Traffic Density Control System for VIP Vehicles

Abstract

The aim of the “Traffic density control system for VIP vehicles” is design to overcome traffic congestion problem. This project provides solution all problems of traffic. This system can be used traffic related problem such as ambulance, VIP vehicles. This project consists of PLC & SCADA, IR sensor push button. IR Sensors are detecting presence of vehicles & send the signal to PLC. This project is divided into two parts which are hardware and software the hardware part of this project is a model of the four way junction of the traffic light system. Each lane has a two sensor. Two indicator lamps with different colors (Red and Yellow) are installed at each lane for represents as traffic light signal. The software part operates with Allen-Bradley® Micrologix™ 1400 Programmer. With using this software, the ladder logic diagram is programmed to control the traffic light base on the flow chart.

I. INTRODUCTION

This proposed work is “A model of traffic light system with the application of PLC” which is one of the applications of traffic light control system. In addition, the application work involves state equation and ladder diagram of the traffic light with ability of the time modification of the timer in (PLC) according to the emergency vehicle in one side. The situation in the traffic light control system concerns of emergency vehicles as higher
priorities in such case Sensors are detecting the presence of vehicles & send the signal to PLC which check the signal & decide which lane is to be served first. This research exposed the operational of traffic light such as understanding the flow of the traffic system and the program itself. Traffic signal light is used to control the movement of vehicles and passengers, so that traffic can flow smoothly and safely. The many advantages of using PLC to control the traffic lights such as: lower operation cost, ease of programming or reprogramming, low failure rate, and finally the ability to optimize the timing for emergency vehicles.

II. METHODOLOGY

The system which is shown in below gives the automatic implantation in traffic density control system for VIP vehicles. Programmable logic controller is the main part of traffic density control system. The functional diagram of system gives the whole idea of system. In this system we are control on traffic related problem like emergency vehicles, ambulance and VIP vehicle. PLC programming is done using ladder diagram language.

Proposed block diagram

![Figure 1: Block diagram of Traffic density control system](image)

III. SYSTEM DESCRIPTION

The proposed block diagram sensors and SCADA is connected. Sensors are detecting the presence of vehicles and send the signal to PLC. SCADA is only used for the animation purpose. Red and green indicator is used as a traffic light signals.
A. Programmable logic controller (PLC)

The Allen-Bradley® Micrologix™ 1400 from Rockwell Automation complements the existing Micrologix family of small programmable logic controllers. It provides Ethernet/IP, online editing, and a built-in LCD, plus provides you with enhanced features, such as: higher I/O count, faster High Speed Counter. The development and testing ground for this new means was the U.S. auto industry. The time period was the late 1960's and early 1970's and the result was the programmable logic controller, or PLC. Ladder logic is the primary programming language of programmable logic controller. The basic PLC schematic includes memory, CPU, power supply, input, and output. The central processing unit module is brain of the PLC and is used to read input, execute the control programs and update the outputs. The memory includes pre-programmed ROM containing PLC’s operating system, drive system, application program, and RAM. The input and output module connect the PLC to sensors and indicators and provide isolation for the low voltage, low current signals. [7]

B. SCADA

SCADA which is mainly used for the automation purpose in the project. Here is the scope of SCADA is that to control traffic on “Density Bases” which avoid the traffic Jam situations in metro cities as we face in our daily life and also it can control the traffic remotely by visualizing (monitoring) the traffic situation and provide the clear path (road) in case of emergency like ambulance, fire brigade etc.[4]

C. IR Sensor

IR Sensor work by using a specific light sensor to detect a select light wavelength in the infrared spectrum. Main function of IR sensor is sense the object. IR Sensors mounted on the Poles. It can be a simple IR LED-Photodiode arrangement or a video detection unit which can detect the presence of vehicles. This works on the principle that when a car passes between the IR transmitter and IR receiver, the IR light is blocked and as the result the resistance of the photodiode increases. This change in resistance can be converted to electrical pulses, used to control the traffic lights. [8]

D. Traffic light

Traffic light, also known as a traffic signal, stop light, stop-and-go lights, robot or semaphore, is a signaling device positioned at a road intersection, pedestrian crossing, or other location in order to indicate when it is safe to drive, ride, or walk using a universal color code.[3]

E. Push button

Push button switches are type normally open (NO) or normally closed (NC) type switches where some pressure must be maintained to keep the switch activated. Some switches may employ both NO and NC. These switches are used to send signals into the PLC as input commands. For example, a green pushbutton can be used to start a motor while a red one is used for stopping a motor. [2]
IV. PROPOSED FLOW DIAGRAM

A. Flow diagram description
When ambulance is present in the special track then first sensor is detect the present ambulance and send the signal to PLC. PLC gives red signal to all indicators that time other vehicles are stop and ambulance pass the junction. After some second sensor is on then all LEDs are green and execute normal operation.

B. Advantages
i.) Provided for orderly movement of Traffic.
ii.) Increase capacity at intersection.
iii.) Interrupt heavy traffic to allow pedestrians to pass.

V. CONCLUSION
Here we have proposed a system that would be used to reduce traffic density with the PLC and different types of sensors used in it. The main aim of this proposed system is to detect the presence of important vehicles and give intimation to PLC, where PLC would perform such operation to ON and OFF the traffic lights used as traffic indicators. This is the proposed work in which we have just focused to control traffic of vehicles.
VI. REFERENCES


[2] Experiment of Traffic light control system for an intersection using S7-300 PLC.


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