

# Auto Smart Brake Failure Detection System

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**Abstract - One of an automobile's most crucial parts is the braking system. The purpose of this effort is to develop a brake failure indicator-equipped safe braking system. Most brake failures are caused by brake shoe wear and liner cuts. There are two sensors in it, one of which is connected to the brake shoe and the other to the brake liner. To a microcontroller is given the signal from both sensors. When the brake shoe is worn out or if the brake liner is cut, the sensor sends a signal to the microcontroller. After analysing the signal, the microcontroller activates the matching indicator. The green indication illuminates when there are no defects everywhere, whereas the red indicator illuminates when there are brake shoe or brake liner issues.**

**Keywords:** Smart brake, brake failure, detection, microcontroller, braking system.

## I. INTRODUCTION

A mechanical brake is a device that prevents motion by sapping the power from a moving system.[1] Friction is most frequently employed to slow down, stop, or prevent the motion of a moving vehicle, wheel, or axle.

Although other methods of energy conversion may be used, the majority of brakes typically use friction between two surfaces that are pressed together to convert the kinetic energy of the moving object into heat.

For instance, when braking regeneratively, a large portion of the energy is converted to electrical energy, which can then be stored. Other processes transform kinetic energy into potential energy in forms that can be stored, like pressurized oil or air. An eddy current brake employs magnetic fields to convert kinetic energy into an electric current, which is then converted into heat. The brake disc, fin, or rail does this.

Even more braking techniques even change the form of kinetic energy, for instance, by transferring it to a rotating flywheel.

## II. LITERATURE REVIEW

Machines are now frequently controlled by control systems. Economical and efficient control of machinery is required to meet the demands of an expanding population.

The goal is to create a control system that uses an IR sensor to electronically regulate an automatic brake failure warning. The auxiliary braking system, which includes an automatic brake failure warning, is made up of a frame, a control unit, and an IR sensor circuit.

Brakes, which are used to slow down the car, are an essential component of a vehicle. One of the key issues that cause numerous accidents is brake failure. The brake lining brakes, which are utilised in the majority of automobiles, cause brake failure.

The purpose of our study is to identify the defective braking system and to enable the secondary or auxiliary braking system to work when the primary braking system fails. When the primary pneumatic brake fails, the pressure sensor recognises the issue, alerts the driver, and also activates the auxiliary brake, which the driver can manually modulate using a manual control board.

This braking mechanism protects the car's structure without endangering the driver or the passengers.

The simplest kind of braking is this one. When the motor windings are connected for reverse rotation while the armature is still revolving in the forward direction, under the influence of an external torque or because of inertia, this is known either as plugging or as counter-current braking.

Reconnecting the motor's power supply causes it to pull in the other direction while plugging. In case, it is required to bring the drive system to rest, it is necessary to include a special device to cut off the supply exactly at the instant when the motor stops.

## III. REQUIREMENTS

- DC motor with wheels
- Buzzer
- Indicator lamp
- Continuity sensor circuit
- Temp sensor
- Noise sensor
- Power supply
- Microcontroller

#### IV. OBJECTIVES

- 1) To develop a efficient and effective model which can detect the break failure of the car.
- 2) To achieve good accuracy.
- 3) To detect the failure and inform the driver and prevent the accident.

#### V. METHODOLOGY

Stage 1: In stage 1 by different sensors the electrical continuity, oil temperature and pressure, noise level and friction all this parameters are checked.

Stage 2: All the calculated data is them send to controller (Atmega328p) which analysis the data throughout.

Stage 3: The power supply is provided by the vehicle battery to the controller.

Stage 4: In this last stage the red colored indicator is provided, if there's any problem in brakes the buzzer gets activated in driver's cabin.

#### VI. PROPOSED SYSTEM

The break adjusts proportionally when pressure is applied within a particular range, indicating that the break is functioning normally and displaying the amount of pressure as well as being in automated mode.

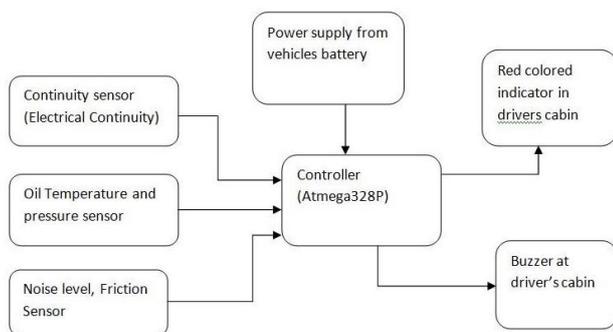


Figure 1: Block diagram of proposed system

In order to create digital devices and interactive objects that can sense and control physical items, Arduino are a software firm, project, and user community that develops and produces computer open-source hardware, open-source software, and microcontroller-based kits.

The project is based on designs for microcontroller boards made by a number of suppliers utilizing different microcontrollers.

A variety of expansion boards (also known as shields) and other circuits can be interfaced with these systems' sets of digital and analogue I/O pins.

For loading software from personal computers, the boards provide serial communication ports, some of which include Universal Serial Bus (USB).

The Arduino project offers an integrated development environment (IDE) for microcontroller programming that is based on the Processing programming language and additionally supports C and C++.

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