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Solar Energy Based Object Detection And Automatic Speed Reducing Intelligence Robot Using Sensors

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ABSTRACT :When compared with olden days life span of human is reduced. Death rate due to accident is drastically increased because vehicles usage is increasing by day by day. Due to brake failure so many accidents are occurring so when we control the brake by automatically we can reduce the effect of accident. An Ultrasonic setup is placed in front of vehicle and that setup consists of an emitter and a receiver. Ultrasonic emitter always emits the ultrasonic waves, whenever an obstacle is detected then wave gets reflected and receiver receives the signal. Reflected wave sends the signal to the Arduino controller from that based upon distance of object it actuates the buzzer and to stop the vehicle with LED indications. Vehicle actuated by using motor. Motors are operated by electrical signal and it actuates brakes by using relay. By using this system we can prevent more accidents and save more lives.

KEYWORDS: ATMEGA 328, ULTRASONIC SENSOR, SOLAR, RELAY, DRIVER IC,

I. INTRODUCTION

The number of automobile users is increasing day by day. At the Same time, traffic congestion has become a worldwide problem. This problem is mainly due to human driving which involve reaction time delays and judgment errors that may affect traffic flow and cause accidents. Road accident is most unwanted thing that happens to road user. In Indian control, brake assists etc. for driver's safety. All these systems employ different types of sensor scenario, normally vehicles equipped with ABS (Anti-Lock Braking System), traction to monitoring the condition of the vehicle and respond in an emergency situation. This smart braking system has to be work with ABS (Anti-Lock Braking system) equipped in vehicle in order to increase vehicle stability during emergency braking. The primary objective of this paper is to develop a safety braking system using ultrasonic sensor and to design a system with less human attention to the driving. This type of vehicle would be suited to replace traditional combustion engines for everyday transport activities. The use of solar energy to power the vehicle allows for more applicability, and a means of using green energy. The normalization of a vehicle of this type would dramatically reduce the amount of carbon dioxide produced by vehicles and reduce the demand for oil. Anti-Lock Braking System is a piece of safety equipment that prevents the wheels of a vehicle from locking up under emergency, panic, or harsh braking conditions. Thanks to the latest safety regulations, nearly all four and two-wheelers nowadays come with an ABS. In case of sudden braking, there is a possibility of an immediate loss of traction between the tyres and the road surface. This can cause tyres to skid. The situation becomes worse when all this happens uncontrollably. In such a case, the vehicle continues to be in motion, and the loss of grip may result in the driver or the rider losing control over the steering of the vehicle. This may, in turn, lead to an accident. That's where an ABS comes to the rescue

When an ABS works, the brakes are applied and released numerous times in one second, and hence, the system ensures that the wheels do not lock up under hard braking. The vehicle slows down while maintaining its grip, and the available traction also allows the driver to give steering inputs. This helps the driver steer the vehicle to avoid an accident. The advanced Anti-Locking Braking System hence offers significant benefits over normal brakes.

Road accidents are a common place in today's scenario. Accident prevention has been one of the leading areas of research. In Indian scenario, normally vehicles are equipped with ABS (Anti-Lock Braking System), traction control, brake assist etc. for driver's safety. All these systems employ different types of sensors to constantly monitor the conditions of the vehicle, and respond in an emergency situation. There are many intelligent people working on this

topic and developing new technologies. We are also working and studying parallel to this topic. In this project we are developing the prototype of the IBS which uses infrared (IR) sensors in safety systems for controlling the speed of a vehicle. This project known as 'Intelligent braking system'(IBS) includes an infrared wave emitter provided on the front portion of the car. An infrared receiver is also fitted to receive the signal. The reflected wave gives the distance between the obstacle and the vehicle. Then a arduino is used to detect the pulses and apply brakes to the vehicle. Today's world requires speed on each and every engineers field are confronted to the challenges of efficient systems.

II. PROPOSED WORK

The proposed work is likely to control the speed of vehicle and automatic format braking system. It is divided into three main steps; Detect the object (Hurdle) from vehicle. Control the speed of vehicle. Automatic braking system.

The proposed method will automatically inform about the hurdle in the path of the vehicle on the display with the help of different sensors. Ultrasonic sensors are connected in the vehicle to sense the object (Hurdle) and then send signals to the controller. The controller takes different actions based on these signals in order to create a safe environment for the driver. After detecting the obstacle in front of the car, we will directly view the distance between the car and obstacle on the LED display. When the distance between two cars or distance between cars & obstacle is very small, means if accidents like situation are detected by sensor then the automatic braking system is activated.

The purpose of this part of the proposed method is the secure the speed of car or security of driver and vehicle against different hurdles. To achieve this target ultrasonic sensors are used on front sides of the vehicle. Sensor consists of one transmitter and one receiver. The transmitter of the sensor will continuously transmit the signals. When these signals will collide with any object and will be reflected back, the receiver of sensor will catch these reflected signals and forward them to the microcontroller. To find the object side the signal is send to processing unit through different ports. In ultrasonic sensor, the power is directly proportional to range of ultrasonic sensor

BLOCK DIAGRAM

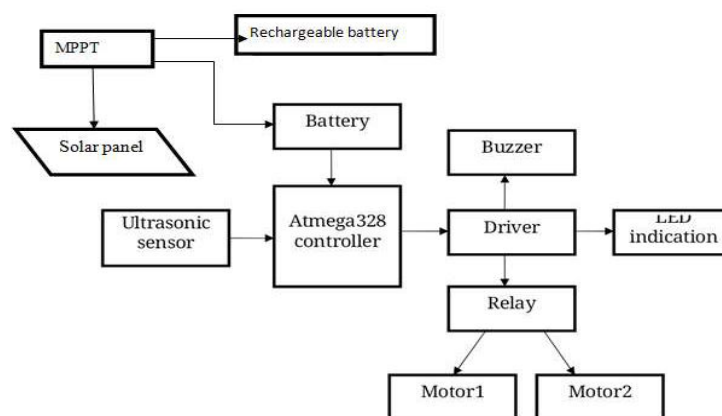


Figure 1 BLOCK DIAGRAM

III. BLOCK DIAGRAM DESCRIPTION

In this project to reduce the vehicle accident through ultrasonic sensors. In this system is consists of controller, ultrasonic sensor, driver, relay, motor, battery and LED indications. In this project used Atmega328 controller. Ultrasonic sensor is used to detect the obstacle in front of the vehicle. The ultrasonic sensor is used to transmit the ultrasonic rays. If any obstacle is detected in a path, the rays are reflected back. The reflected rays are received by the receiver circuit called "ULTRASONIC RECEIVER". The ULTRASONIC TRANSMITTER circuit is used to transmit the rays. The ultrasonic receiver circuit receives the reflected ultrasonic rays from the obstacle and giving the control signal to the control circuit. The control circuit is used to activate the solenoid valve.

This system works when driver does not apply brake manually. When any obstacle is detected by ultrasonic sensor the signals are sent to microcontroller to activate braking system. Thus the brakes are applied. This system can help to save the people inside the vehicle and also will save the external body of vehicle from getting damaged. If sensor detect object, the sensor signal is given to controller. Controller to stop the vehicle motor depend on the sensor data through relay driver unit. Controller to give the alert signal through alarm and LED indications like red and green color. Red color indicates stop the motor and green indicates to run the motor. Driver to operate the vehicle motor through relay.

IV. WORKING PRINCIPLE

The Hardware prototype consists of a Solar panel, Diode, Battery, Relay circuit, US sensors, Motors and Arduino board. When sun rays falls on the grids of the solar cells, each solar cell converts the light energy to electrical energy of 0.18 volts by Photovoltaic effect and then solar panel converted the solar energy to electrical energy of 6 volts(6V), which is send to a rechargeable battery of 6 volts through the diode circuit. Here the diode circuit is placed to oppose the reverse flow of current into solar panel. The battery supplies the 6 volts to the Arduino Board and motors. A voltage regulator is placed in the Arduino board which minimizes the output voltage to 5 volts. A relay circuit board is connected to Arduino board for triggering the relay circuit at the time of obstacle detection. The US sensor is placed in front of the vehicle which is connected to the Arduino board. The US sensor used in this project has a range of 25 cm. When an obstacle comes in front of the sensor, then the US sensor senses that obstacle, and an error signal or a triggered voltage pulse of 3-5 volts is send to the Arduino board. The Arduino board receives that error or voltage signal and initiates the buzzer and stops the voltage or triggering input to the relays. When the triggering signal or the voltage stops to the relay circuit, the coil of the relay stops energizing and the closed circuit

The compressed air from the compressor at the pressure of 5 to 7bar is passed through a pipe connected to the Solenoid valve with one input. The Solenoid Valve is actuated with Control Timing Unit. The Solenoid valve has two outputs and one input. The air entering into the input goes out through the two outputs when the timing control unit is actuated. Due to the high air pressure at the bottom of the piston, the air pressure below the piston is more than the pressure above the piston. So these moves the piston rod upwards which move up the effort are, which is pivoted by control unit. This force acting is passed on to punch/rivet which also moves downwards. The circuit is to transmit the Infra-Red rays. If any obstacle is there in a path, the Infra-Red rays reflected. This reflected Infra-Red rays are received by the receiver circuit is called receiver. The IR receiver circuit receives the reflected IR rays and giving the control signal to the control circuit. The control circuit is used to activate the solenoid valve.

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V. RESULT

The system is fully automated reliable and convenient. This can be used in vehicle to avoid accidents by using sensor. Here we are implementing ABS technology which is made operative with controller. Rechargeable battery was added as a source which is further on connected with MPPT Controller. The brakes were applied to the vehicle automatically as the object appeared in front of the vehicle with in distance of 25cm. It also continues to move on its path automatically once the object disappears from its travel path. The input energy was derived from the solar energy with help of solar panels and was supplied to the components used in the system. After detecting obstacles and applying brakes, the audio and LED indication was activated to the driver.



Figure 2 Working Model

VI. FUTURE ASPECTS AND CONCLUSION

This sensor based braking system can be used in driverless cars, in which it works more efficiently. Even in high traffic region it works better and driver need not pay much attention and waste his energy in applying brakes frequently. This system can be used in industries for material handling. The trollies used for material handling can be installed with this system and can be operated independently without help of operator, thus saving manpower. This system can be used as a facility for physically disabled and also for elderly people who visit to the monuments. This system is designed such that it can withstand load up to 60kgs. As it is continuously charged by the solar energy it can be used for whole day

The Automatic Braking system, if implemented can reduce number of accidents and can save invaluable human lives and property. The whole system is widely open and can work with various sensors and actuator solutions. It have found other applications since they were designed. Now, this system is designed as a project work at small level but we can adopted this system at industry level so that we can prevent lots of accidents and human lives. The future of automotive safety is more than just developing new technology for preventing accidents.

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