SELF ADAPTIVE TRAFFIC SIGNAL CONTROL SYSTEM

Ashish Kumar Sahani[1], Kritika Mishra[2], Prashant Srivastava[3],

AmanSharma[4], Sandeep Singh[5]

[1234]*Student, E&C Dept., Buddha Institute Of Technology, Gorakhpur U.P., India.*

[5]*Assistant Professor, E&C Dept., Buddha Institute of Technology, Gorakhpur U.P., India.*

ABSTRACT

At a time people living style and the improvement on their living style growing rapidly high so the transportation or traveling is also growing high and vehicles are one the most major factor of transportations or travelling and this is the only reason why the use of vehicles are important or useful right now. So basically the number of vehicles is also getting rapidly high for use and it will cause traffic congestion and harm environment and pollute it rapidly fast so the **Self-adaptive Traffic Signal Control System** will solve some of the traffic problems by controlling traffic signal automatically and our system will not follow the standard time control system of traffic light signal. It will run by analyzing the density of vehicles in a lane and then our system program will operate traffic lights automatically.

Keywords: Webcam, Raspberry Pi, Traffic Lights

INTRODUCTION

The purpose of any model is to simplify the way of living. Self-adaptive traffic control system provides the major problem solution that is congestion, traffic accident, environment pollution. We live in country where a lot of problem is caused by traffic congestion like traffic accidents environment pollution and somewhere it also affects our economy. It delays the transportation & due to this the supply of any product or anything cannot be transferred from one place to another in a provided time period. In current traffic control system each lane have three traffic lights: - Red, Yellow, Green. The time for each light is fixed and the time taken by the system to change one light to another is also fixed. Because of fixed time span congestion cannot be controlled by this system. Self-Adaptive Traffic Control System introduces an optimum solution for these problems. It will automatically adjust the time span of each and every lane. When the number of vehicles at any of one side is far greater than the other side the system will automatically extend the time span of that side. It means the traffic light (red yellow and green) will adjust automatically by spotting the number of vehicles in each lane. This kind of traffic control system can maximize the number of vehicles passing the intersection and minimizing the number of stranded vehicles, as a result, can effectively alleviate traffic congestion. The famous and existing Self Adaptive Traffic Control Systems were SCOOT, SCATS, LA ATSAC, OPAC, In Sync, ACS Lite and RHODES. The motive of this paper is to provide the best traffic system to our country. So the problems caused by traffic can be solved.The domain of this project is Control and Automation. Where Control is the operation of a device that requires interaction from the user, in the form of a single action. And automatically controlled operation of an apparatus, process, or system by mechanical or electronic devices that take the place of human labor [1]. Automatic control system used for controlling operating equipment automatically.

LITERATURE REVIEW

1. **Jinyang Li, Yuanrui Zhang, Yixiang ChenA Self-Adaptive Traffic Light Control System Based on Speed of Vehicles:[2] -**the purpose of this system is to reduce the traffic congestion with the help of vehicles speed. It change the traffic light signal in real time following the speed of vehicles. This system is an instance of V2I (Vehicle to Infrastructure) communication model, realizing data transmission between vehicles and traffic lights.

2. **Yizhe Wang , Xiaoguang Yang , Hailun Liang , and Yangdong Liu A Review of the Self-Adaptive Traffic Signal Control System Based on Future Traffic Environment[3]:-**according to this paper the traffic control system is divided in 5 levels.

A level means the changes in the system according to the generation.

- **GENERATION 1.** The first-generation self-adaptive control system adopts the multi-time timing control of fine division of period, or completely isolated self-adaptive control, to realize the simple regulation of traffic flow.

- **GENERATION 2** .The second-generation traffic signal control system dynamically adjusts the parameters of the signal timing scheme

  (Signal period, green signal ratio, and phase difference). Compared with the timing and induction coordination control system, the second-generation system greatly improved the flexibility and adaptive adjustment ability of the control system. Typical second-generation control systems include **SCATS and SCOOT.**

- **Generation 3.** The third-generation control system uses the similar idea as the second generation to dynamically adjust the signal timing parameter in response to the fluctuation of the time-varying traffic flow at the intersection. Typical third generation control systems include OPAC and RHODES

- **Generation 4.**The fourth-generation self-adaptive traffic signal control system is an integrated traffic management and control system, which can realize the integrated management of network traffic and maximize the technical and performance advantages of multiple subsystems.

- **Generation 5**.The fifth-generation self-adaptive traffic signal control system is based on the abilities of self-learning and high efficiency calculation in automated vehicles and regular vehicles environment Based on the empirical information and real-time traffic condition, the fifth-generation adaptive traffic signal control system learns the traffic control knowledge independently and reduces the computational burden of decision optimization intelligently. It includes InSync System.

3. **City Of Los Angeles Department Of Transportation- Adaptive Traffic Control System[4]:-** The Adaptive Traffic Control System (ATCS) is a personal computer based traffic signal control program which provides fully automated traffic responsive signal control based on prevailing real-time traffic conditions. ATCS automatically adjusts all three critical components of traffic signal timing (cycle, offset, and phase split) in response to current traffic demands.
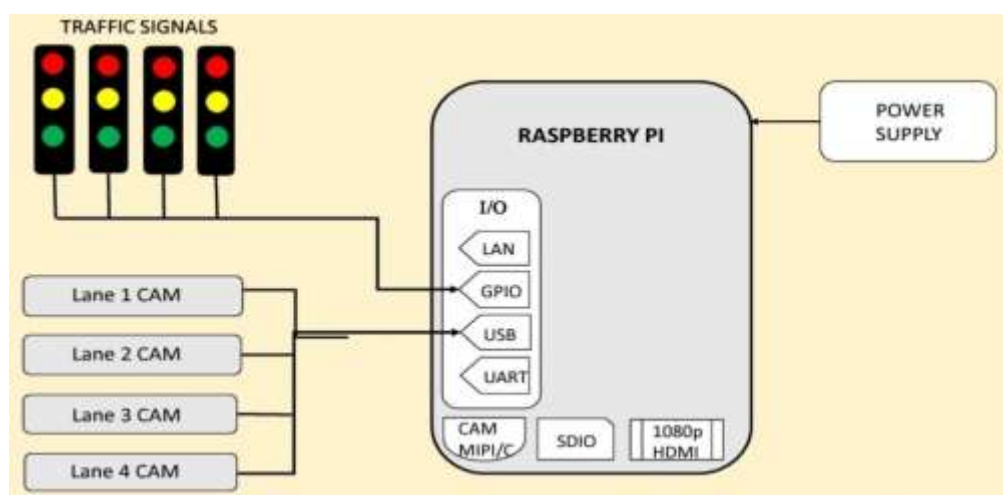
BLOCK DIAGRAM

Fig:1 Block Diagram

WORKING

Working is basically divided into four cases. These cases were

Case1: Normal lane

➢ The green light will start from the 1st of the lane
➢ It will cycle to the next lane in clockwise ordering.
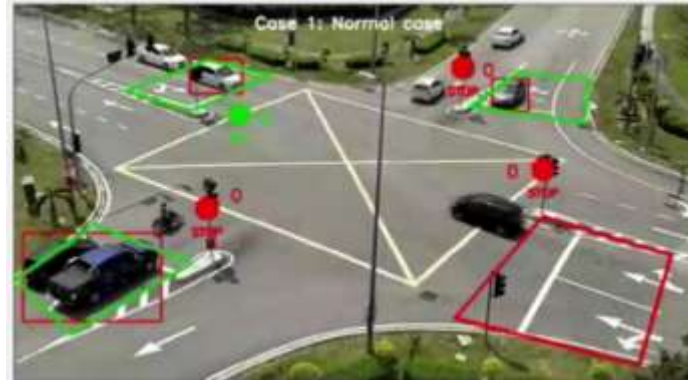➢ And to the last one it will continue looping until the program is closed

Fig2: Normal case

Case2: Skip lane

➢ The green light will start from the 1st lane
➢ The second lane will skipped because the lane has no vehicles detected
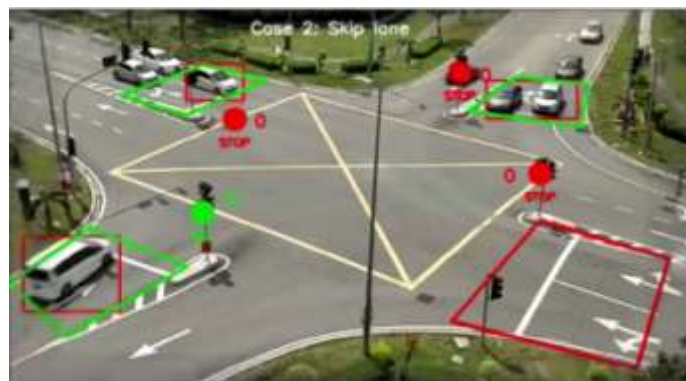➢ It will proceeds to the next lane.

Fig3: Skip lane

Case3: Extended Time

➢ The green light will start from the 1st lane
➢ If the number of vehicle in next lane is more than that lane where the traffic light signal is green.
➢ After passing all the vehicle of that lane the system will automatically reduce the time span and add it to the other side of lane where the traffic is high.
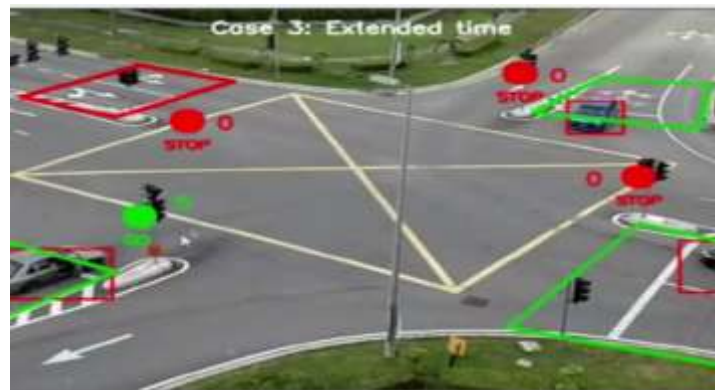➢ And then system will proceed to the next lane.

Fig4: Extended lane

Case4: No Vehicles Around

➢ The system will start from the top lane
➢ If there is no vehicles around any lane and after some time on any of the lane vehicle is detected, system will automatically shift to that lane.
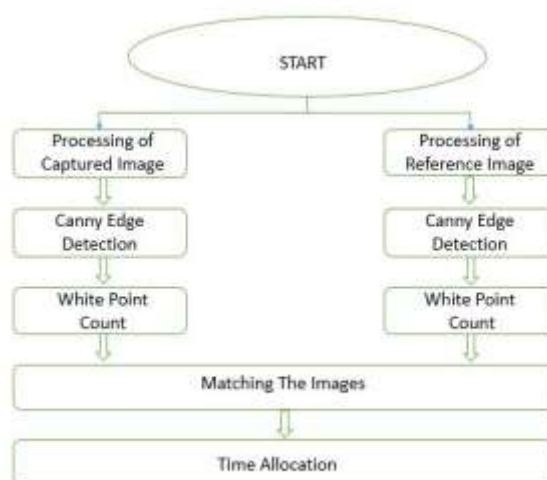

Fig5: No Vehicles Around

METHODOLOGY

Fig6: Methodology

Need comfortable model and block diagram then use all the useful component for the project and their specific use to automate and control and generate some of the initial design and then use it to operate. Complete project will install with standard traffic control system.

ADVANTAGE

•They move traffic along faster and with fewer stops.

•Signals are constantly being reprogrammed to maximize the green light length and allow the most cars through.

•Multiple intersections are coordinated, so that traffic can move freely throughout the corridor, rather than encountering frequent starts and stops.

PROTO TYPE

Fig7: Prototype

FUTURE SCOPE

* To control traffic automatically.
* Less time delay in traffic.
* Less rush for people in traffic.
* Less congestion and useful for traffic congestion area.

CONCLUSION

* The current traffic control system is unable to handle the traffic density in India.
* Current traffic system have a fixed time period to switch traffic light between different direction
* With the help of this Self-Adaptive Traffic Control System the problem of traffic congestion can be reduced to a significant lower level.

REFERENCE

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