Retraction

Retraction: Smart Traffic Control Scheduling in Smart City Signal Control (J. Phys.: Conf. Ser. 1916 012192)

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This article (and all articles in the proceedings volume relating to the same conference) has been retracted by IOP Publishing following an extensive investigation in line with the COPE guidelines. This investigation has uncovered evidence of systematic manipulation of the publication process and considerable citation manipulation.

IOP Publishing respectfully requests that readers consider all work within this volume potentially unreliable, as the volume has not been through a credible peer review process.

IOP Publishing regrets that our usual quality checks did not identify these issues before publication, and have since put additional measures in place to try to prevent these issues from reoccurring. IOP Publishing wishes to credit anonymous whistleblowers and the Problematic Paper Screener [1] for bringing some of the above issues to our attention, prompting us to investigate further.

[1] Cabanac G, Labbé C and Magazinov A 2021 arXiv:2107.06751v1

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Smart Traffic Control Scheduling in Smart City Signal Control

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Abstract. The most critical concerns in urban life are increasing population growth and an increase in the count of vehicles on road, tends to traffic congestion. Traffic signal control devices are commonly used to track and monitor the vehicles. Traffic congestion leads to air and noise pollution and many health issues. Therefore, this project reduces time and fuel consumption. In this project, a video processing technique is used to present a new approach for controlling traffic light. The developed model evaluates the traffic light scheduling based on the count of vehicles. Raspberry pi is used to execute it.

Keywords: Traffic light scheduling, Reduces time, Health issue, Raspberry Pi.

1 Introduction
Overpopulation, lack of city road planning, widespread use of private vehicles, road capacity and insufficient and inadequate public transportation are the main causes of traffic congestion. As a consequence of the preceding factors, there has been a significant effect on climate, human health and the economy. Many people face traffic congestion as a big issue. It causes many of the issues including air pollution, accidents, time and fuel waste. It raises the death rate as well as health issues such as asthma and lung disease.

In comparison to the rising number of vehicles in urban life, we face an inequality problem in the expansion of road infrastructure [1]. Traffic congestion has become a serious problem as a result of the growing number of vehicles [2]. It also leads to large time delay between traffic lights. It contributes to the waste of time and fuel which causes people to become impatient and increases in air pollution and noise pollution [3, 4]. Congestion increases during peak hour, special occasions, worse weather, accidents or constructional activities [5].

To rectify this problem, density-based traffic light system is used. Traffic lights are managed by identifying the vehicle density using cameras and raspberry pi. The proposed approach would be able to reduce the cost and time delay.

2 Existing Method
To estimate the vehicle count on the lane, different methods of traffic light control systems are introduced. As discussed in [6], using video processing methods, total density of the traffic can be
calculated. A web camera is utilized to catch photographs of the roadway at each plane of the traffic signal. By using image matching method, these recorded photos and reference photos are compared. To evaluate the boundaries of photos, we use Canny Edge Detection. The edge detection methods are used in lot of papers [7].

In [8], calculating the density of traffic related to the total vehicle count on the lane based on the number of pixels in one video sequence. Based on PIC microcontroller, the density of traffic is calculated using infrared sensors and achieve dynamic time slots for various levels [9].

Manual Controlling refers to the traffic controlled by using manpower. For controlling traffic in a specified area, traffic police are allotted. Using timers and electrical sensors, traffic signals are controlled is known as Automatic Controlling. For implementing manual controlling system, it requires enormous work force.

To monitor the traffic congestion, a social media-driven approach is used, with passengers and customers acting as a sensor, and their tweets serving as reports of local traffic conditions which are based on Hinge Loss Markov Random Fields [10].

For example, Ambulances and Fire engines cannot afford time in waiting for traffic lights to turn green. These vehicles need a device that allows them to cross the traffic signal safely and quickly. A Smart Traffic light System (STLS) that incorporates an Android App, MQTT Protocol, Google maps and Internet [11].

3 Proposed System
Traffic light system is based on a fixed time concept that is assigned to every side of the traffic junction and cannot be adjusted by changing traffic density. After measuring the amount of vehicles, we will know which side has the highest density based on which signals will be assigned for a specific side. Raspberry pi is employed as a microcontroller to provide signal timing related to vehicles count.

Figure 1. Describes the developed model’s overall block diagram. The block diagram of an ambulance unit is represented in Figure 2. The proposed model employs the live footage for, in order to calculate the amount of vehicles travelling through the major roads heading to crossroads. As a result, the camera is to measure the vehicles count which is installed at the traffic signal. Videos from all the directions are provided to Raspberry pi.

Then, the video is processed using video processing technique. During this technique, first the video is captured and then it is converted to black and white stains. In this, the moving vehicle is converted to white stain and background is converted to black stains. By using this, the vehicle count can be calculated. The vehicle count calculated from each lane is compared with one another. The lane with highest number of vehicles is given first priority for opening the signal. Next, the lane with second highest number of vehicles will open and so on.

Figure 1. Block diagram of proposed method
Figure 2. Block diagram of ambulance unit

For emergency vehicles like ambulance, RF Transmitter is fixed at the ambulance and RF Receiver is fixed at the signal.

When the buzzer present in the ambulance is pressed, RF transmitter sends the signal to the RF receiver which is installed at the signal. Therefore, the signals in all the lane becomes red except the lane in which ambulance is arrived If the two emergency vehicles are coming from two different lanes then first come first serve basis exists. Figure 3 represents flow chart of the developed system.

Figure 3. Flow chart of the developed method

4 Hardware Components

1) Raspberry Pi:
Because of its minimal cost, flexibility and open architecture, Raspberry Pi is commonly used in several fields, including weather forecasting. A Raspberry Pi3 model B is used in this project. It has a ARM Cortex-A53 quad-core processor running at 1.2GHz, as well as, Bluetooth, USB boot capacity and 802.11n Wi-Fi as shown in Figure 4.

The Raspberry Pi hardware has evolved over time, with differences in the form of CPU, memory space, networking capabilities and auxiliary unit support. The operating system and program memory are stored on SD Cards in the form factor of MicroSDHC. There are one to five USB ports on the decks. HDMI and composite video are provided for video output and a typical 3.5mm TRS connector (tip-ring sleeve) is used for audio output.

A Broadcom BCM 2837 SoC with 512KiB shared L2 cache is used in Raspberry Pi 3 model B. It is said to have 10 times the processing power of Raspberry Pi 1. According to Benchmark, the Raspberry Pi 3 is around 80% quicker when compared to Raspberry Pi 2 with 1GiB of RAM.

2) Camera:
A video camera that captures video and stored it to the memory. For this proposed prototype, a mobile camera is used.

3) RF Module:
Both the RF Transmitter and the RF Receiver are included in the RF Module as shown in Figure 5. The frequency range related to this is 30 kHz & 300 Ghz.
For a variety of purposes, RF transmission is preferable to IR transmission. Since RF signals can travel over long distances, they are better for long range applications. RF signals can also propagate when there is an interference between the transmitter and receiver, while IR works mainly in line-of-sight mode. When compared to IR transmission, RF transmission is more powerful and efficient. IR signals, which are influenced by other IR emitting sources, RF communication uses a particular frequency.

The operational range of 434MHz RF modules is between 50 metre to 80 metre. The transmission speed ranges from 1 to 10 kilobits per second. An RF receiver, which operates at the same frequency as the transmitter, receives the transmitted data.

5 Result and Discussion

The following figure 6 indicates the program for counting the number of vehicles.

```python
# coding: utf-8

import cv2
print(cv2.__version__)

cascade_src = 'cars.xml'
video_src = 'dataset/video1.avi'

# load classifier

car_cascade = cv2.CascadeClassifier(cascade_src)

# loop over the frames

while True:
    ret, img = cap.read()
    if ret == False:
        break
    gray = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
    cars = car_cascade.detectMultiScale(gray, 1.1, 3)
    for (x, y, w, h) in cars:
        cv2.rectangle(img, (x, y), (x+w, y+h), (0, 255, 0), 2)
    cv2.imshow('video', img)
    if cv2.waitKey(1) & 0xFF == 27:
        break
cv2.destroyAllWindows()
```

Figure 6. Program for counting the number of vehicles

The below figure 7 represents the video clip for counting the vehicles. Figure 8 shows Smart traffic control system using Raspberry Pi.

Figure 7. Video clip for counting the vehicles
Conclusion

An effective traffic signal control system based on vehicle density has been introduced, resulting in a good mechanism of traffic control. It is possible to identify the presence of vehicles on the road more effectively using video processing technique. It overcomes all the limitations of the existing traditional methods. Cameras are used to analyse and monitor the traffic flow. It provides an accurate count of vehicles. This method is cost efficient and simple. It reduces the air pollution and many health hazards.

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