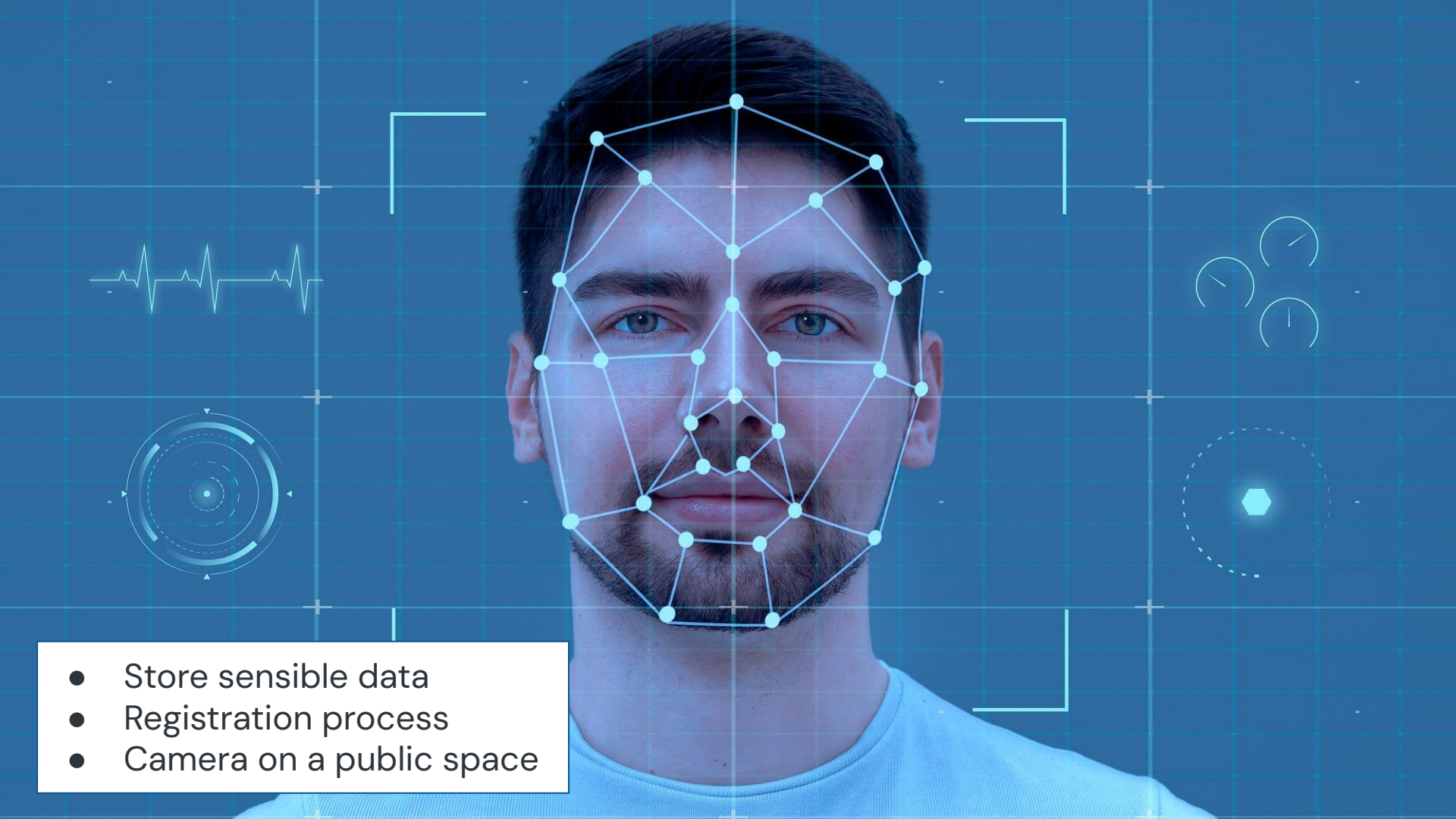



Convolution
Pooling
Flattening
Convolutional Layer
Pooling Layer
2
4
9
...
9


db





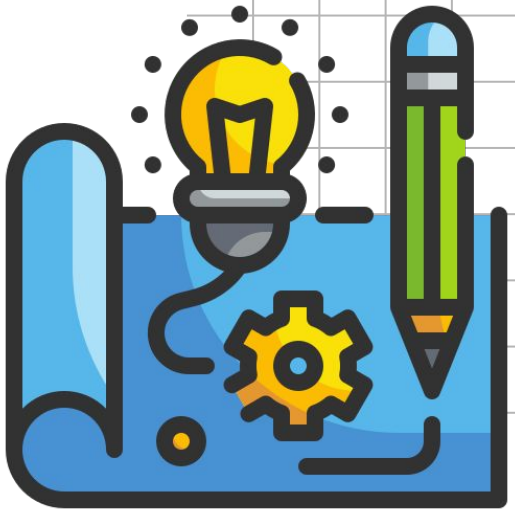

- Store sensible data
- Registration process
- Camera on a public space

Prototyping

"They slow us down to speed us up. By **taking** the **time to** prototype our ideas, we **avoid** costly **mistakes** such as becoming too complex too early and sticking with a weak idea for too long."

— **Tim Brown**, CEO of **IDEO**

One of the most innovative companies in the world



FaceGuard takeaways

Computer Vision

Secure storage

Feedbacks

Usability

Secure access

How to combine this components in a meaningful way...?

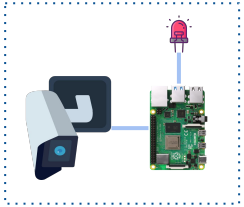
Easy-to-use, easy-to-manage, less privacy concerns, computer-vision

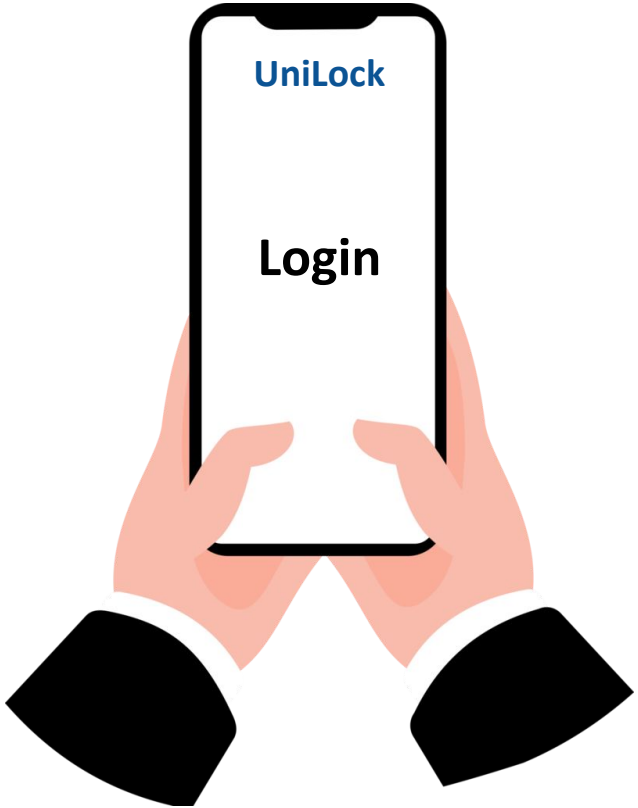
02

UniLock

Workflow

User arrives at the door...





Login

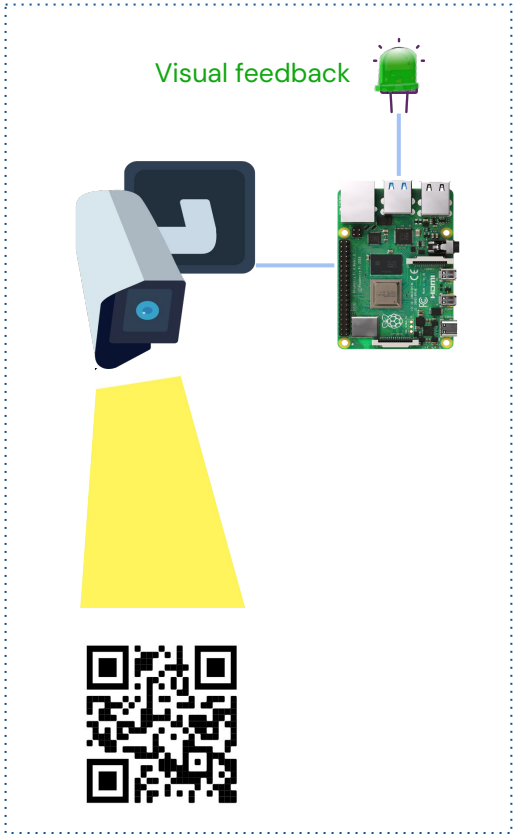
User provides credentials

QR code generation

A temporal one-time password is generated

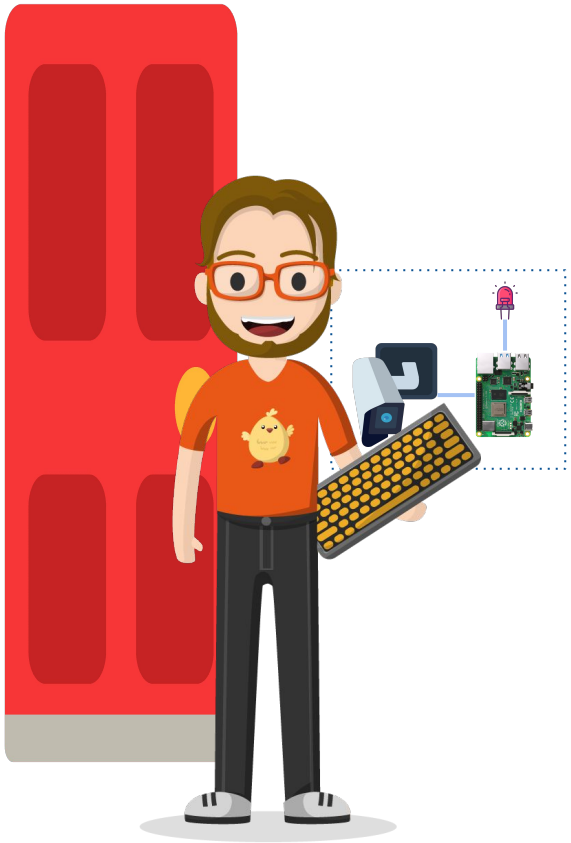
QR scanner

Camera turns on and user shows the QR



System validates QR, user is granted access to the FabLab

Connection with Tristan and Ghamaathige's project



03

UniLock

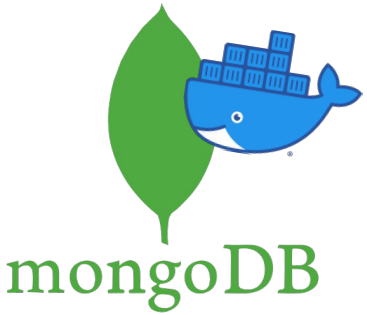
Demo

04

Main components

MongoDB = NoSQL database management application, faster and more scalable than SQL.

VS



How to store data?

DONE

3 collections

Users

Users information

QRs

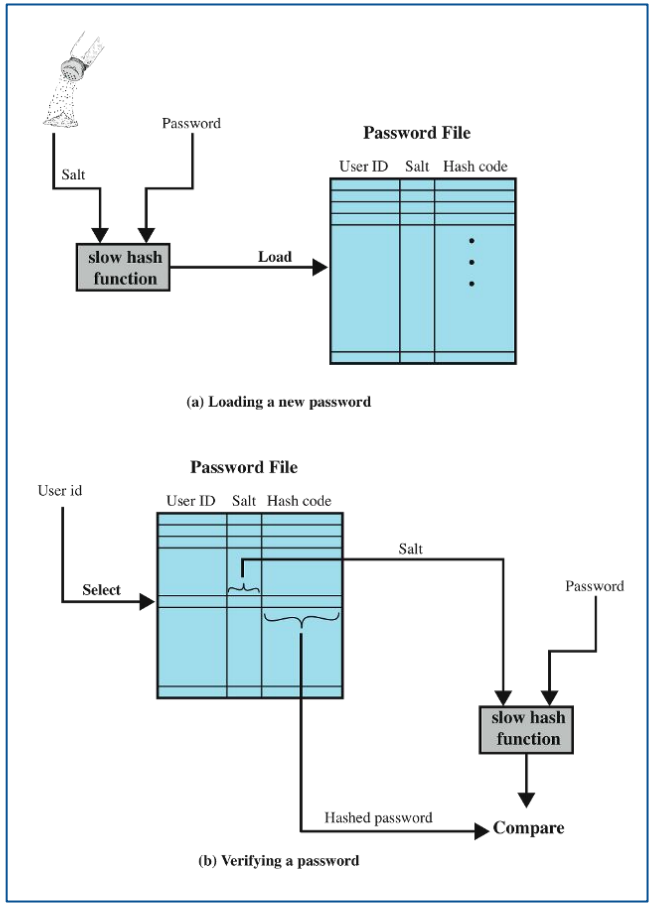
QRs created by the users

Statistics

Track of the number of accesses

Connection with Adriana's project

DONE



How to securely store data?

Credentials securely stored following Unix Encrypted Password System.

Bcrypt, Streamlit-Authenticator

DONE

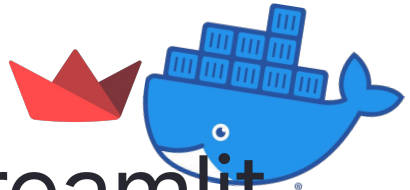
Usability

Easy and fast admin management
and user access.

DONE

Web App

Streamlit vs Streamlit



Streamlit = Open-source Python library for building and deploying custom web apps. Compatible with major Python libraries.

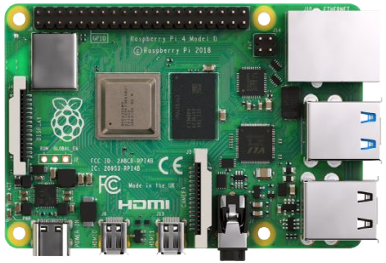
Problem:
- no backend development, database management, URL routing

DONE

Better idea for the webapp

+ full-stack framework for robust, scalable web apps with extensive functionalities

TODO



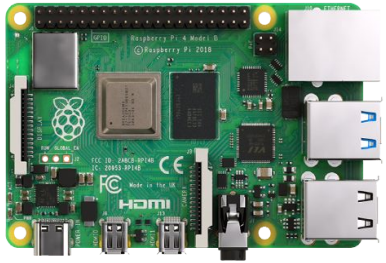
Public access

- Camera, LED

2 Raspberry Pis

Private

- Web Server, Database



TODO

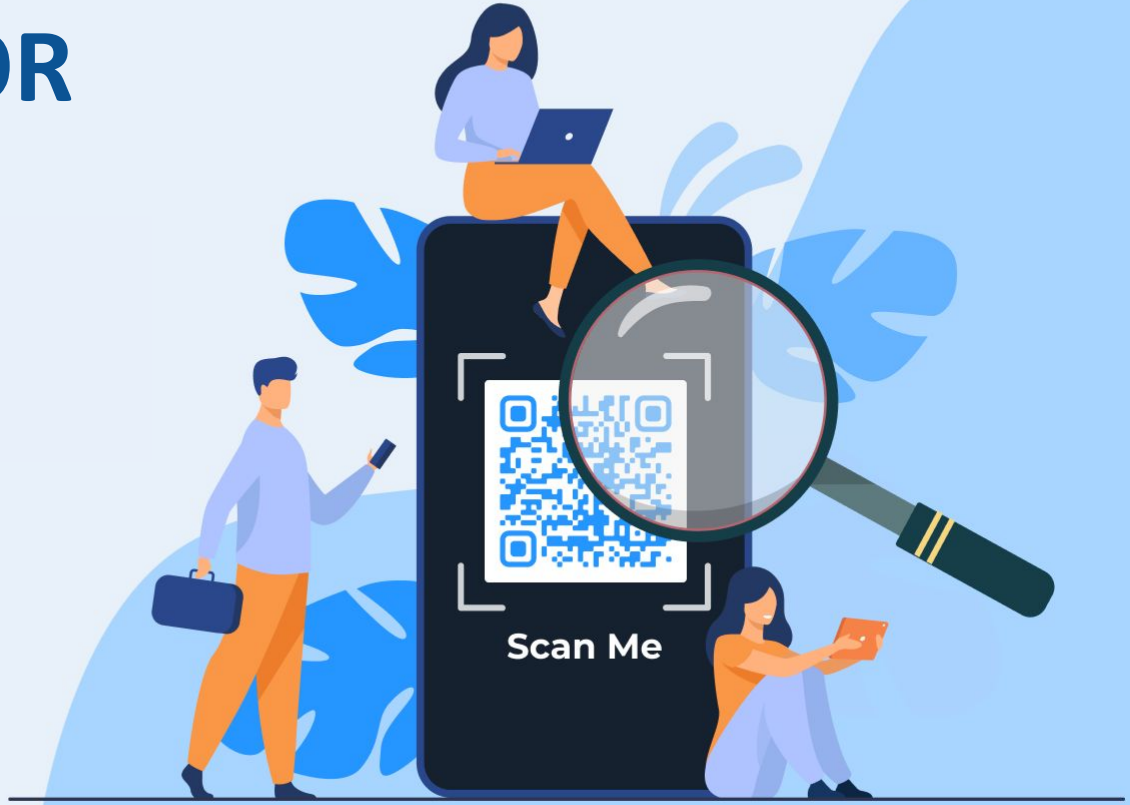
Tech stack

QR VALIDATOR

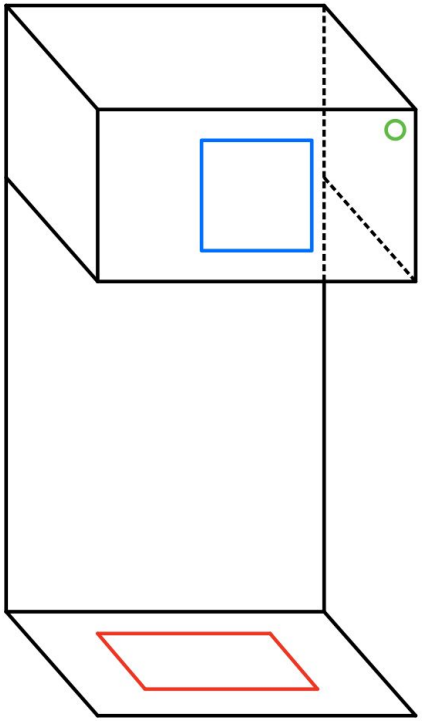
Hardware
Control cam and feedback LEDs

Web Server
Handle requests from web app

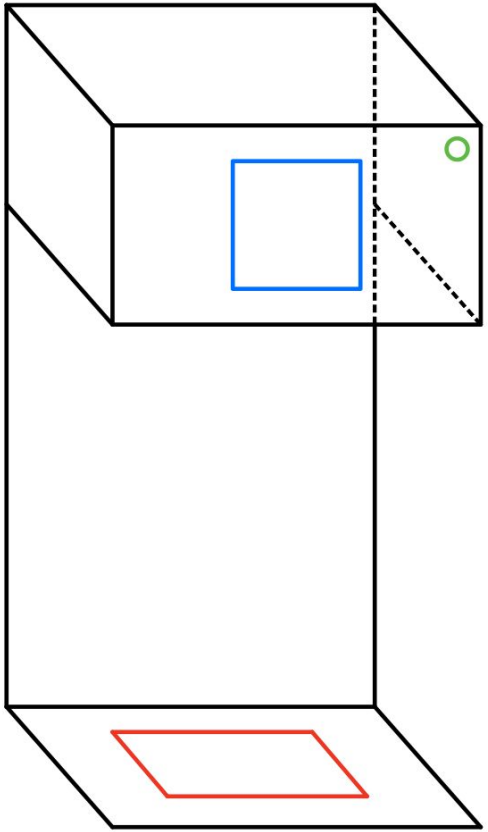
Computer Vision
Extract strings from QR codes



DONE



Shall we glue the Raspberry to the wall…?



UniLock Case

Real QR code
to our website

Scan here your QR

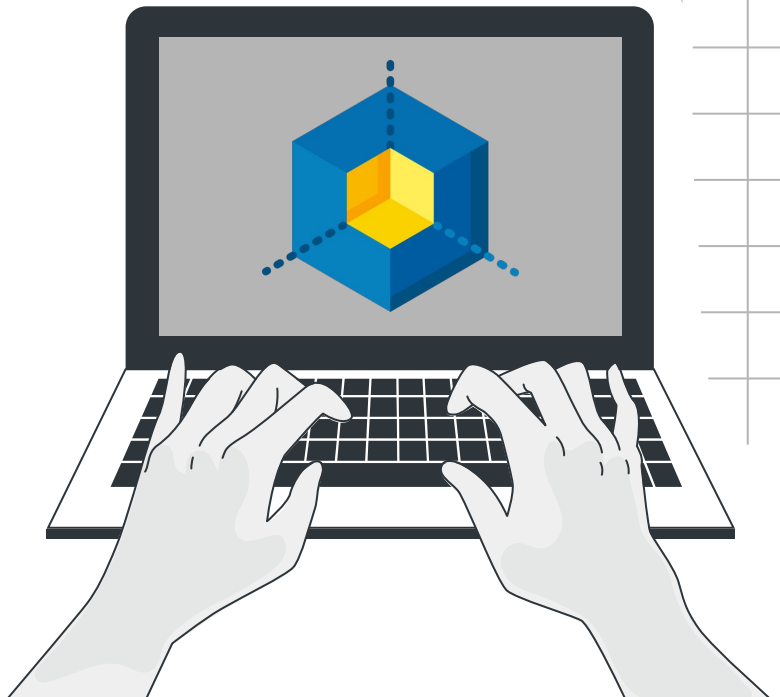
Place here your QR to open the door

LED status

TODO

05

How to access UniLock



project interoperability

How can you access UniLock?

2 proposals:

Web API We provide some a basic REST API for our projects to talk with.

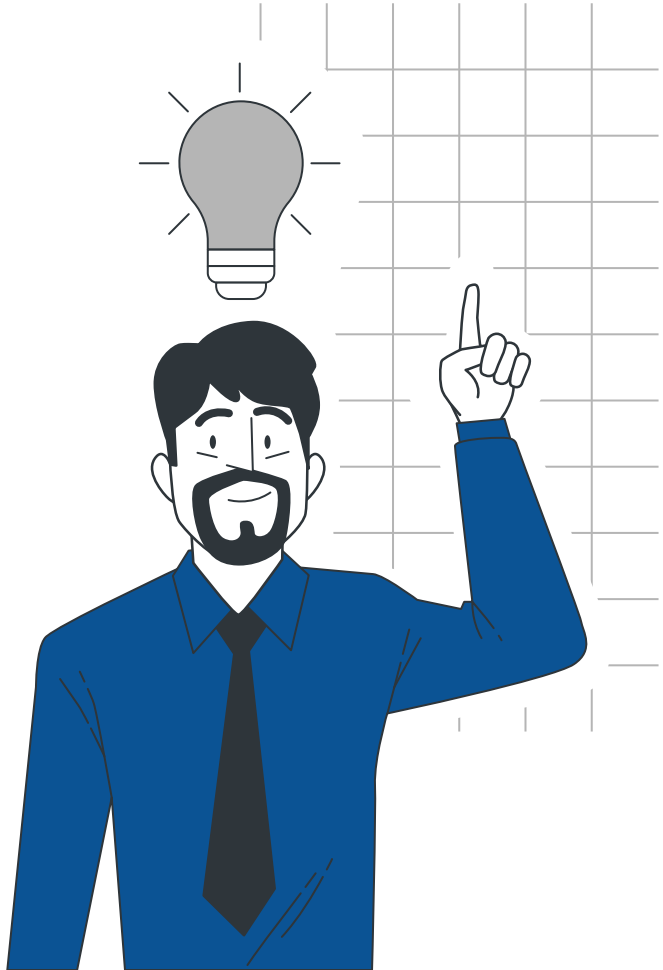
MQTT We agree on a few topics that our projects can subscribe too.

What do you guys think?

On Protofab clone: /2023/projects/unilock

TODO

Thanks

Do you have any questions?

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