Density Based Traffic Control System

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Abstract- *Traffic management has been a significant problem in our country. Many factors such as overpopulation, lack of interest of public, unprecedented techniques has led the mismanagement of traffic. Thus we need a better approach and better techniques to have a control over the traffic management issues in our country. One possible solution to the problem is to introduce an automated traffic system. The proposed model suggests installation of IR LED and Photo diodes on either sides of road and detect the movement of traffic and change the signal based on the density of the traffic. A microcontroller is embedded which processes the signals and changes the traffic lights. This would improve the movement of traffic and is time saving. This is an upgrade from the existing conventional system.*

Keywords- IR LED, Photo diode, Microcontroller.

I. INTRODUCTION

One of the top troubles of current India is site visitors management. This takes place due to the big vehicle addition onto the roads each day. It is envisioned that around fifty thousand vehicles are registered each day inside the country. This has brought about an growth in the quantity of injuries, deaths, roads rage, boom in the commuting time over time passing by using.

The visitors includes cars consisting of automobiles, bikes, buses, cyclists, public transport, taxi, car, pedestrians, and so on. Every one of the above noted is blanketed within the software of traffic rules. Many humans aren't probably to observe the regulations. This occurs because of various factors consisting of lack of know-how, negligence, street rage, peer stress. This outcomes in blocking off of visitors, confusion, and a rather sluggish movement of the visitors and the maximum important of all, injuries.

If ever there occurs to be an coincidence, human beings block the roads as they get into fights and arguments. This takes place whilst the public has a tendency to take the regulation into their personal palms. This manifestly ends in blockage of roads and it makes the movement of the traffic pretty difficult.

One of the predominant troubles of contemporary India is Road Traffic. This is because of the great addition of cars each day. There are round 50-55 thousand new cars registered in India every day, however the range of automobiles removed off the road may be very less. This has caused the explosion of visitors on roads, ensuing in avenue rage, a better wide variety of accidents, deaths, and an growth in commuting time over the years.

The traffic on roads consists of vehicles, motorists, cyclists, buses, trucks, public delivery, taxis, vehicles, pedestrians, and many others. The street visitors guidelines apply to a lot of these styles of traffic. Not many humans have a tendency to follow the traffic regulations. This is due to poor information, negligence, street rage, loss of time, and peer strain. Itnis ensuing in visitors snarls, confusion, gradual movement of traffic and particularly injuries.

II. RELATED WORKS

The two best methods used by India to control the traffic system is either by the traffic lights or by the traffic policemen. But due to vast population it is not possible to maintain the situation at each and every corner of the area. But anyhow these two are thought to be the best methods used by till now.

As we are aware that this system won't last long. so, we need an efficient manner to solve this problem as in the current traffic system the change of lights is based on the timer system as whatever time may be fixed for that it will change after that only irrespective of the traffic jam.

So, here we want an efficient system which doesn't depends on the manual system or we can say that which doesn't follows the manual system.

In this system we are proposing that a video camera with a micro controller will be used so, that it can be checked whether traffic is high or low and accordingly the signal of lights will be changed.

In the past many suggestions or changes came to the system and some of them are: -

One of the suggestions is that to manage the traffic in single lane tunnel where the system detects and manage the traffic accordingly and also helps in reducing the number of accidents. They used IR sensors for the implementation of the same but the limitations of the idea are that it won't be implemented for the multi-lane roads or the junction where the road meets and even using IR sensors resulted in a huge amount of money.

Traffic management at alerts has been a primary problem in India. Unscientific techniques, negligence, and overpopulation have led to mismanagement of traffic at visitors signals. It desires the creation of latest generation and a better technique to improve site visitors situation.

A feasible method to this hassle is the density based totally automatic site visitors manage gadget. The proposed model tests for the density of traffic on the visitors signal and changes the visitors lighting fixtures consequently.

A video camera and visitors lights are interfaced with a raspberry pi board. The video is processed actual time and the Raspberry Pi enables the traffic lights to exchange while required. This should make the movement of site visitors less difficult and time-saving. This is an improvement from the conventional timer based operation of visitors lighting fixtures.

Blockage in rush hour gridlock is a difficult issue. In existing framework flag timings are settled and they are autonomous of movement thickness. Huge red-light defers prompt movement blockage. In this paper, IoT based movement control framework is executed in which flag timings are refreshed dependent on the vehicle checking. This framework comprises of WI-FI handset module it transmits the vehicle check of the present framework to the following movement flag. In light of activity thickness of past flag it controls the signs of the following sign. The framework depends on raspberry-pi and Arduino. Picture preparing of activity video is done in MATLAB with simulink bolster. The entire vehicle I performed by raspberry-pi.

III. IMPLEMENTATION

The proposed device the use of a microcontroller of 8051 own family duly interfaced with sensors, adjustments the junction timing routinely to house movement of automobiles easily avoiding useless ready time on the junction. The sensors used in this assignment are IR and photodiodes are in line of sight configuration throughout the masses to discover the density at the sign. The density of the cars is measured in three zones i.E., low, medium, high primarily based on which timings are allotted accordingly.

Further the project may be more desirable with the aid of synchronizing all the traffic junctions inside the city by using setting up a network among them. The network may be wired or wireless. This synchronization will significantly help in lowering site visitors congestion.The methodology includes following devices: -

- 8051 series Microcontroller
- LEDs
- Voltage Regulator
- Resistors
- Capacitors
- Diodes
- Transformer
- IR-LED & Photodiodes
- Transistor

➢ 8051 MICROCONTROLLER

It is a smaller pc and has on-chip RAM, ROM, I/O ports. The AT89C51 is a low-electricity, excessive-overall performance CMOS eight-bit microcomputer with 4K bytes of Flash programmable and erasable read most effective reminiscence (PEROM). The tool is synthetic the use of Atmel‟s excessive-density nonvolatile reminiscence generation and is like minded with the enterprise-trendy MCS-51 coaching set and pinout. The on-chip Flash lets in this system reminiscence to be reprogrammed in-system or through a conventional nonvolatile memory programmer. By combining a flexible 8-bit CPU with Flash on a monolithic chip, the Atmel AT89C51 is a powerful microcomputer which provides an enormously-flexible and price-powerful solution to many embedded manipulate applications.

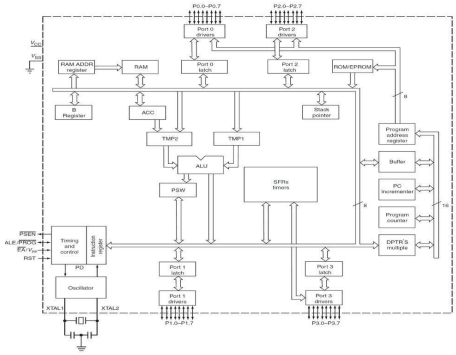

Fig 1: Block Diagram of Microcontroller

➢ Photo Diode

A photodiode is a type of photograph detector able to converting mild into both contemporary or voltage, depending upon the mode of operation.

Photodiodes are similar to normal semiconductor diodes except that they will be either exposed (to locate vacuum UV or X-rays) or packaged with a window or optical fibred connection to permit light to reach the sensitive part of the tool. Features

- Fast reaction time
- High photograph sensitivity
- Small Junction capacitance
- Package in 8mm tape on 7“ diameter reel

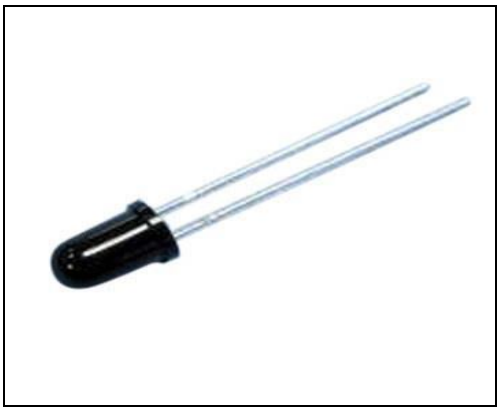

Fig 2: IR LED

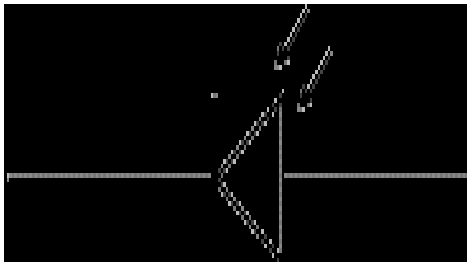

Fig 3: Photodiode

- **BC547**

The BC547 transistor is an NPN Epitaxial Silicon Transistor. The BC547 transistor is a widespread-motive transistor in small plastic programs. It is used in standard-cause switching and amplification BC847/BC547 series 45 V, one hundred mA NPN fashionable-purpose transistors.

Whenever base is excessive, then cutting-edge begins flowing via base and emitter and after that most effective cutting-edge will bypass from collector to emitter.

The undertaking makes use of the IR interruption idea for generating logic states to the enter of the MC. To attain the equal some of IR diodes are used facings photodiodes. While the IR mild falls on the photodiode the resistance of the photodiode falls increasing the bias voltage 17 Logic excessive sensed via the MC input adjustments the inexperienced ON time to a better cost for allowing greater motors to skip via. After sometime in case every other way receives greater logic excessive, the sequential timing gets mechanically accelerated for that manner.

Based on the IR interruption the inexperienced ON time will increase, therefore more the car longer may be the green sign time. Thus dynamic time manipulate is done primarily based on the visitors density.

IV. FUTURE SCOPE

1) In this innovation, we are utilizing Microcontroller to simply catch the video, yet all the preparing is done at the back end servers. This innovation can be enhanced later on to play out the preparing at the movement flag itself, decreasing the expense and the general handling time
2) This innovation can't work effectively amid awful climate conditions at present. Later on, it might be enhanced with the goal that it works proficiently under every climate condition.
3) When the emergency vehicle touches base close to the intersection, the driver needs to physically send a flag to the framework to interfere with it. Later on, it has the extension to be enhanced so the camera can insightfully identify the rescue vehicle in all circumstances and come back to the standard flagging stream promptly after the emergency vehicle has passed.
4) There is a noteworthy degree for development in the nation's transportation segment. We have been utilizing associated taxis through portable applications for as far back as 2-3 years and can expect a noteworthy change in the nation's open transportation framework with the presentation of metro prepare and Hyperloop.
5) We can expect bother free development of movement soon, with better innovation, rules, mindfulness, less mishaps and decreased driving time.

V. CONCLUSION

Thereby, we conclude that by way of the usage of the 8051 micro controller we have efficiently created a machine which is value effective and also correct. The micro controller changes the lights based totally at the coding. The IR sensor and Photo Diodes ship the signals to the micro controller to vary the time of green mild. In contrast with the existing

gadget the efficiency of this device has improved notably. The proposed device has an growth in the talent and edition as nicely. We can say that the proposed gadget has checked all of the corners of development and is efficient.

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