

TRAFFIC MANAGEMENT SYSTEM

PROJECT OVERVIEW:

deploying iot devices ,such as traffic flow sensors and cameras,to monitor traffic conditions requires careful planning and execution.

1.HARDWARE COMPONENT:

(a)AURDINO

use aurdino uno as the main controller for data collection and processing

(b)CAMERA

if you want to capture vissual data,connect a camera to the aurdino uno

(c)GPS MODULE

attach a GPS module to the aurdino to track the location of the monitoring device

(d)INTERNET CONNECTIVITY

ensure the aurdino uno has internet access.

2.SOFTWARE COMPONENT:

(a)PYTHON

develop python scripts to collect ,process,and send traffic data.we can use libraries like 'request','gpsd',and 'picamera'.

(b)DATA COLLECTION

use the GPS module to retrive location data.capture the images or videos from the camera if needed.collect other revelent data such as speed,timestamp and environmental conditions.

3.TESTING AND DEPLOYMENT:

test the system throughly in a controlled environment.deploy the monitoring device in a real world location.monitor the system performance and troubleshoot any issues that arises.

4.REMOTE MONITORING AND MAINTANENCE:



set up a system for remote monitoring and maintenance of the devices. This can include remote diagnostics and ability to update the device firmware.

5.COMPLIANCE AND REGULATIONS:

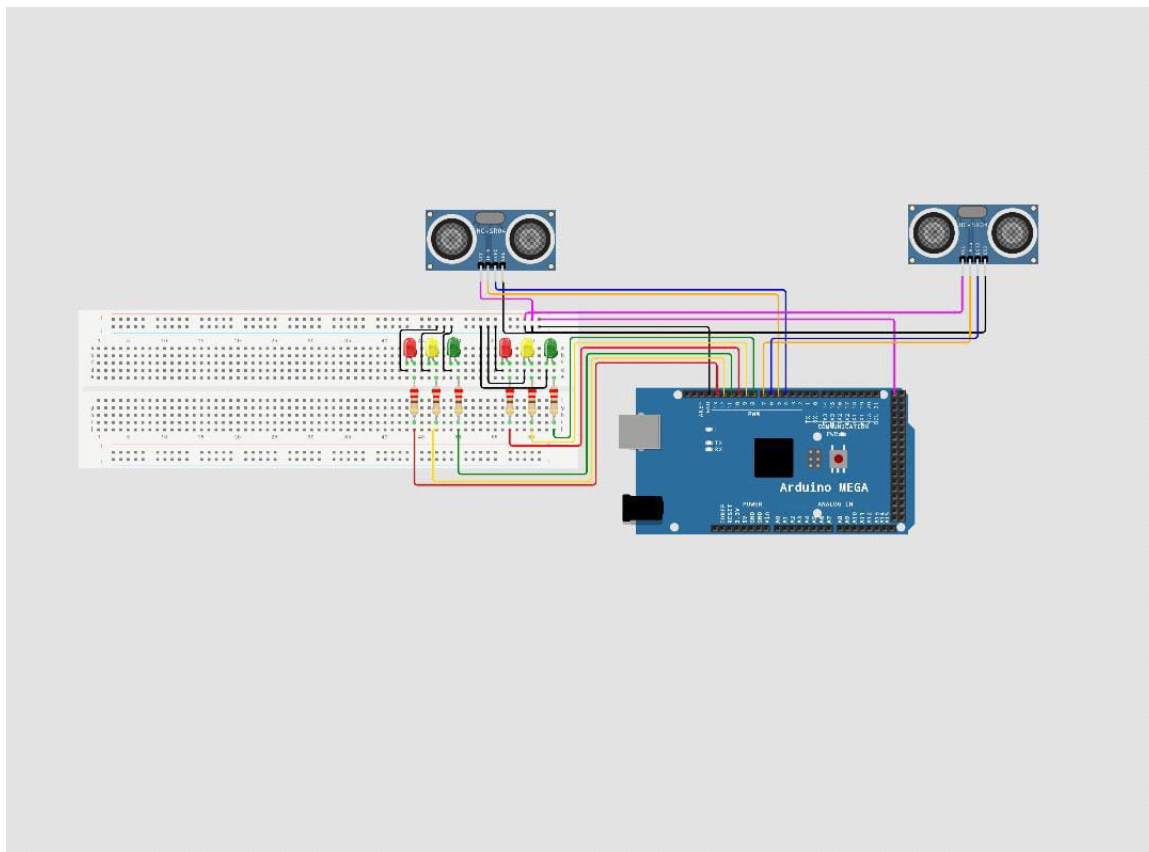
ensure the deployment complies with local regulations, privacy laws, and data protection requirements.

6.COMPONENTS:

Arduino Uno, ultrasonic sensors and camera.

7.SYSTEM ARCHITECTURE:

The system architecture involves the Arduino Uno as the central controller, which interfaces with the camera and ultrasonic sensors. The Arduino Uno collects the data from these sensors, processes it, and sends the data to the ThingSpeak platform over Wi-Fi. ThingSpeak displays the output in graphical representation.



8.SOURCE CODE

```
#include <WiFi.h>
```



```

#include <DHTesp.h>

#include <Ultrasonic.h>

#include <ThingSpeak.h>

const char*ssid="wokwi-GUEST";

const char*password="";

const unsigned long channel ID=2315218;

const char*writeAPIkey="WJLKFCP438EX4NG2";

python

import time

import request

#configure ultrasonic sensor pins

TRIG_PIN=23

ECHO_PIN=24

#simulated ultrasonic sensor data

def get_simulated distace():

return 60

#ThingSpeak configuration

THINGSPEAK_API_KEY='your_api_key'

THINGSPEAK_URL='https://api.thingspeak.com/update'

try:

while true:

#distance=get_distance()

#distance=get_simulate_distance()

#send data to thingspeak

payload={'api_key':THINGSPEAK_API_KEY,'field1':distance}

response=request.post(THINGSPEAK_URL,parms=payload)

```



```

#intialize GPIO settings

GPIO.setmode(GPIO.BCM)

GPIO.setup(TRIG_PIN,GPIO.OUT)

GPIO.setup(ECHO_PIN,GPIO.IN)

def get_distance()

GPIO.output(TRIG_PIN,True)

time.sleep(0.00001)

GPIO.output(TRIG_PIN,False)

while GPIO.input(ECHO_PIN)==1:

pulse_end=time.time()

pulse_duration=pulse_end-pulse_start

distance=(pulse_duration*3400)/2

return distance

try:

while true:

distance=get_distance()

if response.status_code==200:

print("DISTANCE:{distance}cm-data send to thingspeak")

else:

print("failed to send data to thingspeak")

time.sleep(60)

except KeyboardInterrupt:

GPIO.clean up()

GPIO on exit

```

9.OPERATION:



import required libraries.define thingspeak parameters.intialize GPIO settings.

(a)LOOP

the program enters a infinite loop,contineously checking for the presence of vechicle using motion sensors

(b)TIMING

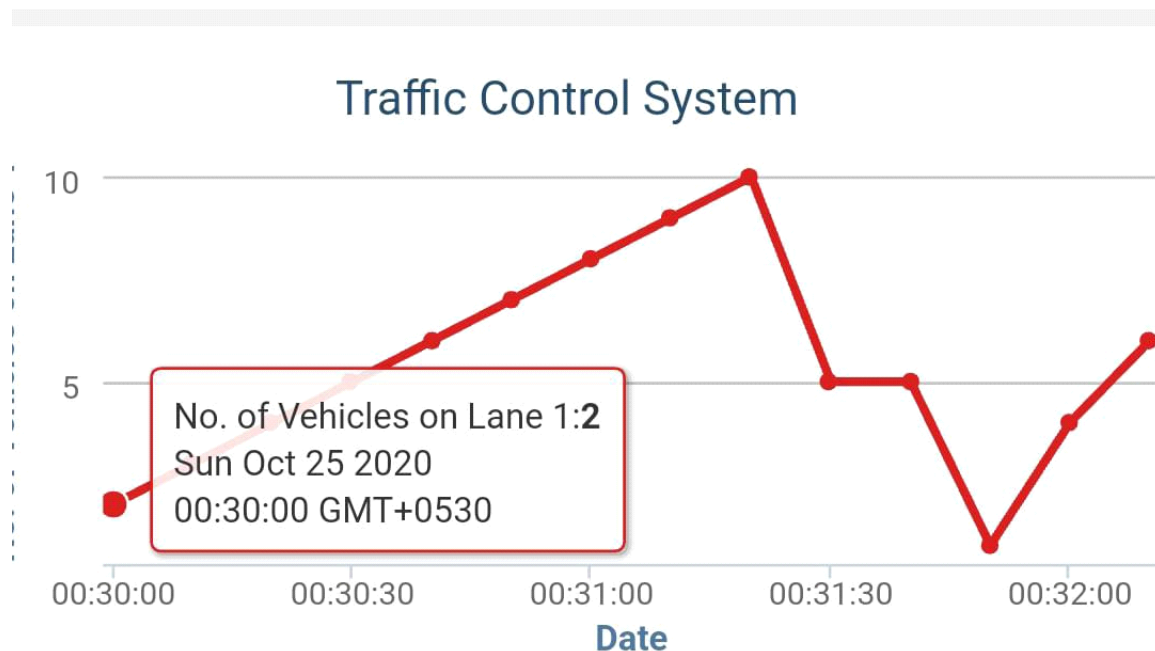
the program then waits forn 2 seconds before repeating the process,checking for vehicle presence again.

(c)TERMINATION

to stop the program,you can press ctrl+c,which trigger a keyboard interrupt,allowing for GPIO cleanup and existing the program.

10.DIGITAL OUTPUT:

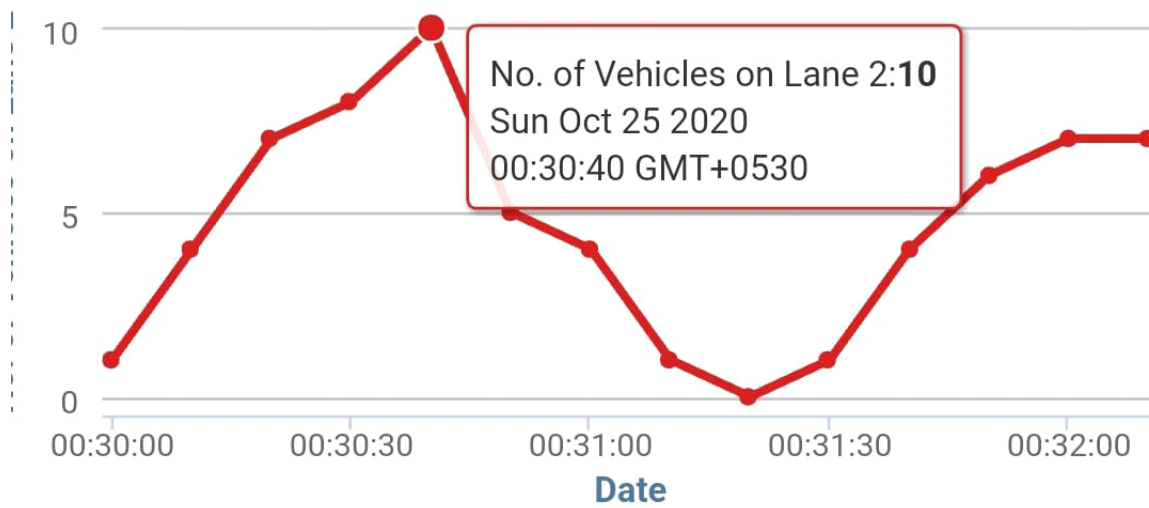
(a)FIELD CHART 1



(b)FIELD CHART 2

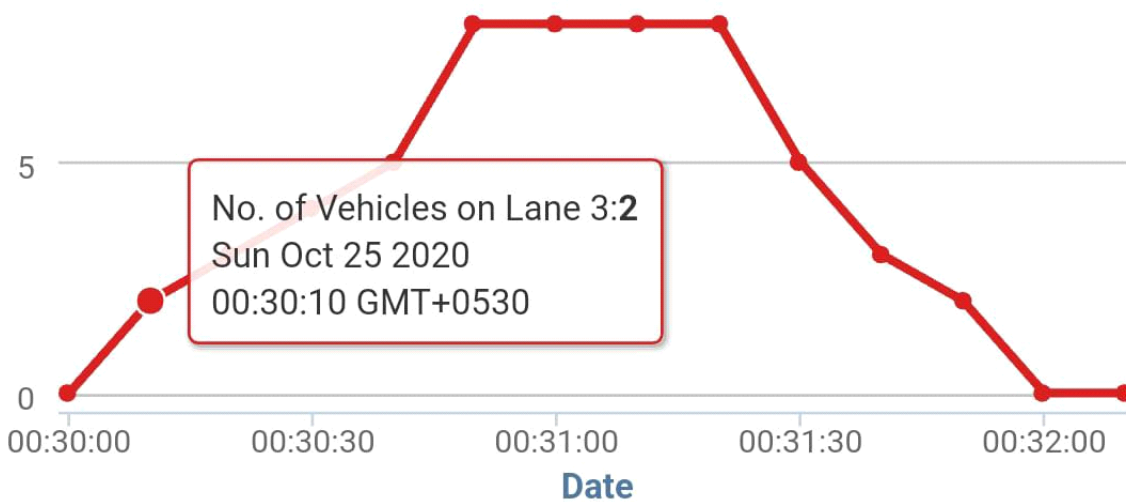


Traffic Control System



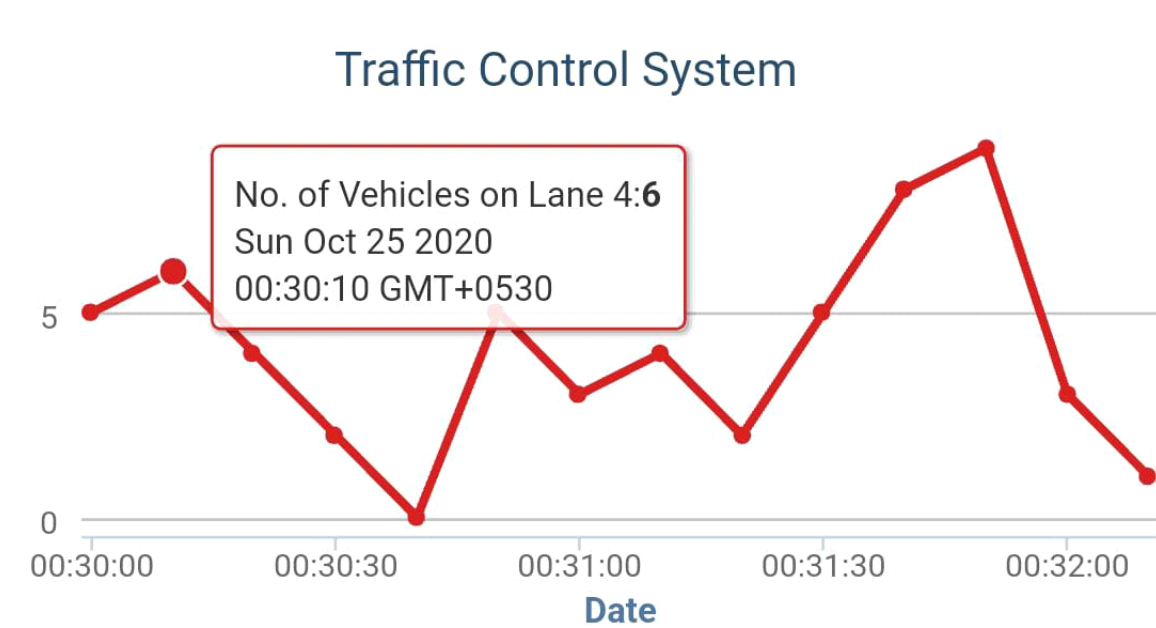
(c)FIELD CHART 3

Traffic Control System



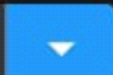
(d)FIELD CHART4





11.WOKWI SIMULATION OUTPUT:





Simulation

Code



00:07.776 49%

210.00



12.CONCLUSION:

in conclusion, the provided python program demonstrates a basic traffic management system that stimulates the operation of traffic lights based on the detection of vehicle presence using a motion sensors.the program also communicate with the TingSpeak platform to record and monitor traffic condition in simple mannner.

