



AUTOMATIC VEHICLE MOVEMENT DETECTION AND ACCIDENT PREVENTION USING PLC

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Abstract: This paper deals with road accidents at bends and turns. Here we are using PLC and sensors for automatic detection of vehicles. these sensors are placed at either side of the roads. The sensor used is ultrasonic sensor. It is connected to the input side of the PLC. The output are chosen as red, green and yellow lights. The topology used is a half adder logic with bubbled AND gate. when no vehicle is detected on both sides yellow light glows. when anyone of the sensor detect vehicle on anyone side green light glows. when both sensors detect vehicles on both the sides then red light glows. this method helps in prevention of accidents.

Keywords: ultrasoinc sensor, PLC,redlihg, green light, yellow light, half adder logic, bubbled AND gate.

I. INTRODUCTION

Accidents are caused day by day due to improper notice of vehicles arriving on the other side. To overcome this we have design a simulation using PLC functional block diagram topology. The main advantage of using PLC is that it can control larger number of outputs and inputs, it has automatic control, the space required for the entire PLC setup is very less. The installation cost of this project is very less and more efficient when compared to the other methods. Here we are using crouzet millenium3 PLC, with CD -24V DC ESSENTIAL 12inputs and 8 outputs.

II. SYSTEM ARCHITECTURE

In this PLC is supplied by the EB supply , the 2 sensors are connected to the input side of the PLC. The output of the sensors are connected to the half adder and to the bubbled AND gate. The output of the half adder and the bubbled and gate are connected to the light loads. To understand the concept of vehicle detection we should have deep knowledge about the truth table. The whole logic is drawn using functional block diagram. As shown in fig.1. Logic. Which is easy to operate as well as easy to be understood.

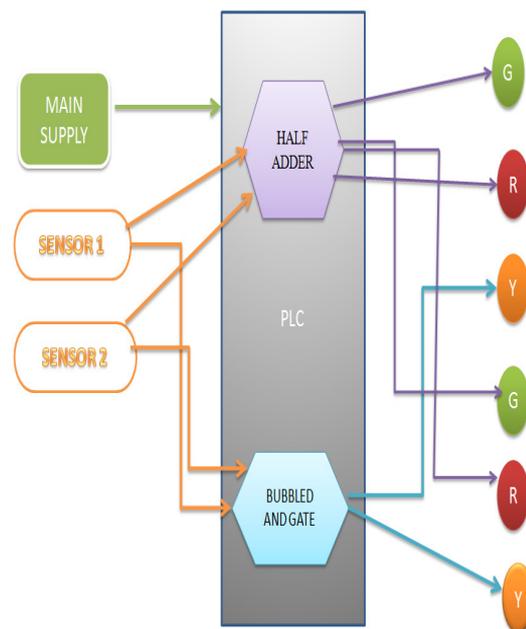


Fig 1. Block Diagram



III. LOGICAL OPERATIONS

A. HALF ADDER LOGIC

Half adder is a combination of XOR gate and AND gate. The logical diagram and truth table are given in the fig 2.

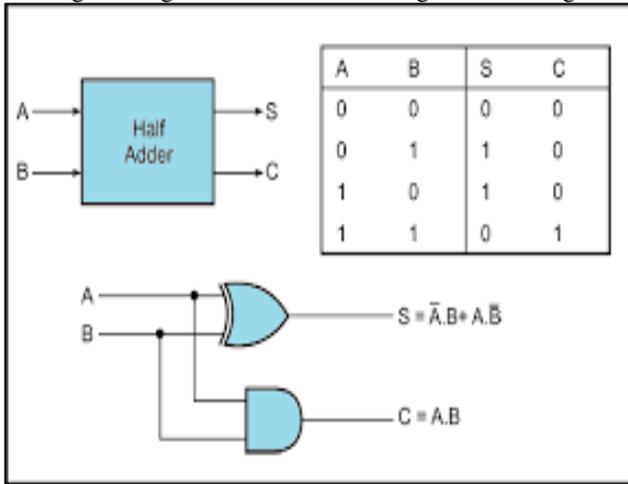


fig 2. half adder logic

B. BUBBLED AND LOGIC GATE

It is also known as 2 input negative and gate. It gives output as the opposite of the input. The logical diagram and truth table are given in the fig 3.

2-input Negative-AND gate



A	B	Output
0	0	1
0	1	0
1	0	0
1	1	0

Equivalent gate circuits

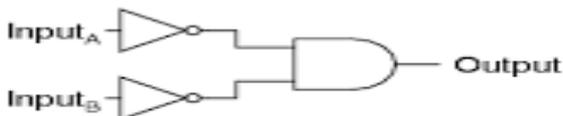


fig 3. bubbled AND gate logic

IV. WORKING OPERATION

In this project when both the inputs are OFF it follows bubbled AND gate logic and both the yellow lights are on which indicates that there is no vehicle detected as shown in fig 4. When any one of the input is active green light glows as shown in fig 5 and in fig 7. That is vehicles are detected on either side. When both the inputs are ON, as shown in fig 6, the red lights glows which indicates a warning signal to the other vehicle coming in the opposite side. Also the working operation is in table 1.

TABLE I
 WORKING OPERATION

INPUT A	INPUT B	LIGHTS
OFF	OFF	YELLOW
ON	OFF	GREEN
OFF	ON	GREEN
ON	ON	RED

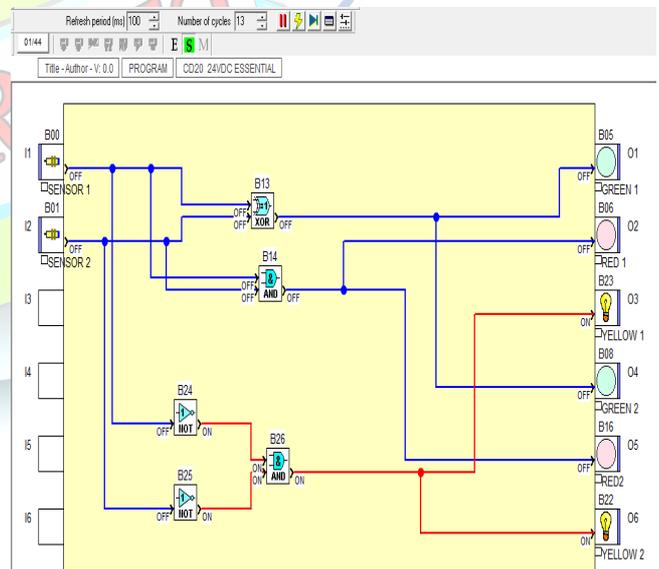


fig 4. when both the inputs are OFF

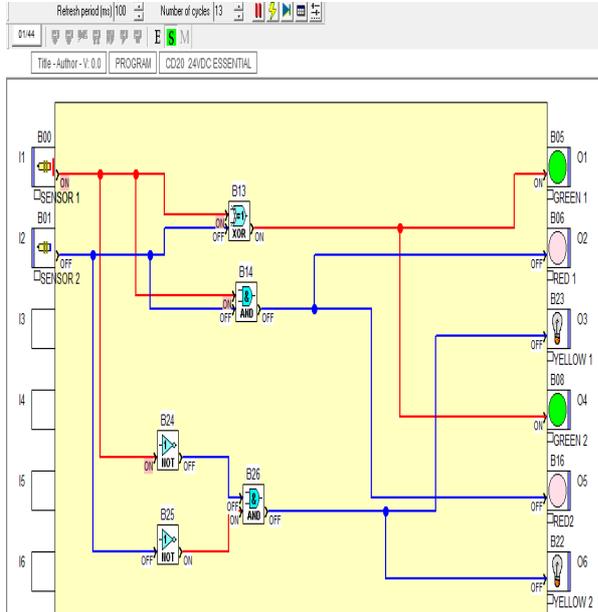


fig 5. when first input is ON

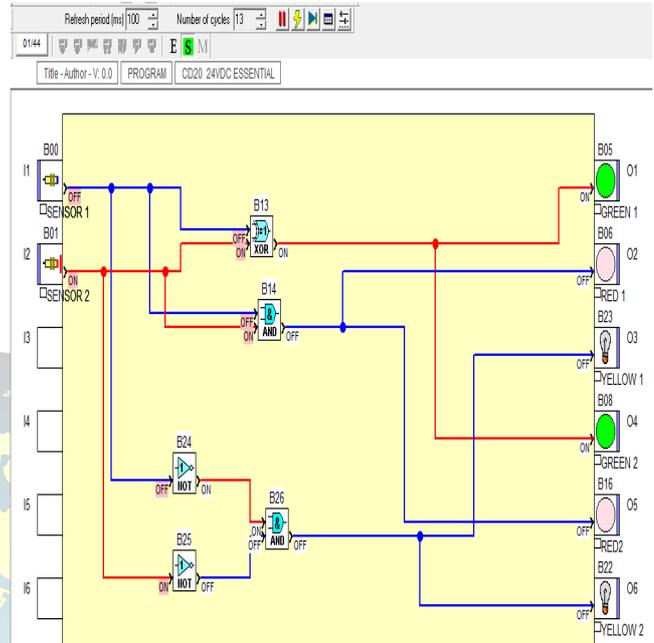


fig 7. when the second input is ON.

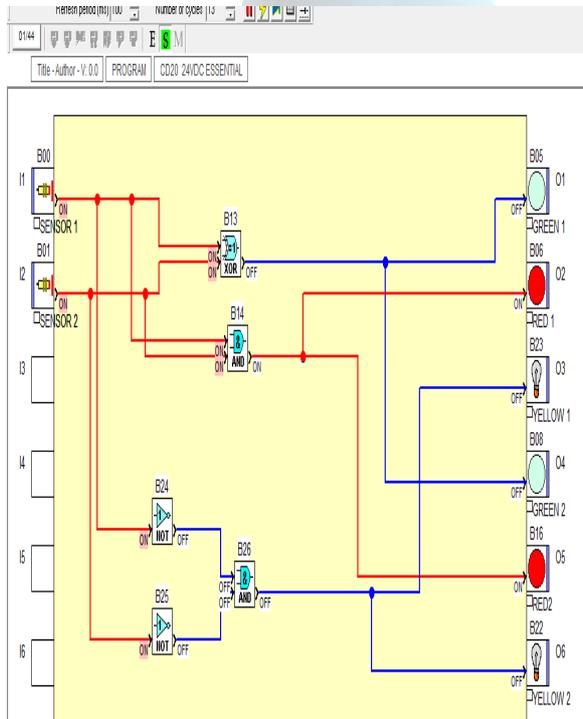


fig 6. when both inputs are ON

V. CONCLUSION

When compared to other topologies PLC is best suited for vehicle detection because it is an automatic process and also PLC can connect many inputs and many outputs so it is advantageous when compared to other devices like arduino and microcontroller. Further we can also attach a solar supply to overcome power interruption. Using plc we can connect many inputs and outputs as required in the design specifications. It is most preferably used in hill bends and road turns also it can be suggested to be used in railways signaling.

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