



Intelligent Braking System using the IR Sensor

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ABSTRACT

Most of the accidents in four wheeled vehicles occur because of failure of braking systems. Manual method of applying brakes is always dangerous as it leads to accidents. Unconsciousness of driver, failure in the linkages of braking systems, road conditions, uncontrollable speed of the vehicle and manual operation of braking systems are the reasons of accidents. It is necessary to control brakes automatically through electronics devices to minimize the accident problems. In this research paper we propose an effective methodology for automatic control of braking system to avoid accidents. In this technology we used Arduino, relays, IR transmitter and IR receiver for effective function of braking control system. This complete system can be fitted on to dashboard of a vehicle and effectively used for automatic control of braking system.

Key Words: *Arduino, Intelligent braking, IR sensor.*

1. INTRODUCTION

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.

There are many material handling trolleys available in the industrial fields but for small scale industry due to more cost and maintenance problem it is not utilized.

2. BASIC COMPONENTS

2.1 IR SENSOR:

An infrared sensor is an electronic instrument which is used to sense certain characteristics of its surroundings by either emitting and/or detecting infrared radiation. Infrared sensors are also capable of measuring the heat being emitted by an object and detecting motion. Infrared waves are not visible to the human eye. In the electromagnetic spectrum, infrared radiation can be found between the visible and microwave regions. The infrared waves typically have wavelengths between 0.75 and 1000 μm . In this project we are using IR Sensor to detect an obstacle. When IR sensor find obstacle in front of vehicle then the receiver sensor gives high output. This output pin is connected to Arduino pin

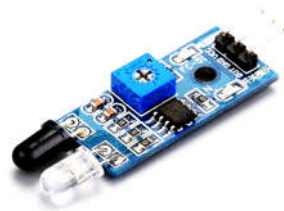


Figure 1 – IR Sensor

2.2 CONTROL UNIT:

The control unit (CU) is a component of a computer's central processing unit (CPU) that directs the operation of the processor. It tells the computer's memory, arithmetic/logic unit and input and output devices how to respond to a program's instructions. In this project we have used Arduino Uno as a control unit. Arduino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analogue inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller.

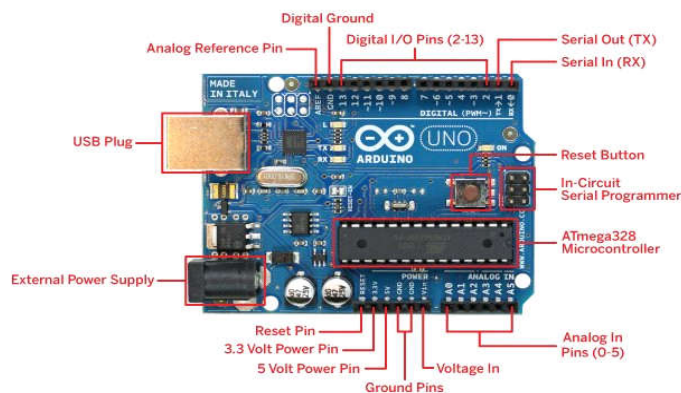


Figure 2 - Arduino-Uno

2.3 WIPER MOTOR:

In this project we have used wiper motor to move the device



Figure 3 – Wiper Motor

2.4 MOTOR DRIVER:

A motor driver is a little current amplifier; the function of motor drivers is to take a low-current control signal and then turn it into a higher-current signal that can drive a motor. In this project we have used L293D motor driver circuit. L293D is a typical Motor driver or Motor Driver IC which allows DC motor to drive on either direction

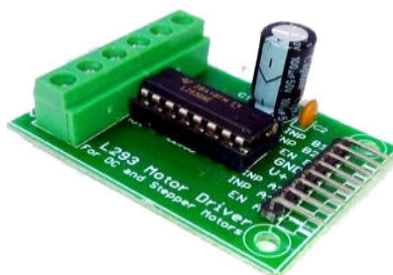


Figure 4 – Motor Driver

2.5 FIRMWARE USED: - ARDUINO SOFTWARE

We are using Arduino software to make the program which will run the system of Intelligent Braking assembly.

2.6 ASSEMBLY OF THE COMPONENTS

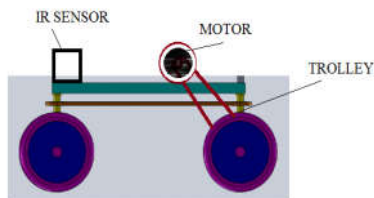


Figure 5 – Assembly of the Components

The arrangement is shown in schematic diagram of proposed intelligent braking system. We have fabricated prototype of ‘Intelligence Braking Material’. In this prototype there are two basic units

- i. Mechanical unit
- ii. Electronic unit.

• **SPECIFICATION**

These machines are small enough to operate with PMDC (Permanent Magnet Direct Current) motor.

- Function: Material handling trolley.
- Specification :

- i. Type: Mechanical mechanism
- ii. Power:- Motor operated.
- iii. Man power requirement:- No Requirement
- iv. Overall dimensions (Tentative): 530 x 650 x 335 mm
- v. General Information: The machine consists of a structure for holding and IR sensors for start and stops the motor.

3. WORKING:

Our projects working on following two conditions or cases:

- CASE 1:

If there is no obstacle in front of vehicle then the sensor output remains unchanged that means LOW and so that motor drives the vehicle as its output is HIGH.

- CASE 2:

If there is obstacle detects by the IR sensor in front of our vehicle then sensor outputs the value HIGH and so that motor stops running as its value will be LOW and our vehicle will be stops.

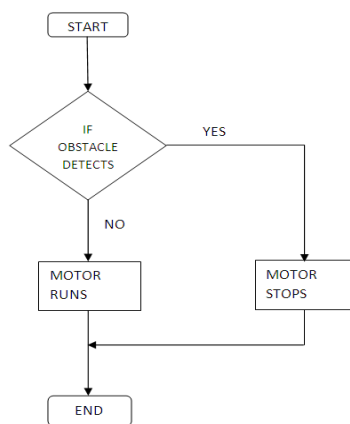


Figure 6 – Flow Chart of the System



4. CONCLUSION:-

Proposed arrangement used for intelligent braking system has a lot of potential applications especially in developed countries where research on smart vehicle and intelligent highway are receiving ample attention. We can use this system in the four wheeler vehicle and can reduce the number of accidents taking place on road.

The system when integrated with other subsystems like automatic traction control system, intelligent throttle system, and auto cruise system, etc. will result in smart vehicle maneuver. In modern industries also for material handling trolley and machinery it requires and it is industries need.

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