AUTOMATIC TRAFFIC SIGNAL WITH SPIKE CONTROL

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Abstract :

A Road spike system, the road spike system used for various application like consoling traffic on road with help of vehicle density sensor also used in BRT for avoiding the entering non permitted vehicles used for security in industries and in one way road .In that the spike which can be fixed on shaft who receive power from DC stepper motor .A motor which control by microcontroller and microcontroller r commanded by sensor. The system with spring operated used for one way road. This system ensures to obey traffic rules properly and reduces accident.

Guardian Traffic Systems road blockers, traffic spikes, access controls and CCTV are used to control access to or from airport parking and ground transportation, car rental agencies, car parks, parking garages and airport freight delivery. The Guardian product line is the most extensive, well-engineered and best built product for effective and economical controlled access. Guardian Traffic Systems' tire spike units are available in either surface mount or in-ground applications. Our tire spike units utilize a proprietary spring-loaded counter balance technology ensuring spikes return to their upright position. Our tire spikes systems are designed for reliability and low maintenance providing years of dependable service. Guardian Traffic access controls manage who can go where and when in designated areas. Access Control means management can control who has access to secured areas and what time, while recording and storing the information.

Key Words :Spike Control, Traffic Signal, Sensors, etc.

I. INTRODUCTION

INTRODUCTION

In modern world, vehicle user increases largely. As the vehicle count increases the traffic also gets rises. By this effect, we can see a lot of road accidents. To rescue the victims, several problems have to be faced by the ambulance because of traffic problems. The main objective of this system is to stop the vehicle at signal and also restrict the vehicle which is entering in to the BRT road. This system can be used in the retractable spikes before the zebra crossing that comes out when the traffic signal is red and goes off when the traffic signal turns to green. This is an innovative idea mainly to avoid congestion and rescue the

ambulance. In the usual traffic system the peoples were not following the traffic rules properly. To overcome this problem we were using this system. The main aim of this system is to obey the traffic rules properly if not there will be an opening of spikes. It will make all the people to obey the traffic rules correctly.

The system will analyze the traffic at four way junction and adjust green light intervals for variable densities of traffic. E.g. If at a traffic signal number of vehicles coming from north & south is too much and that of coming from the east & west is very little, the green light interval for north & southbound traffic will be longer and that for east & westbound traffic will be shorter. The system will be comprised of sensors and a microcontroller. Sensors will be fitted at appropriate positions at the four way junction. The sensors will measure the density and will communicate the same to a microcontroller. Microcontroller will use these to adjust timing intervals of green lights.

We also would implement a feature to ensure integrity of traffic rules at the signal. A spike strip will be introduced at the front of each lane before the zebra crossing. The spike strip will be engaged once the signal goes red. Once the strip is engaged, if any, vehicle tries to cross the strip; the vehicle tire would get punctured. Once the light goes green the spike strips will be disengaged and vehicles could move freely.

EXPERIMENTAL SETUP

The major objective of this system is to provide a safety secured system for our society this .On using the spikes module, the spikes system operates using DC motor. In case ambulance reaches signal the spikes will gets OFF and other signals gets ON with an emergency alert. This system provides a secured system for our society. No other way of breaking the traffic rule. The system will analyze the traffic at four way junction and adjust green light intervals for variable densities of traffic. E.g. If at a traffic signal number of vehicles coming from north & south is too much and that of coming from the east & west is very little, the green light interval for north & southbound traffic will be longer and that for east & westbound traffic will be shorter. The system will be comprised of sensors and a microcontroller. Sensors will be fitted at appropriate positions at the four way junction. The sensors will measure the density and will communicate the same to a microcontroller. Microcontroller will use these to adjust timing intervals of green lights. We also would implement a feature to ensure integrity of traffic rules at the signal. A spike strip will be introduced at the front of each lane before the zebra crossing. The spike strip will be engaged once the signal goes red. Once the strip is engaged, if any, vehicle tries to cross the strip; the vehicle tire would get punctured. Once the light goes green the spike strips will be disengaged and vehicles could move freely.

Microcontroller: A microcontroller is a small computer on a single integrated circuit. In modern terminology, it is similar to, but less sophisticated than, a system on a chip; a may include a microcontroller as one of its components. Microcontrollers are used in automatically controlled products and devices, such as automobile engine control systems, implantable medical devices, remote controls, office machines, appliances, power tools, toys and other embedded systems. By reducing the size and cost compared to a design that uses a separate microprocessor, memory, and input output devices, microcontrollers make it economical to digitally control even more devices and processes.

DC Motor: A DC motor is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic; to periodically change the direction of current flow in part of the motor. DC motors were the first type widely used, since they could be powered from existing direct-current lighting power distribution systems. A DC motor's speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its field windings. DC motor is used to operate the spikes.

COMPONENTS AND DESCRIPTIONS

The term component refers to any specific element of the entirety of the project. Types of components can include specific schedule events, specific tasks, specific locations, and specific rules. Component is somewhat of an uber-term, in that it can refer to many different things within a project. Major components used in our projects are listed below,

- ➢ Wooden cardboard
- ➢ Plastic Bush
- ➢ Dummy shaft
- ➢ DC gear motor
- ➢ PCB Dot board
- ➢ Transformer
- ➢ Motor clamps
- ➢ Variable resistor
- ➢ Double contact relay
- ➢ Integrated circuit (IC)
- ➢ Transistor, Resistor, Capacitor & Diodes
- ➢ Bolt & Nut & Spikes

WOODEN CARDBOARD:

In cardboard we are placing the spikes, two step-down Transformers (9V, 12V), PCB dot board, motor, etc…, the card board acts as base of the working principle.

4.1.2 PLASTIC BUSH:

The bush is placed under the wooden cardboard. Bush acts as a pillar of the model. The hole is made on four side of wooden cardboard and the bushes are placed and tighten with screws.
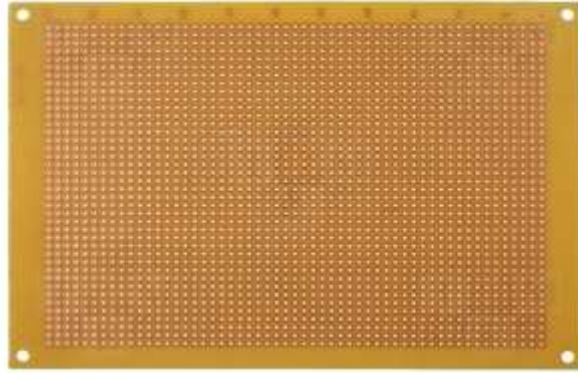
4.1.3 DUMMY SHAFT:

The dummy shaft is coupled with motor and acts as a rotating shaft. The spikes are placed over the dummy shaft.

4.1.4 DC GEAR MOTOR:

The capacity of direct current (DC) gear motor is about 12V. The gear motor is placed on wooden cardboard. The dummy shaft is coupled with 12V dc gear motor.

4.1.5 PCB DOT BOARD:

The PCB stands for **Printed circuit boards.** In dot board the transistor, IC, capacitor, diodes, resistor, double contact relay are connected.
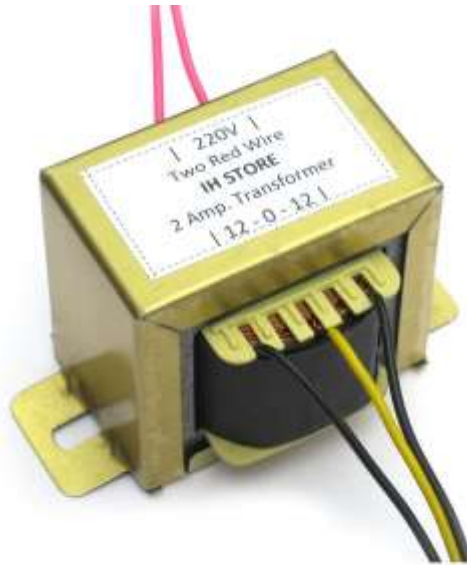
4.1.6 TRANSFORMERS:

Transformers are used in alternate current for reducing or increasing voltage by changing its current. In this model we use 9V&12V transformer.

i.   **9V TRANSFORMER;**

The 9V transformer will give the supply to circuit board by reducing or increasing voltage by changing its current.

ii.   12V TRANSFORMER;

The 12V transformer will give the supply to gear motor by reducing or increasing voltage by changing its current.

4.1.7 MOTOR CLAMPS:

The Clamping Motor Mount is great for applications where the perfect motor alignment is needed. When used in conjunction with a gear motor that has an offset shaft, you can index the motor by sliding the motor forward/aft in the mount or rotating it within the mount.

4.1.8 TRIMPOT OR VARIABLE RESISTOR:

A variable resistor is a resistor of which the electric resistance value can be adjusted. A variable resistor is in essence an electro-mechanical transducer and normally works by sliding a contact (wiper) over a resistive element. When a variable resistor is used as a potential divider by using 3 terminals it is called a potentiometer. When only two terminals are used, it functions as a variable resistance and is called a rheostat.

4.1.9 DOUBLE CONTACT RELAY:

Relays are the switches which aim at closing and opening the circuits electronically as well as electromechanically. It controls the opening and closing of the circuit contacts of an electronic circuit. When the relay contact is open (NO), the relay isn't energizing with the open contact. However, if it is closed (NC), the relay isn't energize given the closed contact. However, when energy (electricity or charge) is supplied, the states are prone to change.

**4.1.10 INTEGRATED CIRCUITS (IC):**

An integrated circuit (IC) is a small semiconductor-based electronic device consisting of fabricated transistors, resistors and capacitors. Integrated circuits are the building blocks of most electronic devices and equipment. An integrated circuit is also known as a chip or microchip. In this model we use two types of IC;

IC N555;

The **555 timer IC** is an integrated circuit (chip) used in a variety of timer, delay, pulse generation, and oscillator applications. Derivatives provide two (556) or four (558) timing circuits in one package.

IC 4017;

IC 4017 is a CMOS decade counter IC consists of a 5 stage Johnson counter with 10 decoded outputs that can count up to 10 decimals.

4.1.11 TRANSISTOR, RESISTORS, CAPACITOR & DIODES:
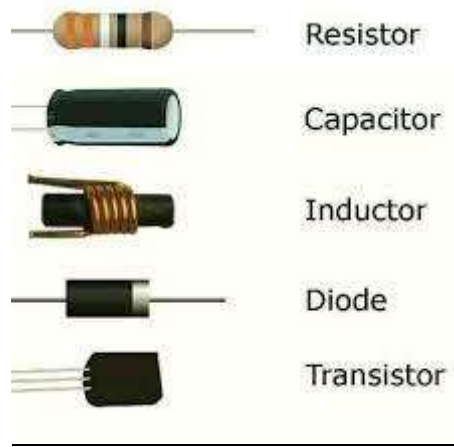
Fig.4.1.11

Resistor is an element which opposes the flow of current. It is a current limiting device when current of any circuits needs to be reduced.

Capacitor is device used to store an electric charge in form of static field separated by 2 insulators.

Diode is a semiconductor device with two terminals, typically allowing the flow of current in one direction only. It is used for rectification.

Transistor is also a semiconductor device used for amplification and some it is used for rectification.

4.1.12 BOLT & NUT:

Fig.4.1.12

Nuts and bolts are designed to hold two or more objects together. They work by inserting a bolt through the two objects and then fastening a nut at the other end of the bolt. It's usually a very simple task, but unfortunately it can be made a little complicated thanks to different factors like what appliances need the nuts and bolts. Another thing to take into consideration is how the bolts are inserted into the objects and the kind of nut needed to hold it together.

4.1.13 SPIKES:

Fig.1.13

The spike is placed over the dummy shaft or rotating shaft. Spike are used in traffic signal because to control the accident and follows the laws.

CONCLUSION

At the outset of the project, the Road Spike System was chosen as the most suitable conceptual design for satisfying the problem statement. Consequently, the main objective module was to Develop a mechanism for Road Spike System. The module was concluded successfully and the result was a suitable design satisfying the earlier demands. The mechanism was developed on the basis of the Rule of Thumb and ease of manufacturing, availability of components at short lead times. One more aspect of the project was to reduce the traffic management problem and inculcate behavior of following traffic rules and regulations in citizens. The machine is also important from the point of view of security application to the potential customers. Thus, the project was concluded to be successfully and beneficial for the overall development of both the society and the students.

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