

CHAPTER 1

INTRODUCTION

A traffic light, traffic signal, or stop light 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. In Malaysia, the traffic lights for vehicles commonly have three main lights, a red light that means stop, a green light that mean go and yellow that means ready to stop. However for the pedestrians, there have only two lights, a red light and a green light that mean go and stop respectively. The traffic lights have given many benefits to all road users. Besides reducing the number of accidents, it made the traffic flow smoothly and possibly could save people time.

1.1 Background history

The world's first traffic light came into being before the automobile was in use, and traffic consisted only of pedestrians, buggies, and wagons. Installed at an intersection in London in 1868, it was a revolving lantern with red and green signals. Red meant "stop" and green meant "caution." The lantern, illuminated by gas, was turned by means of a lever at its base so that the appropriate light faced traffic. On January 2, 1869, this crude traffic light exploded, injuring the policeman who was operating it.

After the coming of automobiles, the situation got even worse. Police Officer William L. Potts of Detroit, Michigan, decided to do something about the problem. What he had in mind was figuring out a way to adapt railroad signals for street use. The railroads were already utilizing automatic controls. But railroad traffic traveled along parallel lines. Street traffic traveled at right angles. Potts used red, amber, and green railroad lights and about thirty-seven dollars worth of wire and electrical controls to

make the world's first 4-way three color traffic light. It was installed in 1920 on the corner of Woodward and Michigan Avenues in Detroit. Within a year, Detroit had installed a total of fifteen of the new automatic lights.

At about the same time, Garrett Morgan of Cleveland, Ohio realized the need to control the flow of traffic. A gifted inventor and reportedly the first African American to own an automobile in Cleveland, Ohio, he invented the electric automatic traffic light. Though it looked more like the semaphore signals you see at train crossings today.

Many others had obtained US Patents for Traffic Signals, some as early as 1918. But Morgan's Patent was purchased by General Electric Corporation and provided the protection they needed to begin building a monopoly on traffic light manufacture. [9]

1.2 Problem Statements

The current system of traffic light have been provides a fixed traffic control plan, which settings are based on prior traffic counts but may be manually changed. It is the most common form of signal control for now a days and result in inappropriate behavior in traffic which differs from that which the plan was based, such as the use of unnecessary phases when the traffic is light.

1.2.1 The current system of traffic light

The traffic jams are the common problem in most of the city in the world. The one of the main cause of this problem is accident. To find the way to maximize the traffic flow smoothly can reduce the numbers of the accident and can reduce the people time in road. The government has carried out a few rules to overcome this problem. Beside take the punishment to all the traffic offenders, the traffic lights have been made at the location that high risk in accident. However, increasing the numbers traffic lights have contributed some contra issues/problems:

(a) Traffic light cause the heavy traffic jams

Increasing the number of vehicle in road, have cause the heavy traffic jams. This happened usually at the main junctions commonly at the morning, before office hour and at the evening, after the office hour. The main effect of this matter is increasing time wasting of the people at the road.

(b) No traffic, but the road user still need to wait

The traffic light has contributed more wasting time people at road. At the certain junction, sometime there have no traffic. But because the traffic light still red, the road users should wait until the light turn to green. If they run the red light, unfortunately they maybe should pay the fine about RM 300.

(c) Emergency car stuck in traffic jam

Usually, during traffic jam, the emergency vehicle, such as ambulance, fire-brigade and police will be stuck especially at the traffic light junction. This is because the road users waiting for the traffic light turn to green. This is very critical problem because it can prevent the emergency case become complicated and involving life.

1.3 Aim and Objectives of Project

Aim of project

The aim of this project is design a program for Programmable Logic Controller (PLC) that could minimize the waiting time of the cars at intersections, when the traffic volume is significantly low. Beside that, it can prevent the emergency car stuck in the traffic jam at the intersections as well. The programming of Programmable Logic Controller (PLC) could change timing plans for three mode of operation; normal mode, emergency mode and night mode.

Objectives of the Project

- 1 To understand the structure and operation of PLC
- 2 To study the ladder program and their programming technique
- 3 To understand how to make the interfacing to the PLC
- 4 To design the program which are working together with model of sensors for four-junction traffic light
- 5 To build the model of four-junctions of intelligent traffic light that can overcome some of major problem of current traffic light