Build a smart garage door opener using computer vision

Present by Wing Chan

Rapid Growth - reach USD 114 Billion by the end of 2025

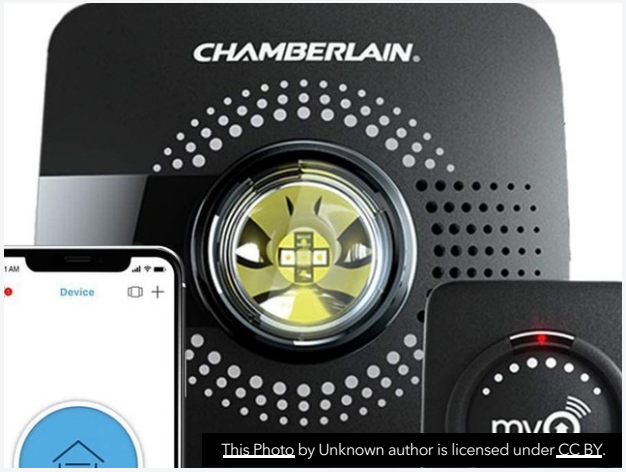
Cheap - Chamberlain's myQ Smart Garage Hub is only $30.

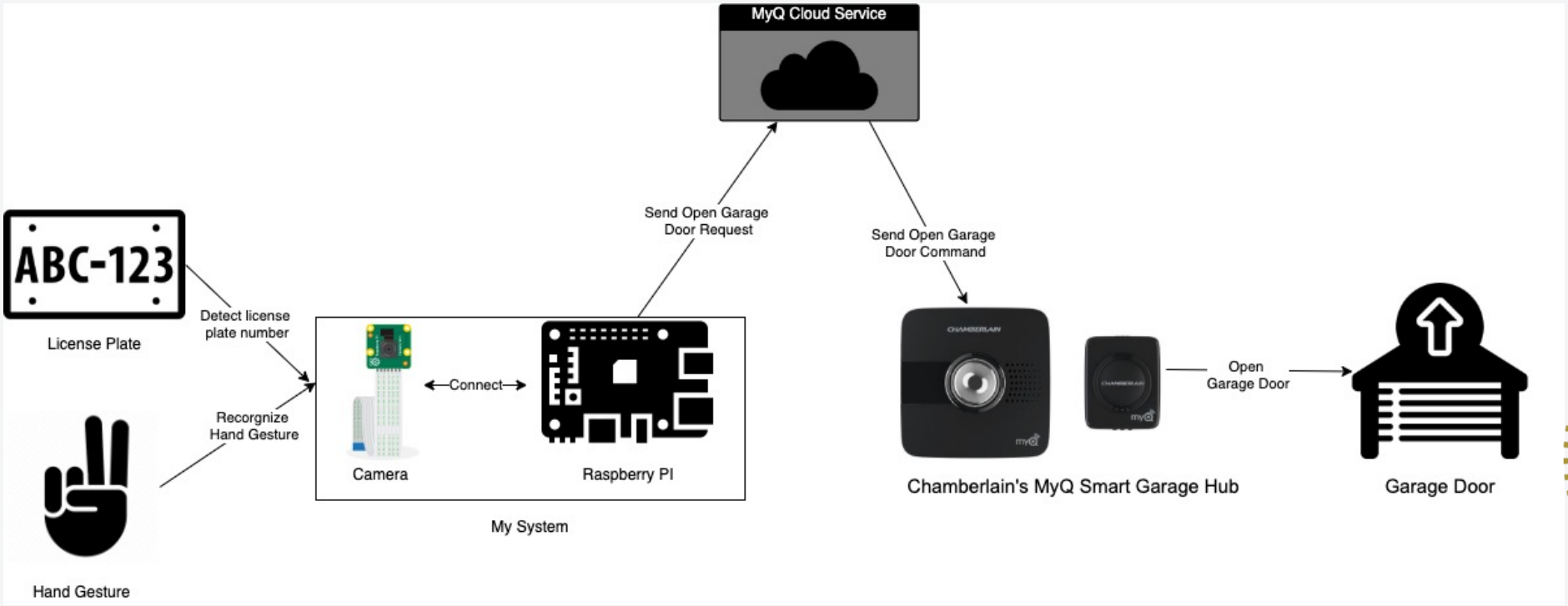
Integrate with Chamberlain's myQ Smart Garage Hub and its cloud APIs.

Added features using computer vision

- License plate detection
- Hand gesture recognition

Raspberry Pi connected with camera




MyQ Cloud Service
Send Open Garage Door Request
Send Open Garage Door Command
ABC-123
License Plate
Detect license plate number
Recorgnize Hand Gesture
Hand Gesture
Camera
Connect
Raspberry PI
My System
Chamberlain's MyQ Smart Garage Hub
Open Garage Door
Garage Door

Automatic number-plate recognition (ANPR) - perform optical character recognition (OCR) on images taken by cameras.

Involve 3 steps:

1. Plate localization - detect and localize a license plate on the picture
2. Character segmentation – extract individual characters on the plates
3. Optical character recognition (OCR) - find the matching letters or numbers from character segmentation

One of the most challenging problem for computer vision

Recognizing hand gestures from real-time video streams and identifying hand region away from its background objects

Involve 4 steps:

1. Hand detection
2. Fingers and palm segmentation
3. Fingers recognition
4. Hand gesture recognition

Hardware modules

MyQ Smart Garage Hub

Raspberry Pi 4

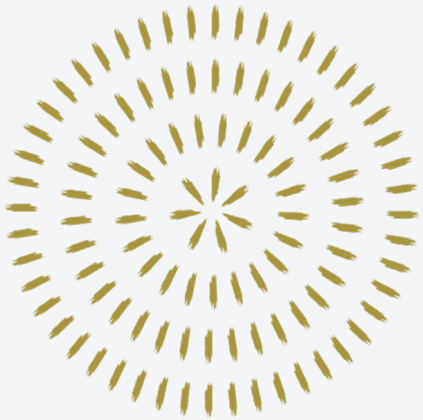
Raspberry Pi Camera

Software packages

Pymyq

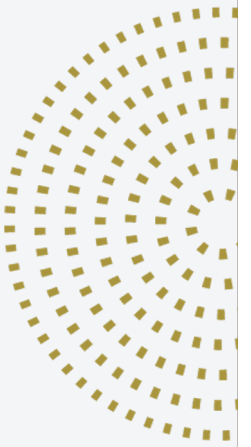
License Plate Detector by Apoorva Dave

Gesture Recognition by Gogul Ilango



Demo

https://github.com/wingchanatibsa/LearningSessions/tree/master/SmartGarrageDoorOpener/demo



Results

It's WORK if it is under a strictly controlled environment

Many unpredictable situations could affect the accuracy of CV result

Challenges

Install python 3.8 on Raspberry Pi OS is a PAIN

Reflective surfaces on your car could affect the accuracy of license plate detection

Hard to detect hand gesture at the outdoor