

IOT_PHASE 4

DEVELOPMENT PART 2

INTRODUCTION

- A smart traffic management system utilizing camera data, communication and automated algorithms is to be developed to keep traffic flowing more smoothly.
- The aim is to optimally control the duration of green or red light for a specific traffic light at an intersection.
- The traffic signals should not flash the same stretch of green or red all the time, but should depend on the number of vehicles present.
- When traffic is heavy in one direction, the green lights should stay on longer; less traffic should mean the red lights should be on for a longer time interval.

SYSTEM DESIGN

- Raspberry Pi
- LED lights which are used for the purpose of signaling.
- Traffic cameras which are used for monitoring traffic.
- Node MCU Microcontroller

BLOCK DIAGRAM

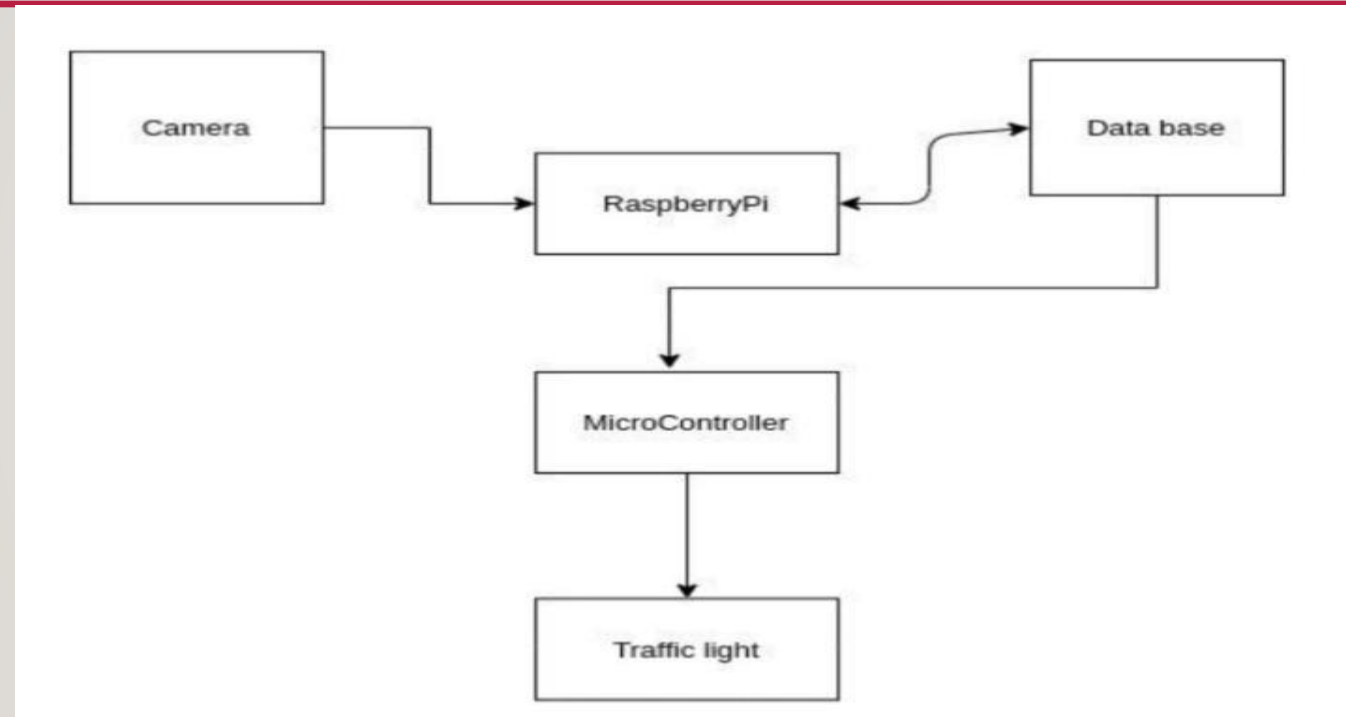


Fig: flow chart

SYSTEM IMPLEMENTATION

Steps in the proposed system for controlling traffic light 1:

- Camera: Continuously record traffic video.
- Read Image: Read frames of the traffic image.
- Grayscale Image Conversion: It converts color image to grayscale image. This method is based on different color transforms. According to the R, G, B value in the image, it calculates the value of grayscales and converts the image into a grayscale image.
- Image Binarization: Grayscale image is converted into black and white image.
- Traffic Signal Control: Based on vehicle count signal timings are changed and the respective LED glows.

SYSTEM IMPLEMENTATION

Steps for controlling traffic light 2:

- Initialize System.
- Configure ESP 8266 module for multi access point through AT commands.
- Connect WI-FI module to WI-FI network.
- Start UDP local port in WI-FI module.
- Establish UDP connection to Raspberry pi.
- Wait for data.
- Change traffic light signal 2 depending upon their received data from raspberry Pi.

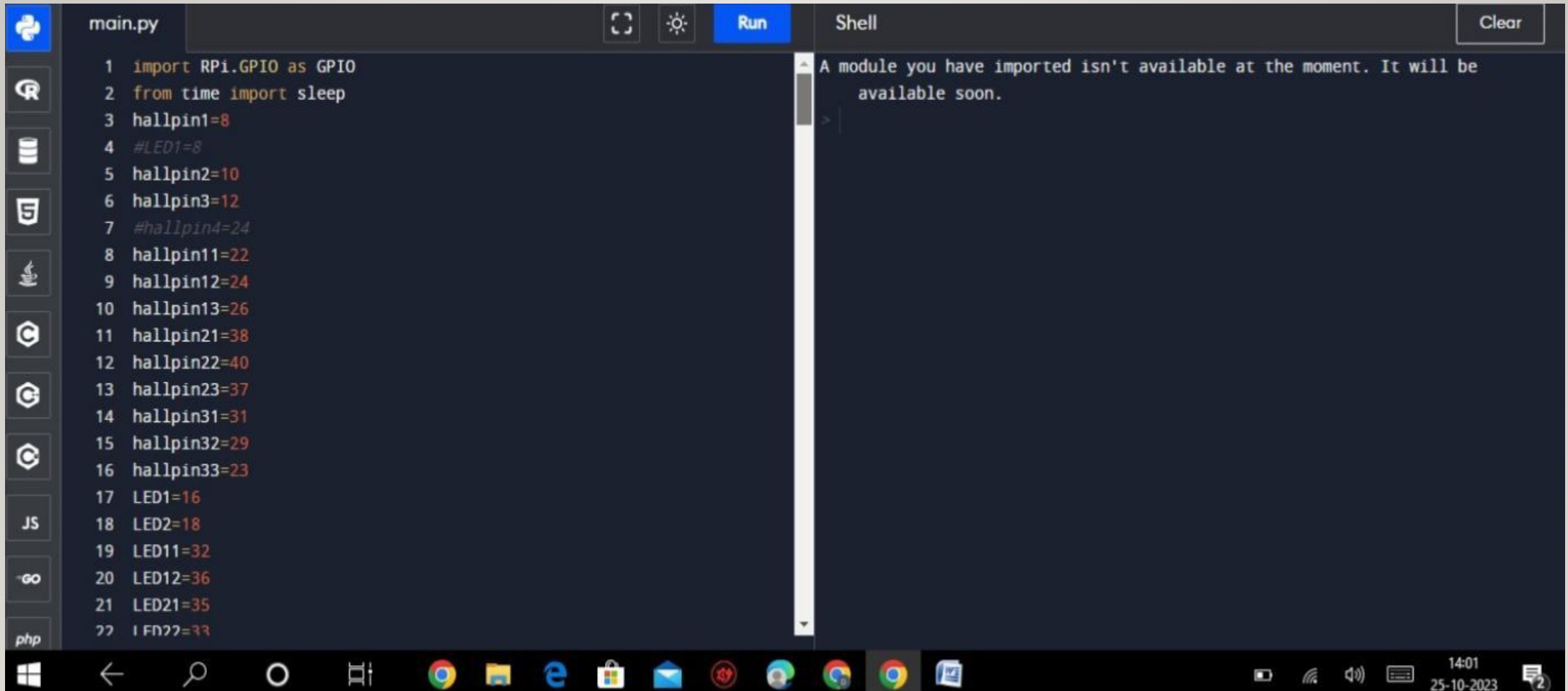


COMPONENTS

Smart traffic management system consists the Following components.

- Radio signal detector
- Radio waves transmitter
- Ultra-sonic sensor/Hall Effect sensor
- Raspberry Pi
- Python programming
- Light Emitting Diode









PROGRAM CODE



The image shows a code editor window with a dark theme. The editor is displaying a Python script named `main.py`. The script contains 22 lines of code, mostly in red text, which appear to be pin assignments for an RPi.GPIO module. The code is as follows:

```
1 import RPi.GPIO as GPIO
2 from time import sleep
3 hallpin1=8
4 #LED1=8
5 hallpin2=10
6 hallpin3=12
7 #hallpin4=24
8 hallpin11=22
9 hallpin12=24
10 hallpin13=26
11 hallpin21=38
12 hallpin22=40
13 hallpin23=37
14 hallpin31=31
15 hallpin32=29
16 hallpin33=23
17 LED1=16
18 LED2=18
19 LED11=32
20 LED12=36
21 LED21=35
22 LED22=33
```

Below the code editor, there is a shell window. It displays an error message: "A module you have imported isn't available at the moment. It will be available soon." The shell window also has a "Clear" button in the top right corner. The bottom of the image shows a Windows taskbar with various icons, including the Start button, task view, search, and several application icons. The system clock in the bottom right corner shows the time as 14:01 on 25-10-2023.





JS

GO

php

main.py



Run















Shell





Clear

```
66 print("not detected")
67 if(GPIO.input(hallpin3)==True):
68     a3=1
69     print(" magnet 3")
70     print(" detected")
71 if(GPIO.input(hallpin3)==False):
72     a3=0
73     print("magnet 3")
74     print(" not detected")
75     print("-----")
76 if(GPIO.input(hallpin11)==True):
77     b1=1
78     print("magnet 11")
79     print("detected")
80 if(GPIO.input(hallpin11)==False):
81     b1=0
82     print(" magnet 11")
83     print(" not detected")
84 if(GPIO.input(hallpin12)==True):
85     b2=1
86     print(" magnet 12")
```


A module you have imported isn't available at the moment. It will be available soon.


>







14:03
25-10-2023













main.py



Run



JS

GO

```
127 ~ if(GPIO.input(hallpin31)==True):
128     d1=1
129     print("
130 magnet 31")
131     print("
132 detected")
133 ~ if(GPIO.input(hallpin31)==False):
134     d1=0
135     print("
136 magnet 31")
137     print("
138 not detected")
139 ~ if(GPIO.input(hallpin32)==True):
140     d2=1
141     print("
142 magnet 32")
143     print("
144 detected")
145 ~ if(GPIO.input(hallpin32)==False):
146     d2=0
147     print("

```
















Shell





Clear

A module you have imported isn't available at the moment. It will be available soon.


> |

<https://www.programiz.com/python-programming/online-compiler/>





14:03
25-10-2023



1

OUTPUT

Moderate traffic. Alternating signals.

High traffic. Red signal for the main road.

Low traffic. Green signal for the main road. Moderate traffic. Alternating signals.

Moderate traffic. Alternating signals.

High traffic. Red signal for the main road.

High traffic. Red signal for the main road.

High traffic. Red signal for the main road.



CONCLUSION

- Smart Traffic Management System has been developed by using multiple features of hardware components in IOT.
- Traffic optimization is achieved using IOT platform for efficient utilizing allocating varying time to all traffic signal according to available vehicles count in road path.

THANKING YOU