Weight Overloading Protection System in truck

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Abstract **The present work focuses on the prevention of vehicle damage due to the overloading of the vehicle. Problems that arise due to overloading of the vehicle are Truck Instability, Braking Default, Damage to The Infrastructure, Economic Impact, Suspension system, Steering trouble, Fuel economy. New technologies are being developed for more efficient overload screening and enforcement. Weigh-in Motion (WIM) technologies allow vehicles to be weighed in the traffic flow, without any disruption to operations, but these are just measuring the weight of the vehicle but not considering the overload and improper loading of the vehicle Much progress has been made recently to improve and implement WIM systems, which can contribute to the safer and more efficient operation of vehicles. The main thing we are innovating in this field is that as soon as the vehicle is overloaded, there will be an intimation to the driver with a display and buzzer to draw the attention of the driver and to inform him about the overloaded condition and then the ignition will get cut off after some delay and hence in any circumstances the user can not start his vehicle unless he reduces the load on the vehicle.**

Keywords - vehicle damage, Weigh-in Motion, Truck Instability, buzzer, Python, Steering trouble, Suspension system, Infrastructure, overloading, Accident, Image Processing,

I. INTRODUCTION

Our customers are Truck drivers, Truck owners and truck manufacturers, the given analysis comes from real-time reviews given by our potential customers. As they faced many problems like loss of control of the vehicle which causes accidents and damages to the vehicle due to overloading. For the truck owners it leads to huge loss and for the drivers who drive the vehicle run the vehicle with fear because they don't get enough control over the vehicle. It also damages the important parts of the vehicle when the load is more than the maximum capacity of the vehicle. They think that it would be better if there was a sensor which automatically measures the weight of the load and insist the driver when the load exceeds the maximum limit of the vehicle. As of now they are measuring the weight manually by taking the vehicle to any of the nearby weighing stations, which is more time consuming. They feel that they can save the time if the weight is measured automatically by using any device.

II METHODOLOGY

A) EXISTING SYSTEM

From the empathy analysis, In India accidents of heavy load vehicles are increasing day by day, over 50% of accidents are occurring due to the overloading of vehicle. Overloading of vehicle may cause loss of control of the vehicle. It enhances the chances of accident. Vehicles react differently when the maximum weights which they are designed to carry are exceeded. The vehicle will be less stable, difficult to steer and take longer to stop. Vehicles react differently when the maximum weights which they are designed to carry are exceeded. Overloaded vehicles can cause the tires to overheat and wear rapidly which increases the chance of premature, dangerous and expensive failure or blow-outs. By overloading your vehicle, you will incur higher maintenance costs to the vehicle – tyres, brakes, shock absorbers and higher fuel consumption, so the driver's control and operating space in the overloaded vehicle are diminished, escalating the chances of an accident.

B)PROPOSED METHODOLOGY

The present work focuses on the prevention of vehicle damage due to the overloading of the vehicle. Problems that arise due to overloading of the vehicle are Truck Instability, Braking Default, Damage to The Infrastructure, Economic Impact, Suspension system, Steering trouble, Fuel economy.

From the above problem our team find our four solutions

for the problem statement, they   are,

1. Using high capacity vehicles,

2. Monitoring the weight manually,

3. Using overload sensor to monitoring the weight,

4. Upgrading the vehicle according to weight.

In this project, We have designed a IOT device called Weight overload protection kit.

The main objective for the development of this project is to make the work easier to weighing the load in the vehicles and to avoid overloading.

• Reduce time consumption.

• Helps to reduce accidents caused by heavy load vehicles.

• To reduce damage of vehicle due to overloading.

III RESULTS AND IMPLEMENTATION

First, we have to calibrate this system for measuring the correct weight. When user will power it up then the system will automatically start calibrating and if the user wants to calibrate it manually then press the reset button. In this work, we have used Arduino to control the whole process. Load cell senses the weight and supplies an electrical analogue voltage to HX711 Load Amplifier Module. HX711 is a 24bit ADC, which amplifies and digitally converts the Load cell output. Then this amplified value is fed to the Arduino. Now Arduino calculates the output of HX711 and converts that into the weight values in grams and shows it on LCD. If the weight limit is permissible then Arduino sends the signal to on the fuel, if not fuel cut off is done. The calibration will be done every time the Arduino Uno is reset, Hence enabling it for the application in different conditions. The buzzer is interfaced give a sound notification to draw the driver's attention and here, With the usage of DC motor, we represent the fuel cut off, which will happen in real-time applications.
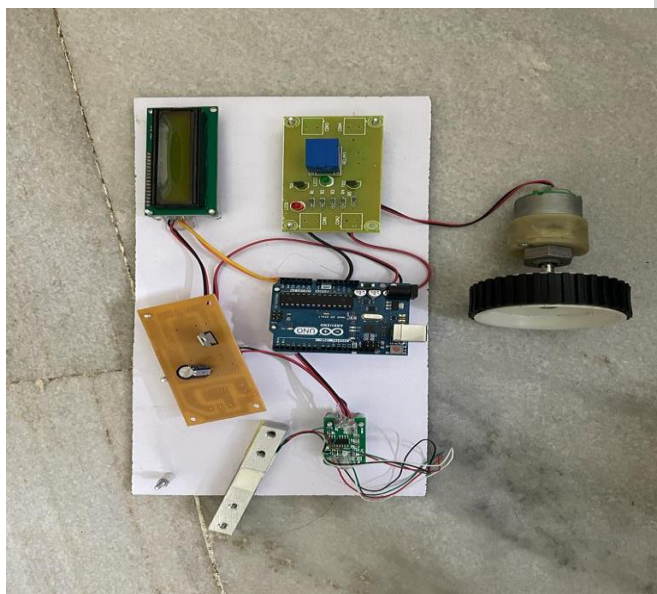

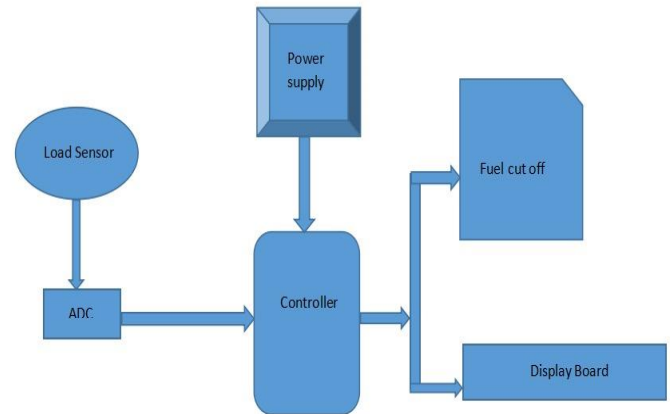**Fig 1; Prototype of proposed idea**

Fig 2; Block diagram of the proposed idea

Testing done manually by using our device in college busses with various weight limits. Our device attached with the leaf spring. The function of leaf spring is to provide comfort to the passengers by minimizing the vertical vibration caused by the no uniformity of road geometry. The vibration of the heavy load vehicles mainly depends on the amount of weight loaded in that vehicle. Total weight of the load in vehicle completely falls on the load cell of our device so it automatically detects the weight and when it exceeds the weight limit of the vehicle the engine of the bus turned off automatically.

Testing done by applying weight to the load sensor so that it can measure the amount of weight loaded into the container. For testing, initially the weight limit was 3kg. At first we added 2kg of load to the load sensor, it is less than the weight limit so the motor runs without any interruption. Then we added 5kg of load as it was higher than the weight limit so the motor was stop running. When the load weight is less than 3kg the motor will run without any disturbance. If the load weight exceeds the 3kg weight the motor will not run.

IV. CONCLUSION

Our project focuses to reduce the accidents which takes place due to the overload of vehicles and trucks. By interfacing load cell and microcontroller with the vehicle, we can control the ignition of the vehicle. Most vehicle manufacturers nowadays offer a relatively low-cost onboard weighing solution based on APT sensors. In addition, the sensor industry solutions based on the strain gauge sensor technology seem to offer an attractive prospect.

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