CALIFORNIA SCIENCE & ENGINEERING FAIR
2019 PROJECT SUMMARY

Name(s)

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Project Number

J1018

Project Title

Stop, Slow, Go!

Abstract

Objectives

My goal is to develop a traffic light system that will do just that while ensuring the safety of lives and properties at the intersections of the roads. I intend to combine commercial softwares and sensors built under the surface of the road to make intersections smarter. My hypothesis is to make the current traffic light smarter so that the flow of the traffic will be quicker. The detector could do this by sending a message (by program) to the Central Processing Unit (CPU) and saying, Hey, there is a car here, turn on the green left turn signal! And then the output of PLC would turn on the green left turn signal.

Methods

Colored LEDs (Light Emitter Diodes) are used to indicate the actual colored traffic lights. A micro-logic hardware producing a 24 DC (Direct Current) voltage is used to energize these LEDs for a safe required electrical operation. One kilo-Ohm, one Watt-resistor is connected in series to each LED to split the produced 24-volt output from the micro-logic to safely operate the LED which requires no more than 2.5 volts to operate. Small switches are used in place of metal detectors cut and placed in the asphalt/concrete for left turns to determine if any car(s) are waiting to make a left turn. When there is a car waiting to make a left turn on south or north of an intersection, the switch (metal detector) picks up the existence of the car and input that to the CPU (Central Processing Unit). Then, the green light allows left turns from south to west and from north to east while the green light allows right turns from east to north and from west to south. These lights will turn to yellow and then to red after the timer runs out. When there is a car waiting to make a left turn on east or west of an intersection, the green light allows left turns from east to south and from west to north while the green lights allows right turns from south to east and from north to west. These lights will turn to yellow and then to red after the timer runs out. The green lights allow cars to go straight when the left turn lights turn Red. An additional timer is added to the program which extends the time for straight through from south to north as well as north to south if there was no left turn from south to west and/or north to east. Likewise, another timer perform the same function for extending the time for straight through for east to west and west to east in the case there was no left turn from west to north and/or east to sout

Results

This innovation worked, but can still be made better. My traffic light model can still be made better and will need some future fixes. A copy of the program controlling the traffic light along with its data such as input/output and timers will be attached to the poster. Active inputs/outputs and timers are highlighted in green

Summary Statement

My project is a model of a traffic light on oak plywood that was programmed using Ladder Logic on a computer which was connected into a series of wires to the PLC that shows how a traffic light works and how we can innovate it.

Help Received

I designed the model, programmed my traffic light, and assembled all the components onto the model. My dad helped me with connecting the series of wires from the PLC(Programmable Logic Controller) to the LED lights/switches. I learned how to program this language from a teacher, Haj Mohamad, at Boston