Parking Lot System

GROUP 6
411850257 王逸凱
411855777 殷德光
411855066 李愛莎
411850232 張議文
411855710 雷熙達

OUTLINE

1. Introduction
2. Parking Gate System
3. Indicator Light System
4. System Integration and Implemntation
    a. Hardware connections
    b. Image processing with Python
5. Conclusion

INTRODUCTION

The Internet of Things (IoT) is a crucial area of technological development today, enabling the exchange of information and intelligent control between various devices connected to the internet. The smart parking system is a typical example of IoT applications, aimed at improving the efficiency and convenience of parking management. This report will introduce an Arduino UNO and ESP32-based smart parking system. The system uses an ultrasonic sensor to detect vehicles, and a camera to capture images, which are then processed on a computer using Python to recognize license plates. Indicator lights guide vehicle parking operations.

What kinds of benifits we get from this system ?

1

Time saving

2

Better security

3

Lowering the cost

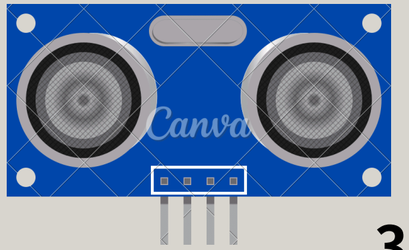
Parking Gate System

Working Principle

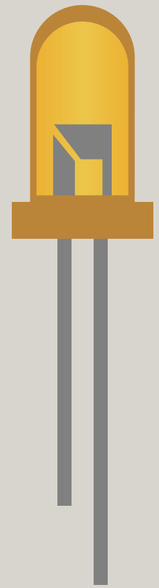
- Ultrasonic sensor detects approaching vehicle
- Camera captures image of the vehicle
- Image is processed on a computer using Python to recognize the license plate and display the number
- Gate opens to allow vehicle passage
- Gate closes after the vehicle passes

Equipment Used

- Arduino UNO
- Ultrasonic sensor
- Motor
- ESP32 for the camera
- Computer for image processing



Indicator Light System

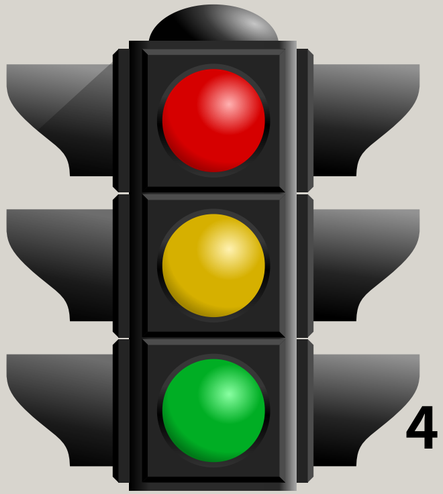


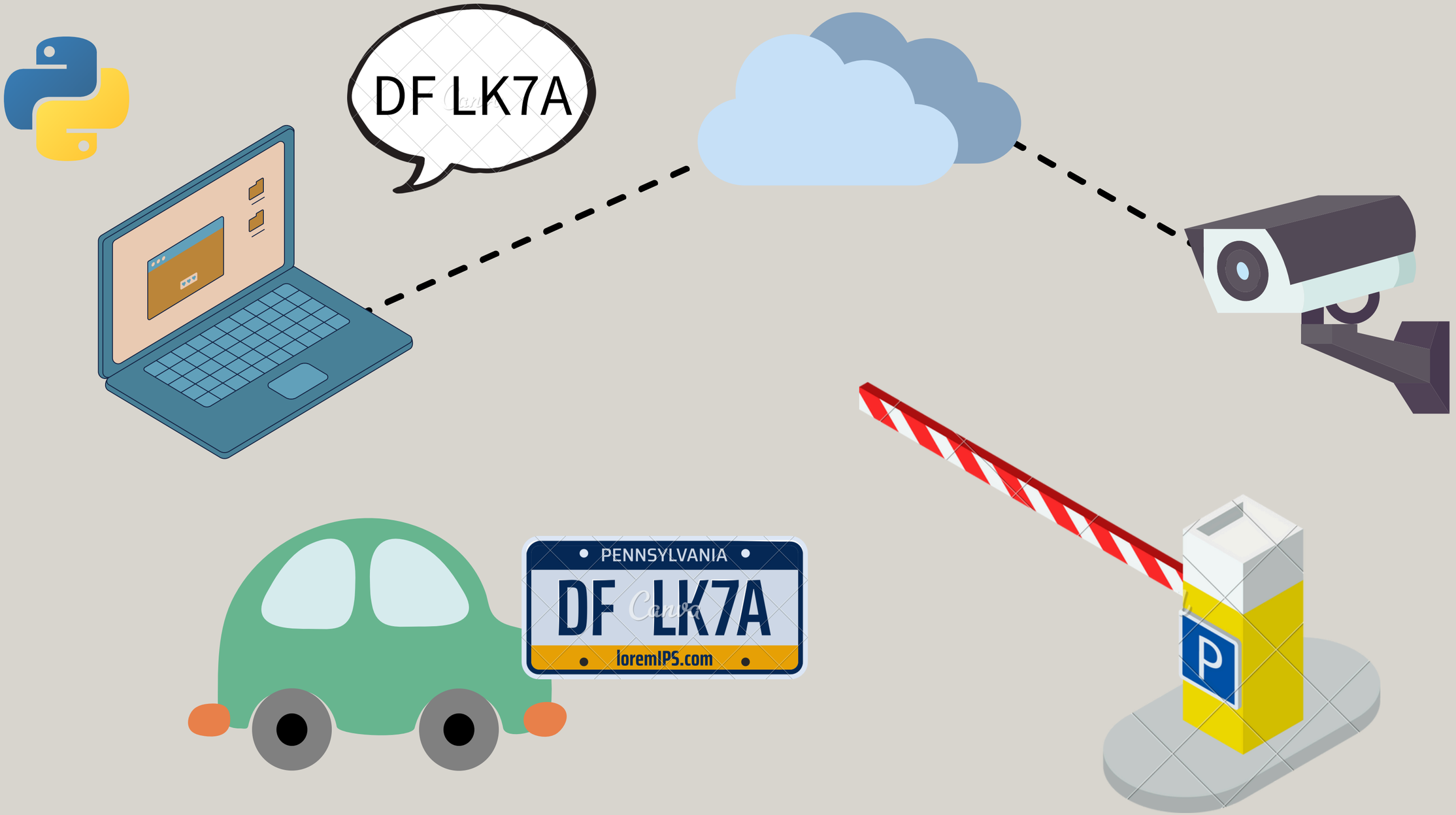
Working Principle

- Red light indicates stop
- Green light indicates go

Equipment Used

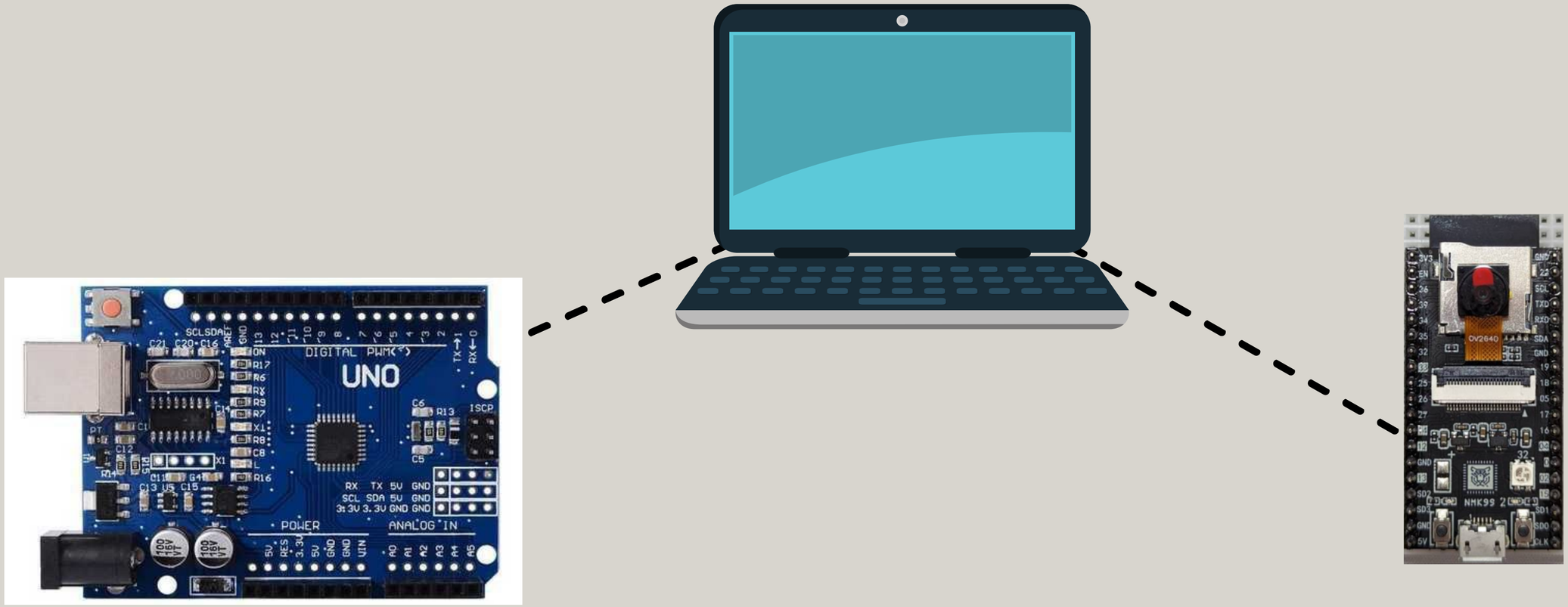
- LED lights *2 (red and green)
- Control module connected to Arduino UNO



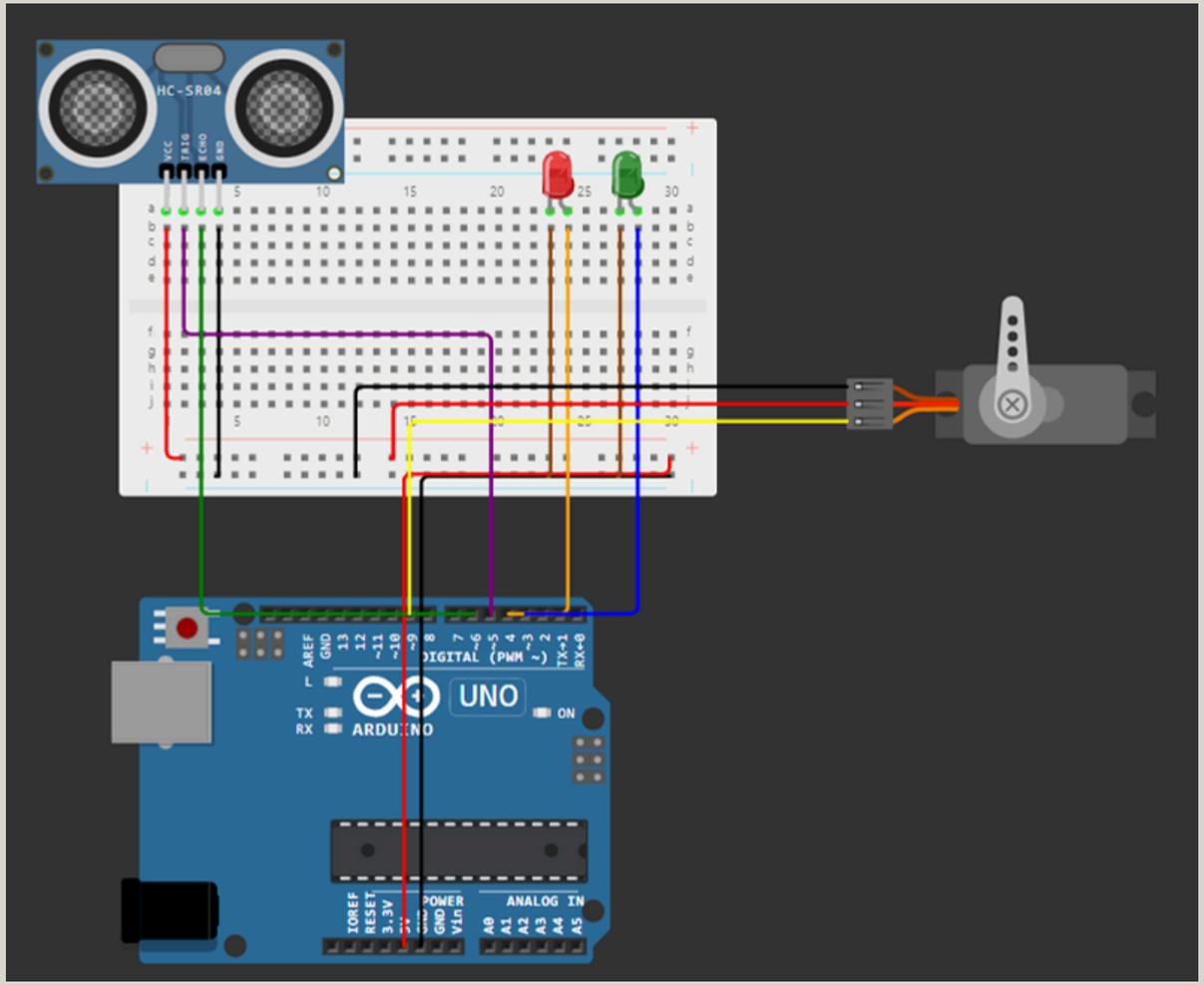

DF LK7A
PENNSYLVANIA
DF LK7A
loremIPS.com
P

System Integration and Implementation

Hardware connections



Hardware connections



Ultrasonic Sensor	
trigPin	5
echoPin	6

LED	
Green_LED_Pin	3
Red_LED_Pin	4

Motor	
motor_Pin	9

Image processing with Python


```
PROBLEMS   OUTPUT   TERMINAL   DEBUG CONSOLE   POR

PS C:\Users\User\Desktop\iot project> python .\pic
Error:cannot access local variable 'stream' where
get a pic

car plate:
get a pic

car plate:
BFQ-8888
```

CONCLUSION

The smart parking system, through the application of IoT technology, significantly improves the operational efficiency and convenience of parking lots. Using ultrasonic sensors for vehicle detection and cameras for capturing images, which are processed on a computer to recognize license plates, facilitates smoother vehicle entry and exit. The indicator light system provides intuitive operational guidance. In the future, as technology continues to advance, smart parking systems will become even more intelligent and efficient, further enhancing urban traffic management. Overall, such systems not only improve user experience but also contribute significantly to the construction of smart cities.

Reference

https://www.nmking.io/index.php/2024/01/09/1369/
https://chatgpt.com

END

Thank you!