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LITERATURE REVIEW ON SYNCHRONISED TRAFFIC CONTROLLER

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Abstract: Traffic signal control systems are widely used to monitor and control the flow of automobiles through the junction of many roads. We aim to see the smooth motion of vehicles on roads. Our idea proposes a system which will help us to control the traffic more effectively. We want to create a system that makes it easier to control traffic. If there is more traffic at one signal of a square and less traffic at another signal for this our system wants to make changes in the timings for the green signals according to the traffic at each road. Our project also helps in reducing traffic signal violation. If anyone crosses the red signal a buzzer will be buzzed to aware the violator and our system will generate a challan for breaking the signal and it will directly send the challan to the registered number of the vehicle with a specific time limit.

Our idea looks after six main points: ¹ Time saving. ² Traffic congestions can be avoided. ³ System will prove to be efficient in traffic flow. ⁴ Road accidents can be avoided. ⁵ Helps in reducing fuel consumption. ⁶ On-time scheduling & rescheduling of Signals will be done. ⁷ Quick Action can be taken against the signal violators.

Architecture: Hardware for the traffic signals using sensors to check the traffic on the roads. Software will be made using C, C++, Python, AI.

Keywords— Traffic Signals, TSOP Sensors, Arduino Microcontroller, Violation, Buzzer.

I. INTRODUCTION

As the growing population, the number of travelers constantly increases while resources provided by current Infrastructures are not sufficient for this, therefore intelligent control of traffic became a really serious issue. Traffic in the urban areas is generally based on fixed cycle traffic signal lights, which is not properly configured in many cases and causes unnecessary extra waiting times for the vehicles. The traditional traffic signal monitoring techniques include fix-interval monitoring. However, there is no system which we can call a capable and effective system or can be adopted in real-world effectively. This is because the traffic control system is non-linear and thus established methods of modelling and control cannot work very well.

In order to answer the above-mentioned problem comes our project. If there is more traffic at one signal of a square and less traffic at another signal for this our system wants to make changes in the timings for the green signals according to the traffic at each road. We also have the ever-increasing problem of the traffic violation. Our project also helps in reducing traffic signal violation. For example, if anyone crosses the red signal our system will generate a challan for breaking the signal and it will directly send the challan to the registered number of the vehicle with a specific time limit.

Minimizing the quantity of violations brings a lot of order and reduces the quantity of accidents. Currently, the monitoring approaches of traffic violation are not effective and good enough in the majority of the cases..

II. PROBLEM STATEMENT

A. Gradual increase in number of vehicles using the road every day.

Major problem which is increasing in cities nowadays is the problem of increased use of vehicles. The vehicles have become the necessity for people without the use of vehicle coping up with the fast-growing world would be nearly impossible. This increase in number of vehicles on huge level has in turn lead to challenging situation of traffic management.

Traffic congestion is a challenging task for traffic management system in urban areas. The current system is little backward in effective management of the traffic there are huge traffic jams in the cities leading to wastage of valuable time as well as leading to extra fuel consumption which in turn is harming the environment by polluting the air.

There is no alternative to stop the use of vehicles. So, what we can do is we can try and develop an effective way where in the traffic congestions can be avoided or reduced to a certain minimal level.

So here comes our project in picture we are aiming to design a system which will effectively manage the traffic by using latest technology and through use of smart way. The traffic management will be way easier than it is today. The automatic scheduling and rescheduling of timer according to the needs and demands of that particular signal. So, the traffic congestion can be avoided or reduced by implementing our developed project.

B. By the use of sensor electronics and the software automation techniques the signals will become smarter to take the decisions on what time to allot on the particular conditions so as the traffic congestions will be avoided.

Let's go deeper on what we trying to do in our project,

We are using sensor technology which is latest technology till date in markets which senses the physical data efficiently. This principle is beneficial in our project to sense the number of vehicles on particular side of signal.

Then the Microcontroller will be coded with the programs that will collect the data and process it in the manner that it will analyse the number of vehicles and they will generate the timing accordingly i.e., if the vehicles are less, it will allot small a lot of green signals and if the vehicles are more it will a lot big slot of green signal to it.

C. System will smartly alert the authority about the illegal signal crossing by citizens.

We are trying to implement the smart system that will detect unauthorized signal violators who are crossing the signal when the signal is red. In these we are using the Infrared sensors that will check unauthorized cross over and then alert the system by buzzer.

Then the POS tag will sense the number plate of the violator and send the data to central hub. This will make the system easier to sense the unauthorized violators without any error.

III. SYSTEM MODELLING

The project this paper is representing consists of four modules.

➤ Module 1

Sensors and Camera

TSOP sensor will detect the density of vehicles, their number and will provide this information to microcontroller. So, the sensor plays the first and foremost role in our project in sensing the vehicles. The data which it will provide will be then processed for adjusting the time according to the conditions. This is sensing technology is best suited for our project as compared to other sensors as it will provide the exact data to the microcontroller which is not possible in all the available sensors in markets.

The cameras which are on the top of the traffic signal will be used here for the detection of the density of the vehicles.

➤ Module 2

Processing, Decision making, Output

Arduino is the dynamic microcontroller which is easy to code in C & C++ and the microcontroller is equipped with the ports and pins which are more the sufficient for the project which we are aiming for. The micro-controller is easily available in the market without much complications in its name. The micro controller is heart of all the electronics projects so as ours. The micro-controller is bridge between the hardware and the software. It will keenly process the inputs taken from the sensors and then provide the desired output according to the conditions observed. So, the Arduino board is heart of our project as well.

All the data will be processed in the microcontroller and then the decision will be made about the timing of the green signal if there is more traffic at one signal of a square and less traffic at another signal for this our system wants to make changes in the timings for the green signals according to the traffic at each road and then the output will be given to the signal.

➤ Module 3

Buzzer and Challan

If anyone crosses the red signal a buzzer will be buzzed to aware the violator and our system will generate a challan for breaking the signal and it will directly send the challan to the registered number of the vehicle with a specific time limit.

➤ Module 4

Central Hub

The primary collection point for all information. It sits at the centre of your data ecosystem and connects to all the channels, platforms. It collects data from each of these channels, then organize and act on that data, often in real time.

The information used across the organization is often outdated, incomplete, or even incorrect. Crucial data is siloed because it's accessible to just one team or can only be used.

There will be a hub in the centre of the city for the data collection and monitoring of the vehicles and signals of the whole city. It will also monitor the violation that happens from signal breaking.

IV. BLOCK DIAGRAM

The block diagram representing the overview of the project is shown in fig.1.

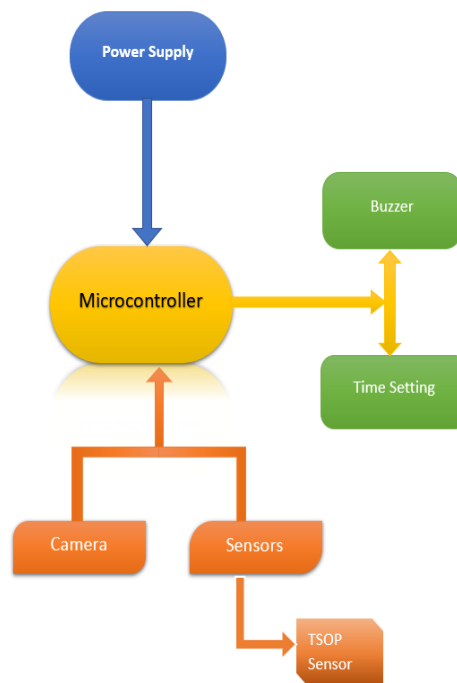


Fig. 1. Block Diagram of the Overview of the Project

➤ Microcontroller

Arduino is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board. The Arduino platform has become quite popular with people just starting out with electronics, and for good reason. Unlike most previous programmable circuit boards, the Arduino does not need a separate piece of hardware (called a programmer) in order to load new code onto the board -- you can simply use a USB cable. Additionally, the Arduino IDE uses a simplified version of C++, making it easier to learn to program. Finally, Arduino provides a standard form factor that breaks out the functions of the micro-controller into a more accessible package.

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➤ Power Supply

All Arduino boards need electric power to function. A power supply is what is used to provide electric power to the boards and typically can be a battery, USB cable, AC adapter or a regulated power source device.

➤ Buzzer

If anyone crosses the red signal a buzzer will be buzzed to aware the violator and our system will generate a challan for breaking the signal and it will directly send the challan to the registered number of the vehicle with a specific time limit.

➤ Time-Setting

If there is more traffic at one signal of a square and less traffic at another signal for this our system wants to make changes in the timings for the green signals according to the traffic at each road.

➤ Camera

The cameras which are on the top of the traffic signal will be used here for the detection of the density of the vehicles.

Thin small outline package (TSOP) is a type of surface mount IC package. They are very low-profile (about 1mm) and have tight lead spacing (as low as 0.5mm).

They are frequently used for RAM or Flash memory ICs due to their high pin count and small volume. In some applications, they are being supplanted by ball grid array packages which can achieve even higher densities. The prime application for this technology is memory. SRAM, flash memory, FSRAM and E2PROM, manufacturers find this package well suited to their end-use products. It answers the needs required by telecom, cellular, memory modules, PC cards (PCMCIA cards), wireless, netbooks and countless other product applications.

TSOP is the smallest leaded form factor for flash memory.

The TSOP Sensor is a miniaturized receiver for infrared remote-control systems. PIN diode and pre amplifier are assembled on lead frame and the epoxy package is designed as IR filter. The demodulated output signal can directly be decoded by a microprocessor.

V. ADVANTAGES

A. Time Saving

Our project will mainly help in time saving of the people in travelling they will not have wait much longer to cross the signal as our project is aiming to solve this problem of people waiting longer and longer on the signals waiting for the green light to cross the road.

B. Road accidents can be avoided.

As the traffic is continuously increasing so the chances of accident on roads are also on rise. Therefore, there is a need of handling the traffic in such a way that it will make the flow of traffic fluent. Our system will prove to be the one which will reduce the accidents on road the efficient flow will prove to be a factor in reducing the road accidents.

C. Traffic Congestions can be avoided

As the timing change of the green signal is based on the traffic of the roads. So, our project will be beneficial in the case of traffic jam. Less the number of vehicles less situation will be created of the traffic congestion. Thus, traffic signals can be avoided easily.

D. Quick actions can be taken against the signal violators.

Signal violation has become a popular trend in the prevailing society, the violators thinks that they are doing nothing wrong by violating the traffic rules. It is because no timely actions been taken against them. There no problem of authority though, the authority tries its best to punish the violators, perhaps trying their best it very difficult task to punish each and every one who is violators. So, our system will of great help to punish the signal violators with the use of technology. This punishment will in turn reduce the signal violations to greater extent. So, the society will be even more disciplined in following the traffic rules.

E. Helps in reducing fuel consumption.

As the vehicles will not wait longer on the traffic signal it will take less time reach their destination and less fuel will be used in this situation. So, our project helps in reducing fuel

VI. CONCLUSION

The aim behind this proposal or system is to reduce the traffic density by creating use of sensors that are on the market on the four roads, the pulses received by the sensors are going to be sent to micro-controller. If there's a lot of traffic at one signal of a sq. and fewer traffic at another signal for this our system needs to form changes within the timings for the inexperienced signals consistent with the traffic at every road.

The planned model here is predicted to perform higher with time, because the quantity of knowledge collected will increase, it'll be potential to form higher predictions. Thus, a reliable and enormous knowledge set can facilitate in economical estimations. Today traffic jam is that the biggest downside that is seen all over and really arduous to face. So, this technique can facilitate America to switch today's issues with the simplest solutions and edges. this technique can very facilitate America to form the longer-term roads flash and free with downfall within the accident graph.

VII. FUTURE SCOPE

Though the image model that we have a tendency to are planning to build, the real-life scenario goes to be far more difficult and demanding. Few of the challenges that ought to be taken into consideration are listed as follows:

Low vary IR sensors might not be a solution for long vary signalling system. we should always resort to optical maser or radio detection and ranging or laptop Vision/Video process primarily based techniques for large scale set-ups.

Next is that the influence of stray signals that will alter the reading of sensing element receptors and cause transfer false info to the microcontroller.

Periodic checking of the accuracy and exactitude may be a should for efficacious operation of this model image.

Safety first: it's to be fully created certain that no compromise is being created on issues of safety, i.e., a secondary stand-by set-up that may exchange from automatic to manual mode, ought to be provided just in case of sensing element gate malfunctions so transport crowd doesn't transcend management. As a part of future advancements, the traffic check post is also connected by wireless transmitters by that the crossings ahead is also AN anticipation of the traffic that's approaching.

If our project works expeditiously, we are going to take it more to Municipal Corporation

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