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Density-Based Traffic Light Controller

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ABSTRACT: Traffic control is a difficult issue in metropolitan and created urban communities. This is because of the huge number of vehicles and the high elements of the trafficking framework. Unfortunate traffic frameworks are the main justification behind problems, and time misfortunes. In spots cause of the shortfall of traffic police, individuals would like to bounce the traffic light which prompts serious problems, and once in a while may end the existence of individuals. In this task, the Verilog code is being utilized to execute the traffic signal regulator plan and the recreation is being tried utilizing the ISim test system. The traffic signal regulator is likewise planned in LabVIEW. Rather than text-based programming dialects, where guidelines decide program execution, LabVIEW utilizes dataflow programming, where the progression of information decides execution. Density-based traffic signal regulator is planned involving IR sensors in the four bearings of streets (north, east, west, and south). IR sensor detects the density of the traffic. As per the IR sensor values green sign is given to the high-density street.

KEYWORDS: IR sensors, Traffic Light Controller, Verilog, and Lab View software.

I. INTRODUCTION

Transportation is a key requirement for specialization, as it allows the production and consumption of products to take place in different places. Performance improvements: Cost and time reductions for existing passenger and freight movements increase transportation's contribution to economic growth. Reliability improves performance over time and reduces loss and damage, which reduces economic attractiveness. Productivity gains through access to a broader and more diverse input base and broader markets for various products (intermediate and final products).The traffic congestion problem contributes a huge impact on the transportation system in the country. Stop and go lights are signals that are used to control the movement of vehicles on the road. At road intersections, traffic lamps are generally positioned to control the stream of traffic. It is an electronic system generally installed on a road intersection to notify the safety-related issues with the help of a specific predefined color system. The traffic lamps consist of three colors namely red, yellow, and green. Red is the sign of danger or warning and on traffic lights, it is an indicator to stop the vehicles. People are made to hold back for the green lamp to further proceed. Traffic control systems have major drawbacks due to a lack of adjustments in the timings of a traffic signal, the traffic has to wait on the roadwith few vehicles within the allotted time the vehicles cannot cross the lanes. Traffic lights are usually timed. When signals are operated exclusively on timers, each direction is reserved for a specific period of 'green' time regardless of traffic conditions at any particular time, which brings stress to people and makes them get fixed in traffic. In India on average,110 cases of traffic violations while registered per day. Of which about 20 cases are of signal jumping. When traffic police are not present at a junction people would prefer to jump the traffic signal which leads to severe accidents and sometimes may take the life of people. In this paper we have developed, the traffic light controller is designed as an automatic traffic control system that changes the timer according to the density of the traffic present on the four roads in the north, south, east and west directions. By designing the system in this way we can efficiently manage the traffic. Figure 1 flow chat of traffic light controller

In fixed-time operation, the traffic lights turn green on each approach for the same duration in each cycle, regardless of traffic conditions.This may be sufficient in highly congested areas, but when an uncrowded secondary road is included in the sequence, not having vehicles waiting on some cycles can be a huge waste, as time could be better allocated for a better approach.

II.LITERATURE SURVEY

1. Jyoshna Chandra [1]: Using Arduino, they designed a traffic light control system based on vehicle movement. Due to improper traffic signal information, there are a lot of problems that are occurring. To reduce this problem, they have developed an Arduino-based identification traffic control system that automatically changes the signal timing when the IR is detected.Arduino was used to develop a traffic light control system.

2. Kesari Ananda Samhith, Y.David Solomon Raju[2]: It is a traffic control system that isbased on the clock period given to all four sides based on preferences. They are designed to generate the sequence of digital data that can be used to control the traffic light of a typical four roads junction in a fixed sequence. They designed the circuit based on the desired specification, writing a code, simulation, synthesis, and physical design implementation. while coming to the limitation in this project highest priority is given to the main road compared to the other roads.

3.M. R. Usikalu, A. Okere,O.Ayanbisi, T. A. Adagunodo, andI. O. Babarimisa [3]: They had developed an Arduino based traffic control system to resolve this problem. As soon as the IR is detected, the signal timing changes according to the traffic density without any manual work.Taking the Arduino circuit, the delays caused by traffic lights are reduced and appropriate hardware and software integration is used so that the traffic density can be easily measured.

4. V.Parthasarathi, M.Surya, B.Akshay, K.Murali Siva and K.Vasudevan [4]: This project mainly focuses on the essentials of an intelligent traffic system ,we use different kinds of tools and combine them to work out a solution for this problem.A traffic control system with efficient operations is designed so that this can help the emergency casualties to be attended quickly without the panic of traffic congestion.In thisproject a prototype is designed for real-time image processing for smart automation of traffic signal system for density Estimation and emergency vehicle detection such as ambulance solutions for this problem. while coming to the limitation in this project manual maintenance is needed and more memory is required.

5.R.Ganiyu [5]: The traffic problems are caused by humans themselves as they have a heavy load of motor vehicles traffic jammed at the junction for reducing this, we use electronics like microprocessor. The implementation of microcontroller-based traffic light system for road intersection controls the movement of vehicles. While coming to the limitation each road is given a constantperiod to pass the way and does not consider thedensity of traffic.

6. M.Ali Qureshi, Abdul Aziz, and S. Hammond Raza [6]: The project was designed using a mealy state machine. Coding of the design is done in Verilog HDL, they have tested and simulated the Spartan-3XC3S400 FPGA development kit. The sensor was added as an input to the controller for an emergency condition. It is also capable to change the timing of a traffic signal according to the density of vehicles. This model takes care of traffic on any chowk consisting of roads. While coming to limitations The traffic light controller is using predefined values to control the traffic.

7. N.Dinesh Kumar, G.Bharagava Sai, K.Shiva Kumar[7]: Explained that as vehicular travel is increasing, the problem of urban traffic congestionspreads and as such there is a pressing need for the introduction of advanced technology and equipment toimprove the traffic control. Traffic problems nowadays are increasing because of the growing number of vehicles and the limited resources provided by current infrastructures. Sostimulating and optimizing traffic control algorithms for increasing demand is needed the time. The simplest way for controlling a traffic light is to use a timer for each phase and the LabVIEW Simulation model for controlling the traffic lights based on time intervals. This Simulation model can be extended to control the time interval of the traffic light based on traffic density. This can be even extended to an integrated traffic management system for a metropolitan city based on the density of traffic."

III.PROPOSED SYSTEM

The densities of traffic are registered through the detection installed either in the carriageway or above the signal heads. The controller then processes these demands and allocates the green time in the most appropriate way.

A vehicle passing through a detector will claim a certain phase, and once that phase is green, any additional vehicles passing through the detector will cause the phase to lengthen. Traffic continues to increase the green time until traffic demand ceases and another approach switches to green conflicting demand causes the maximum green timer to count down.

At some intersections, when one of the side streets has light traffic, the signals are programmed to emit a green light only when there is a traffic demand on the street. This approach is classified as on-demand.
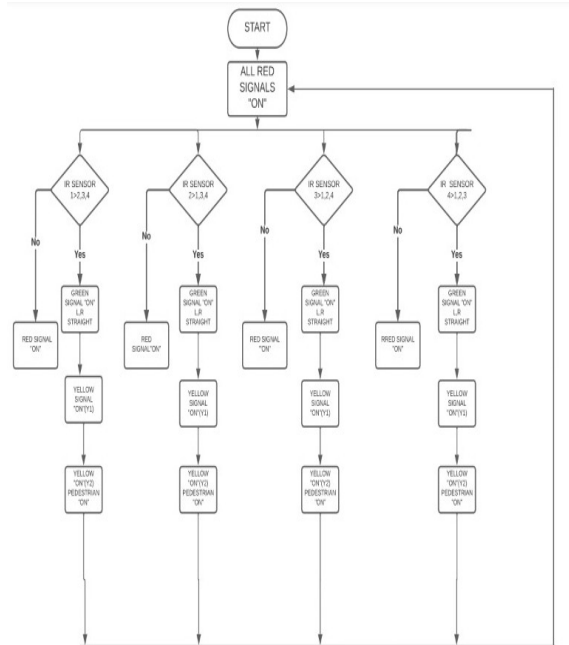

Figure 2 Block Diagram of Density Based Traffic Light Controller

The above stream diagram addresses the four streets traffic signal regulator framework. On each roadside, there is a traffic signal comprised of red, green, and yellow signs. At the point when the traffic signal is turned on every one of the streets will be on red light next the IR sensors introduced on 4 different ways counts the number of vehicles, the green sign is given to the street which is has a large number of vehicles and it goes on for every one of the four streets.
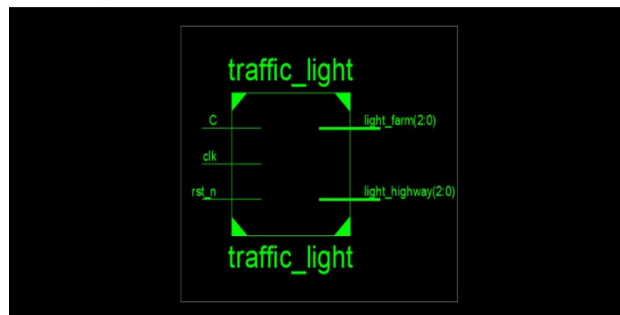
IV.RESULTS
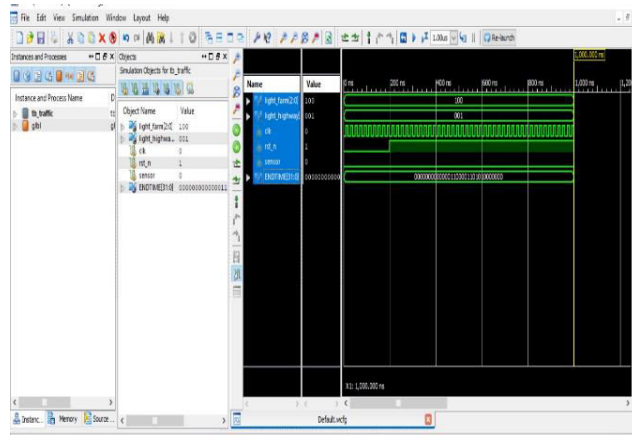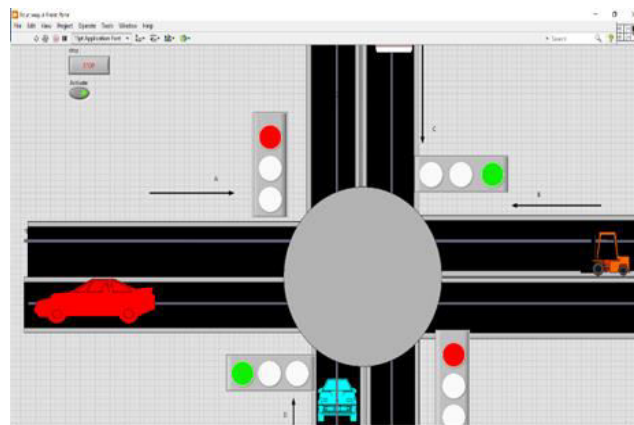

Figure3 Schematic

Figure 4 Timing Diagram

Figure 5 Four way density based traffic   light controller

The above figure represents the four way density based traffic light controller, the four roads are represented by A,B,C and D. The activate button is off, so the traffic light controller is in off state.
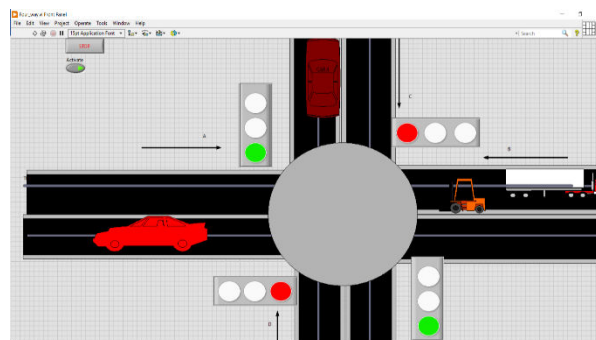

Figure 6 Four way density based traffic light controller

The vehicles started moving from roads C to D and D to C

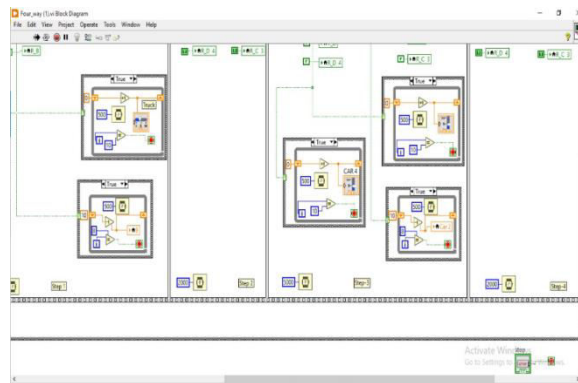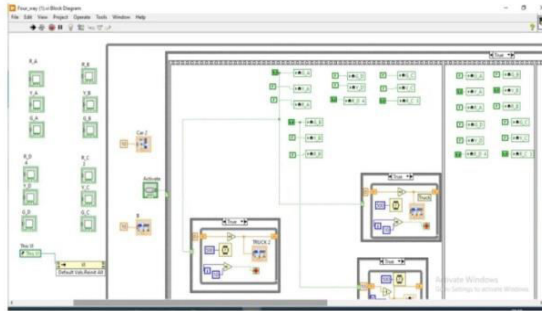Figure 7   Block diagram

Figure 8   Block diagram

The above figure represents the four way density based traffic light controller block diagram, it consists of activate button, four traffic light controllers, case structures and stop button.

V.CONCLUSION

A programmed Traffic control framework is vital for traffic the board in quickly developing metropolitans and cosmopolitans. However there are ordinary techniques that are as yet helpful and important, a LabVIEW-based Traffic control framework is a somewhat simpler methodology according to a peak's perspective who workson the traffic light framework since it is extremely more straightforward to configuration, upgrade, and troubleshoot in LabVIEW as it is a Graphical Programming language. This task can be reached out to configuration Traffic control utilizing picture handling ng procedure. The Design and execution of a LabVIEW-based Integrated Traffic Management framework would be extremely helpful and effective.

VI.FUTURE SCOPE

In the future, person on foot control rationale can be added withthis fluffy traffic regulator. The whole trafficregulator in the city can be associated by making network association and can speak with each other by sending data about current traffic circumstances of their convergences, which will use as contributions for the fluffy regulator. Based on these inputs the regulator will create results to better control of the blockage thinking about the current traffic circumstances of other neighbor traffic regulator's crossing point of the organization. Emergency vehicle control framework can be stretched out by presenting GSM module, which sends alert implication to the regarded emergency clinic specialists expressing that emergency vehicle is close to the clinic. In later we can involve this framework in a few applications by addingextra parts to it.

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