Smart Brake Monitoring System with Brake Failure Indication for Automobile Vehicles

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Abstract: These days mishaps may happen because of different reasons; the principal reason is brake disappointment and is caused because of poor upkeep just as item deformity. So as to save watchman the important human life from these mishaps; there is a requirement for observing of slowing mechanism in cars. Vehicle security is the evasion of car crashes or the minimization of hurtful impacts of mishaps, specifically, identified with human life and wellbeing. Uncommon wellbeing highlights have been incorporated with vehicles inhabitants just, and some for the security of others. In this present research work a brake disappointment pointer circuit that continually screens the state of the brake and gives a broad media sign to rider has been created. Flex sensor is utilized in this proposed framework to change over power connected at the uncommon wheel in to voltage corresponding to the power connected at the break cushion. Mishap is a lamentable occurrence that happens out of the blue and ordinarily bringing about harm or damage. Mishap controller utilizing ARDUINO UNO is a technique which use flex sensors to send sign to marker that serves to prevent odds of mishap. The proposed framework incorporates two sorts of driving modes, programmed and manual. In programmed mode, sensors will be dynamic, contingent upon which sensor has detected the snags it will play out the relating assignment of going ahead, decreasing velocity and applying brakes. In manual mode, sensors will be inactive, steering and braking system will be under the control of driver.

I. INTRODUCTION

Today mishaps are happen because of parcel of reasons, the one of the fundamental reason is brake disappointment, it caused to because of poor support just as item imperfection, so as to safe watchman the profitable human for mishap the mishap checking of brake is significant thing in car. Vehicle security is the shirking of car crashes or the minimization of unsafe impacts of mishaps, specifically as relating to human life and wellbeing. Extraordinary wellbeing highlights have been incorporated with vehicles tenants just, and some for the security of others. We have delight in presenting our new venture "Keen Break Monitoring System with Brake Failure Indicator for Automobile Vehicle". This is prepared by flex sensors and Arduino board. It is certified undertaking which is completely prepared and intended for car vehicles. This structures an essential piece of best quality. This item experienced test in our car vehicles and it is great. A brake is a mechanical gadget that hinders movement by hindering a body or by easing back it. A brake impede the movement of a body making grinding between two working surfaces and changes over the motor vitality of the moving body in to warm. Brakes are commonly connected to moving just as tires. Now and then brake disappointment may happen when the brake coating is cut-off. Also, the brake liquid breaks out causing weight misfortune and thus the brake shoes don't make a difference the required weight on the plates [1].

The brake system of your vehicle is by far the most important safety system that it has. Being able to slow down or stop at a moment’s notice will help to avoid an incident or accident. Improperly working brakes will not do the job they are designed to do and will not be as effective when needed, especially in a panic stop situation. Brakes should be regularly inspected, we recommend having your trusted repair facility regularly test drive the vehicle to see how the brake system functions. Then also perform an actual visual inspection, measuring pad and...
shoe thickness, check for even wear of the pads and shoes, check rotors for run out and hot spots, check hardware to make sure it is working properly and that it is adjusted properly. Make sure the wheel cylinders, brake lines and brake master cylinder are not leaking, inspect calipers for wear, free movement and fluid leaks, and check the level and condition of the brake fluid. Inspect for proper routing and placement of the brake and antilock brake sensors [2]. All of these components need to be in good shape and working properly for the vehicle to have 100% brake system effectiveness while driving. For instance, something that seems simple is the brake fluid, it can get contaminated over time with absorption of moisture and copper, this can decrease the effectiveness of the hydraulics within your brake system causing a less responsive brake pedal to the touch or feel, therefore causing a slight delay or reduction in braking power. We recommend having your brake system inspected with each oil change or at minimum every 6 months or about every 6,000 miles. Then if the inspection reveals any issues with the brake system for your own safety and the safety of others, have it repaired to keep the brake system of your vehicle operating at 100% effectiveness.

II. OBJECTIVE

Accidents have turned into a genuine worry in the present situation. The paces of mishaps are at a record-breaking high as of now. Slowing mechanisms of business vehicles were constantly given the most noteworthy significance concerning wellbeing issues and specifically detached security framework. Improper braking of the vehicles may cause extreme mishaps because of moderately longer halting separations and higher vitality yield of brakes especially on account of vehicle blends. The customary medium utilized for slowing mechanism (packed air) can be currently controlled with the speed and exactness offered by present day electronic capacities.

- To improve the braking system of conventional vehicles by installing sensor controlled brakes using flex sensor.
- To make the braking process comfortable by using embedded design.
- Try providing safety against collisions and thereby avoiding accidents
- To employ different types of sensors those constantly monitor the conditions of the vehicle and subsequently respond in an emergency situation.
- To improving the braking system we are using flex sensor it converts the force to voltage.
- Flex sensor is connected at rare end of the vehicle, it constantly monitoring brake condition when we applying the brake
- Percentage of the brake apply by front vehicle is displayed to back vehicle and back vehicle driver understand the brake percentage of front vehicle and he apply same amount brake while driving.
- We are try to avoid fuel consumption in the vehicle by press brake pad unnecessary while driving.

III. EXPERIMENTATION

Block Diagram: The proposed work of the project consist of battery and power modulator and arduino and flex sensor, continuity sensor, LCD display(16*2),output braking indicator.

![Figure1: Block Diagram of Break failure Indication](image)

A battery is a gadget comprising of at least one electrochemical cells with outside associations gave to control electrical gadgets, for example, spotlights, cell phones, and electric autos. At the point when a battery is providing electric power, its positive terminal is the cathode and its negative terminal is the anode.
In the proposed system ATMEGA5281 Arduino Uno is used to sense braking percentage with the help of the flex sensor along with continuity sensor and it is used to calculate percentage at braking based on flex sensor value with continuous monitoring with the help of 16*2 LCD display and LED indication. Flex sensor is connected to the rear wheel of the vehicle when pressure is applied to the flex sensor take bend with proportional to the force applied at brake pad and it converts the force to voltage and output of the flex sensor proportional to the amount of bend of the flux sensor.

The sensor can yield level sign as a nonstop estimation perusing its 4 to 20 mA simple yield, or it can modify that data into openly customizable exchanging yield signals. This arrangement is accessible with either an inflexible or adaptable test contingent upon the application establishment required, just as a custom test length and it begins the ringer sounds when the brake as disappointment in the vehicle when power is connected yet brake not connected on the framework it start sounding and demonstrates the brake disappointment.

Above the circuit shows that the working of the project , first turn on the power supply to the circuit and switch on the circuit and power supply as 12v or 9 v as the initial power supply and it given to the voltage regulator (7805) it provide constant 5v power supply to the circuit for working .A Flex Sensor or sometimes called as Bend Sensor is a device that measures the amount of bend or angular deflection. Usually, a Flex Sensor is made up of a variable resistive surface and the amount of resistance is varied by bending the sensor.

Flex sensor one end is connected to the analog input A0 of arduino Uno and flex sensor other terminal is connected to the ground. A 1kΩ resistor is connected between A0 and +5v. This connection means that the flex sensor and the 1KΩ resistor when the force is applied to the brake pad, flex sensor starts bending or deflection then the corresponding LED 's are ON . Flex sensor is connect to the rare wheel when pressure is applied to the flex sensor take deflection with proportional to force applied at brake pad.

As I have just referenced in the Basic Flex Sensor Circuit part that a flex sensor is only a variable resistor and it very well may be designed in a voltage divider style alongside another resistor to gauge the simple voltage.

The Uno has various offices for speaking with a PC, another Uno board, or different microcontrollers. The ATmega328 gives UART TTL (5V) sequential correspondence, which is accessible on advanced pins 0 (RX) and 1 (TX). An ATmega16U2 on the board channels this sequential correspondence over USB and shows up as a virtual com port to programming on the PC. The 16U2 firmware utilizes the standard USB COM drivers, and no outside driver is required. In any case, on Windows, an in document is required. The Arduino Software (IDE) incorporates a sequential screen which enables basic printed information to be sent to and from the board. The RX and TX LEDs on the board will streak when information is being transmitted by means of the USB-to-sequential chip and USB association with the PC (yet not for sequential correspondence on pins 0 and 1). A Software Serial library permits sequential correspondence on any of the Uno's advanced pins. The ATmega328 likewise bolsters I2C(TWI) and SPI correspondence. The Arduino programming (IDE) incorporates a wire library to improve utilization of the I2C transport; See the documentation for subtleties. For SPI correspondence, utilize the SPI library [5].

Figure 2: Circuit Diagram of Proposed System
IV. RESULTS & DISCUSSIONS

- We improved the braking system of conventional vehicles by installing sensor controlled brakes by using flex sensor.
- We providing safety against collisions and thereby avoiding accidents.
- To employ different types of sensors that constantly monitors the conditions of the vehicle and subsequently responds in an emergency situation.
- To improved the braking system by using flex sensor it converts the force to voltage.
- Flex sensor is connected at rare end of the vehicle, it constantly monitoring brake condition when we applying the brake.
- Percentage of the brake apply by front vehicle is displayed to back vehicle and back vehicle driver understand the brake percentage of front vehicle and he apply same amount brake while driving.
- We avoid fuel consumption in the vehicle by press brake pad unnecessary while driving.

V. CONCLUSION

Proposed arrangement used for smart braking system has a lot of potential applications especially in developed countries where research on smart vehicles is receiving ample attention. In this project, detailed information regarding smart brake monitoring system using Flex sensor and brake failure indication for automobile vehicle has been discussed. We improve the braking system of conventional vehicles by installing flex sensor controlled brakes by using flex sensor. Flex sensor is connected at rare end of the vehicle, it constantly monitoring brake condition when we applying the brake percentage of the brake apply by front vehicle is displayed to back vehicle and back vehicle driver understand the brake percentage of front vehicle and he apply same amount brake while driving. We are try to avoid fuel consumption in the vehicle by press brake pad unnecessary while driving and we going to avoid accidents by providing front vehicle brake percentage is displayed to back of the vehicle.

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