AUTOMATIC SPEED BREAKER CONTROL SYSTEM BY USING PIC CONTROLLER

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ABSTRACT: *India has a large network of road throughout the country. India faces the highest number of accidents and accidental fatalities in the world. To prevent the accidents caused due to over speeding of vehicles, speed breakers are used. But, the accidents are caused due to both presence and absence of speed breakers. During night, speed breakers are not necessary. During day time, the speed breaker comes up and during night time, the speed breaker flattens. Here LDR is used to sense the available light and RFID is used to sense the vehicles. In rainy days many accidents will occur due low friction during breaking, so the speed breaker is not necessary during rain. Many luxurious cars are struggling to move over a speed breaker. Patients travelling in emergency vehicles face many difficulties due to speed breakers. They need a smooth ride. In these situations, speed breakers are not needed. So, in this project we are controlling the speed breakers automatically based on the requirement by using RF detector and it is controlled using PIC controller.*

KEY WORDS: *PIC controller, RainSensor, LDR Sensor*

1.INTRODUCITON

Road transport is important mode of transport in India. India has large network of road throughout the country. India faces the highest number of accidents and accidental fatalities in the world. The Ministry of Road Transport and Highways report reveals that 2,36,458 deaths were occurred in period of January to July in the year of 2017.

To prevent the accidents caused due to over speeding of vehicles, speed breakers are used. But, the accidents are caused due to both presence and absence of speed breakers. The number of deaths occurred in India due to speed breakers in the year of 2015 is 3,409 which is more than the number of total deaths occurred due to accidents in Australia and UK (2,937 deaths in 2015). The presence of speed breakers causes some difficulties to the patients travelling in emergency vehicles and also it increases the travelling time.

In order to avoid these types of problems we are implementing automatic control of speed breakers. Here we can use the speed breakers only when it is needed. During night time, speed breakers are not necessary. So the speed breaker flattens during night time. It also reduces the travelling time for emergency and VIPs vehicles.

So, this type of speed breaker is so much useful, important as well as required as of today's time period when everyone is chasing the life very fast and wants to have a speedy life to get goals as soon as possible.

In the rapidly changing world, the speed has become an important factor in human's life. Everyone wants to get fast as much as possible. In the fast speed world, there are two perspectives, one is keeping speed and another is to maintain safety mediums as well. So keeping speed is quite easy for a person and in case of safety mediums, there must be a lot of attention. For safety purpose, preventing accidents on road, there

is a conventional method of having concrete speed breakers on road. In case of conventional concrete speed breakers, they are found firm all the time on the road.

2. LITERATURE REVIEW

SUCHIR PATIL et Al (2014) discussed about the planning and development of speed breaker will provide ease in driving as well as ease to traffic police. The problem faced in traffic police and people has inspired the idea of Smart Speed Breaker (SSB). The objective of this design is to control the traffic rules with ease. Three set of sensors are used. The first set of sensors is placed before the SSB which determine the speed of the moving vehicle. The interruption of first set of sensors triggers the timer; the interruption of second set of sensors stops the timer. The time and known distance is used to calculate the speed of the vehicle. The calculated speed is compared with the predefined speed limit which is set by the traffic police. This predefined speed is compared with the vehicle speed. If vehicle speed is less than the predefined speed, then vehicle pushes the SSB down without the feel of pump and hence moves in a smoother way. If speed of vehicle is more than predefined speed, the ratchet is actuated, locks the movement of SSB and thus the bump is felt to the vehicle. When vehicle moves past the lock of ramp is deactivated and the program starts again. The speed breaker should not help in reducing speed, but also control the traffic and provide smoother drive to people. The implantation of SSB on lanes allows the traffic to move in one lane. So people tend to follow their lanes which avoid overtaking and traffic jams. Separate mini lane can be provided to the two wheelers to prevent intervention with the Light Motor Vehicle(LMV) thus maintaining smoother flow of traffic. This prototype design of SSB is reliable in controlling the traffic in a smart way thus preventing stress for people and traffic police.

ASWATHAMAN.V et AL (2011) discussed about generation of electricity from speed breaker. Energy conservation is the cheapest new source of energy. The number of vehicles passing over the speed breaker in roads is increasing day by day. There is a possibility of tapping the energy and generating power by making the speed breaker as a power generation unit. The generated power can be used for the lamps near the speed breaker. The load acted upon the speed breaker setup is there by transmitted to rack and pinion arrangements. Here the reciprocating motion of the speed breaker is converted into rotary motion using the rack and pinion arrangements. The axis of the pinion is coupled with the sprocket arrangement. The sprocket arrangement is made up of two sprockets. Both the sprockets are connected by means of a chain. As the power is transmitted from the larger sprocket to the smaller sprocket, the speed that is available at the larger sprocket is relatively multiplied at the rotation of the smaller sprocket. The axis of the smaller sprocket is coupled to a gear arrangement. The gear wheel with the larger dimension is coupled to the axis of the smaller sprocket. Hence the speed that has been multiplied at the smaller sprocket wheel is passed on to this gear wheel. The speed due to rotary motion achieved at the larger sprocket wheel is less, as the power is

transmitted to gears. Finally the speed is multiplied to a higher speed. This speed is sufficient to rotate the rotor of a generator. The rotor which rotates within a static magnetic stator cuts the magnetic flux surrounding it, thus producing the emf. This regulated emf is now sent to the storage battery where it is stored during the day time .This current is utilized in the night time for lighting purposes. This is a pollution free power generation method and no fuel transportation problem.

3.LAYOUT DIAGRAM
3.1PIN DIAGRAM

The pin diagram of PIC 16F877A is shown in Figure 3.1 PIC 16F873A/87A devices are available only in 28-pin packages, while PIC 16F877A devices are available in 40-pin and 44-F
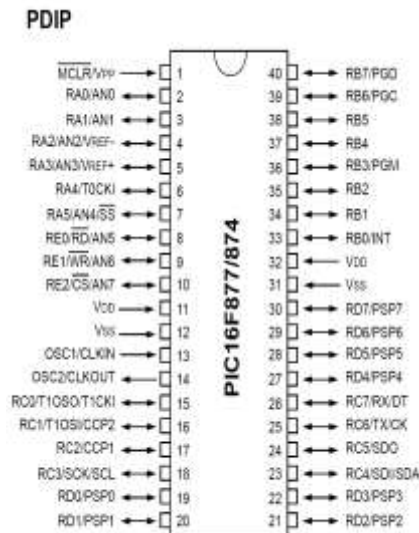
3.2 LDR SENSOR

Figure 3.2

In arduino controller pin 2 LDR sensor is connected. A LDR or a photo resistor is a device whose resistivity is a function of the incident electromagnetic radiation. Hence, they are light sensitive devices. They are also called as photo conductors, photo conductive cells or simply photocells shown in fig 3.2
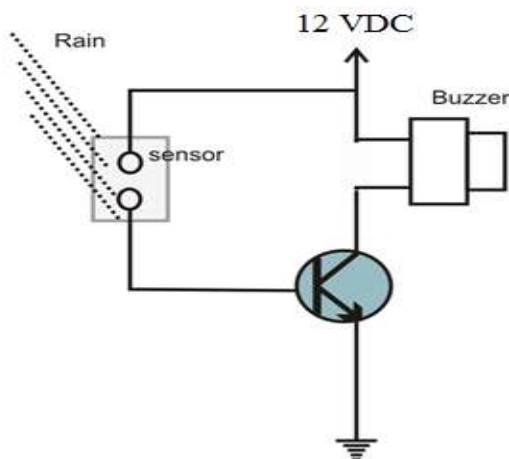
3.3 RAIN SENSOR

Figure 3.3

The rain sensor module is an easy tool for rain detection. It can be used as a switch when raindrop falls through the raining board and also for measuring rainfall intensity. The module features, a rain board and the control board that is separate for more convenience, power indicator LED and an adjustable sensitivity though a potentiometer.

The analog output is used in detection of drops in the amount of rainfall. Connected to 5V power supply, the LED will turn on when induction board has no rain drop, and DC output is high. When dropping a little amount water, DC output is low, the switch indicator will turn on. Brush off the water droplets, and when restored to the initial state, outputs high level shown in fig 3.3
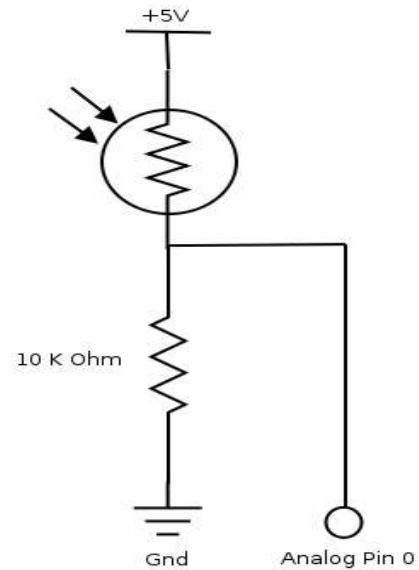
3.4 CONNECTION DIAGRAM

Figure 3.4

SPECIFICATIONS

- Voltage: 3-5V
- Supply Current: 0.5-3mA
- Light resistance: 20KΩ
- Dark resistance: 1MΩ
- Response time: 20-30S
- Peak Wavelength: 540nm
- Ambient temperature: -30~70 ℃

DRIVER CIRCUIT

The following circuit will allow you to drive a 12V relay using logic voltage. The circuit has its own 12V power supply making it self contained but the power supply portion can be left out if an external supply will be used. The circuits shows an output from the power supply that can be used to power other devices but it should be noted that the supply is unregulated and not particularly powerful with the parts started. The 12V DC output is suitable for powering a few LEDs or low voltage lights but should not be used to power other electronic boards or motors.

BUZZER

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers and confirmation of users input such as a mouse click or keystroke.

Buzzer is an integrated structure of electronic transducers, DC power supply, widely used in computers, printers, copiers, alarms, electronic toys, automotive electronic equipment, telephones, timers and other electronic products for sound devices. Active buzzer 5V Rated power can be directly connected to a continuous sound, this section dedicated sensor

expansion module and the board in combination, can complete a simple circuit design, to other side is again forced out. This causes the piston to in stroke and it is said to be negative.

- COM=Common, always connect to this, it is the moving part of the switch.
- NC= Normally closed, COM is connected to this when the relay coil is off.
- NO= Normally Open, COM is connected to this when the relay coil is on.

WIPER MOTOR

Wiper Motor, the power source of the wiper blade, is the core of the whole wiper system. Therefore, the quality of the wiper motor must be guaranteed to ensure its performance. The wiper motor is a permanent-magnet direct current (DC) one. It is equipped on the front windscreen glass with the mechanical parts of the worm gear. The worm gear functions to slow down and increase torque. Its output shafts spur four-bar linkage, by which the movement is changed from rotary to swinging.

Three-brush structure is adopted to make speed change more convenient. The intermittent relay, by which the interval is controlled, utilizing the return of switch contacts and the charge-discharge function of the resistor-capacitor in the relay, drives the wiper to wipe in a certain cycle. The wiper blade tape, the tool to clean the rainwater and the filth on the glass, presses the surface of the glass with springs. Only when the tip of the blade is in a certain angle with the glass, can the required function be realized.

RETRANSMITTER

Radio frequency, or RF, is a frequency or rate of oscillation within the range of about 3 Hz and 300 GHz. This range corresponds to frequency of alternating current electrical signals used to produce and detect radio waves. Since most of this range is beyond the vibration rate that most mechanical systems can respond to, RF usually refers to oscillations in electrical circuits.

Electrical currents that oscillate at RF have special properties not shared by direct current signals. One such property is the ease with which it can ionize air to create a conductive path through air. This property is exploited by 'high frequency' units used in electric arc welding.. Another property is the ability to appear to flow through paths that contain insulating material, like the dielectric insulator of a capacitor.

RF transmitter and receiver are available for operation in the 868-870MHz band in Europe and the 902–928MHz band in North America, both modules combine full screening with internal filtering to ensure EMC compliance by minimizing spurious radiation and susceptibility.

These RF transmitter & receiver will suit one-to-one and multi-node wireless links in such applications as car and building security, EPOS and inventory tracking, remote industrial process monitoring and data networks.
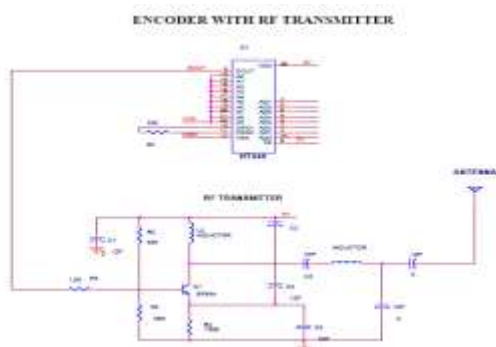
3.5 ENCODER WITH RF

Figure 3.5

ENCODER

In this circuit HT 640 is used as encoder. The 3^{18} encoders are a series of CMOS LSIs for remote control system application. They are capable of encoding 18 bits of information which consists of N address bit and 18-N data bits. Each address/data input is externally programmable if bonded out. It is otherwise set floating internally. Various packages of the 3^{18} encoders offer flexible combination of programmable address/data is transmitted together with the header bits via an RF or an infrared transmission medium upon receipt of a trigger signal. The capability to select a TE trigger type further enhances the application flexibility of the 3^{18} series of encoders.

In this circuit the input signal to be encoded is given to AD7-AD0 input pins of encoder. Here the input signal may be from key board, parallel port, microcontroller or any interfacing device. The encoder output address pins are shorted so the output encoded signal is the combination of (A0-A9) address signal and (D0-D7) data signal. The output encoded signal is taken from 8th which is connected to RF transmitter section A 5/2 valve gets its name because it has five ports and two states. A port is where we can connect a pipe and a state is simply a position that the valve can be in. The ports are numbered to help us make the right connections. The numbers will be stamped onto the casing of the valve.

This project works on pneumatic cylinder because concept of project is using pneumatic systems we have to pick object and to place object. It is work by compressed air which comes from air compressor. There is many type of pneumatic cylinder but here we use two way type pneumatic cylinders its photo showing below figure:

Two way pneumatic cylinder compressed air comes in first way then cylinder's piston comes out side after sometime air comes in second way then piston comes in cylinder. This air flows control by manual two way valve. Now it's 3D drawing showing in this figure:

DECODER

In this circuit HT648 is used as decoder. The 3^{18} decoder are a series of CMOS LSIs for remote control system application. They are paired with 3^{18} series of encoders. For proper operation a pair of encoder/decoder pair with the same number of address and data format should be selected. The 3^{18} series of decoder receives serial address and data from that series of encoders that are transmitted by a carrier using an RF or an IR transmission medium. It then compares the serial input data twice continuously with its local address. If no errors or unmatched codes are encountered, the input data codes are decoded and then transferred to the output pins. The VT pin also goes high to indicate a valid transmission.

The 3^{18} decoders are capable of decoding 18 bits of information that consists of N bits of address and 18-N bits of data. To meet various applications they are arranged to provide a number of data pins whose range is from 0 t08 and an address pin whose range is from 8 to 18. In addition, the 3^{18} decoders provide various combinations of address/ data numbering different package.

In this circuit the received encoded signal is 9th pin of the decoder. Now the decoder separate the address (A0-A9) and data signal (D0-D7). Then the output data signal is given to microcontroller or any other interfacing device.

The comparator is used to convert the saw tooth signal to exact square pulse. The encoded signal is given to decoder in order to get the decoded original signal.

4.CONCLUSION:

This paper represents design and implementation of an Automatic Braking system based on sensor fusion indented to use in vehicles that can solve the problem the resulting system can achieve measurements with high accuracy and improved short distance measurement also The system is very suitable in case of highway and emergency conditions The tests prove that the designed system can satisfy its goals with in the budget limits.

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