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MODEL TRAFFIC CONTROLLING SYSTEM TO FACILITATE ON-ROAD WORK SITES

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ABSTRACT

Traffic control is an outdoors occupation, night or day for long hours in all weathers, and is considered a dangerous occupation due to the high risks.The system proposed to be developed, controls the traffic in road work sites without people attending to it every time. By using the model automated traffic control system, the disadvantages of STOP/GO process can be eliminated.

Key words: *Traffic Control, IR sensor*

1.0 INTRODUCTION

Today's roads are full of fast, heavy traffic.Traffic control is an outdoors occupation, night or day for long hours in all weathers, and is considered a dangerous occupation due to the high risk of being struck by passing vehicles.Drivers have to keep a constant look-out for changing road conditions. Particular attention should be paid to the needs of blind and disabled people, children, elderly people and people with prams. The legislation requires an undertaker, and those working on its behalf, carry out work in a safe manner as regards the signing, lighting and guarding of works. Failure to comply with this requirement is a criminal offence.

In the past a traffic control flaggerwas a person whose job was to maintain safe conditions on the road when unusual conditions exist on a roadway. The traffic control flagger alerts vehicles of the appropriate action to be taken using standardized symbols and gestures, keeping both motorists and people working on the road as safe as possible. Among the many tools that may be used by a traffic control flagger, some of the most important are the signs and gestures used for notifying motorists of conditions ahead[1]. These include signs instructing drivers to go or stop, cones to guide traffic, and hand signals to communicate more vigorously or in lieu of these other measures. At night, these may be supplemented by lighted signs and signal batons. A brightly colored and often reflective uniform is also important for safety, as it helps drivers to see the flagger. Communication

devices such as hand held walkie-talkies are less visible than other tools, but possibly even more important because they allow coordination between flaggers and quick communication when conditions change.In most situations, a traffic control flagger is only used when the conditions changing the road are not permanent. If the condition were permanent and motorists were not in danger, an electronic signal and signs might be used to alert motorists of that change in the roadway. In some countries, machines designed to fulfill the function of a traffic control flagger are used instead of human workers. This is thought to provide road workers with the same degree of safety as a human worker, but with less human error, lower costs, and no dangerous working conditions created by standing in traffic. In order to achieve these, a model traffic controlling system was developed with Arduino mega 2560 board[2].

2.0 EXPERIMENTAL

Arduino Mega 2560 board was used to design the circuit and the IR sensor circuit used to count vehicles in both sides. The signal coming out from the IR sensor was an analogue output. But the research needs digital output. Therefore it is necessary to use analogue to digital converter (LM 324). Programmed the code for this system and also arranged the input by using 4*4 key boards. The output wasdisplayed by 16*2 LCD display.

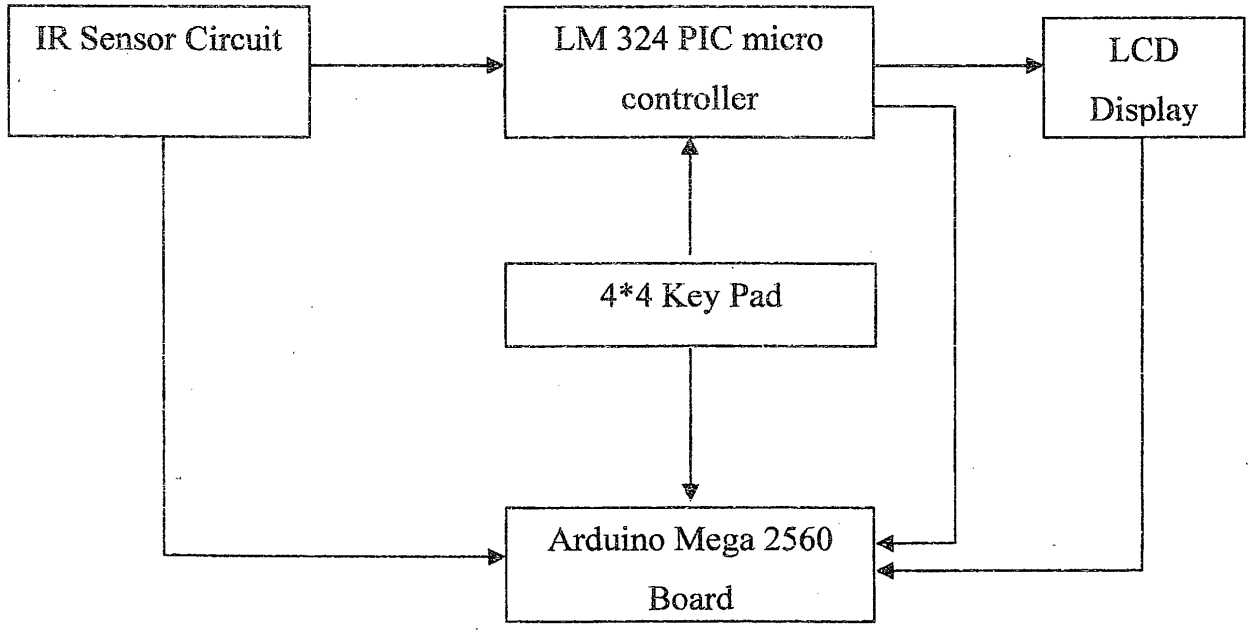

Figure 1: Block Diagram of the System

The IR sensor circuit is used to count vehicles in both sides. The signal coming out from the IR sensor isanalogue output. But it needs digital output. Therefore LM 324[3]analogue to digital converter is used.

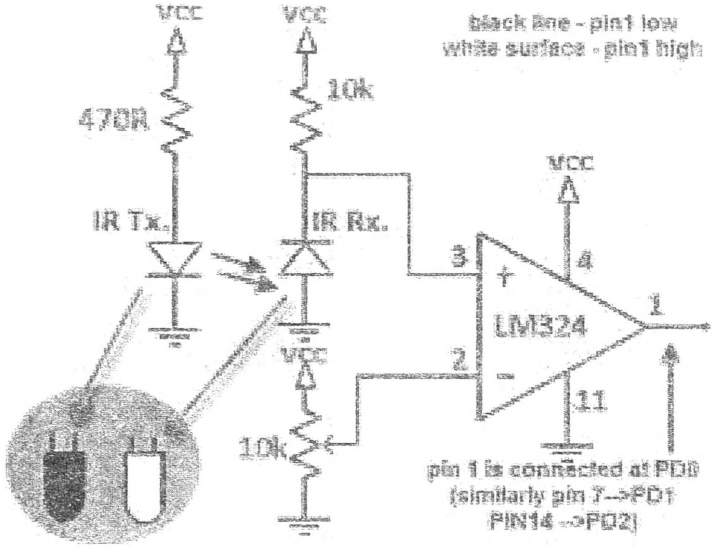

Figure 2: IR Sensor Circuit

Then IR sensors output is to the 38 and 40 pins in the Arduino mega 2560 board and also 22,24,26,28,30,32,34,36 pins are connected to the 4*4 key pad. Four LEDs are connected to 3, 4, 5 and 6 pins such that 3-Red, 4-Green, 5-Red and 6-Green. The LCD display and Arduino board pin connection are given Table (1) below.VEE was preset connection.

Table 1: Arduino and LCD Display Pin Connection

Arduino Board Pin Number	LCD Display Pin Number
8	DB 7
9	DB6
10	DB5
11	DB4
12	EN
13	RS

3.0 RESULTS AND DISCUSSION

At present all vehicle drivers face lots of problems when there is an ongoing road construction. Most of the time two people without proper experience in vehicle traffic controlling will control the vehicle exchanging. This will result in unnecessary traffic.If this can be controlled by an electronic sensing mechanism it allows the construction firm to utilize all the workers to the relevant job. In the designed system the number of vehicles will be detected by IR sensor and will decide to which side it will give the chance and the time for the specific side. Also it will count the number of vehicles which passes through that time and check the vehicle went in the opposite side. It will help to avoid unwanted problems occurring during the controlling. If we have constructed only considering the time then sometimes it will allow other side to go when there are vehicles in other side. This will worsen the case than the manual operation.

In this research IR sensor circuit was used for counting vehicles in both sides. There is an issue when it converted in to the real scenario as it has used an IR sensor for counting the vehicles.In practical situations IR sensors are not suitable for vehicle counting. Because it will count every object which passes in front of the sensor. As the theory of the sensing mechanism is based on reflective of the IR beam it will trigger the signal for all objects. Sometimes it will sense single car as two cars due to the shape of the car. So it would be more accurate if we can use image processing as it will allow us to determine the type of the vehicle. Then it will automatically count the vehicles with its type (for examples it will count and display number of cars, bicycles, Vans)[4].

In the model, IR sensors are used but when practically implementing, appropriate sensors have to be integrated so as to customize the system, according to the requirement. The system can be used at any road work site with that change.

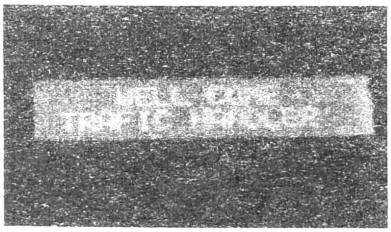

Figure 3: Start up time

Figure 4: Mode selection

Figure 5: No of Vehicles and Direction Select

Figure 6: Manual Mode

Table 2: Manual Mode LED Process Output

	Left	Right
F1	Green on ,Red off	Red on , Green off
F2	Red on , Green off	Red on , Green off
F3	Red on , Green off	Green on ,Red off
F4	Red on , Green off	Red on , Green off

4.0 CONCLUSION

The automated traffic control system can overcome the disadvantages of manual STOP/GO process handled by road workers.

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