EFFECTIVE CARGO LOAD MANAGEMENT USING EMBEDDED SYSTEM

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Abstract—**In many developing countries the maintenance of roads is the major problem. A country's economy also determined by the safe roads and the road conditions of the country. In this project shown the most of the trucks in our state getting accident during taken of Unlimited Load, Weight and truck thefts etc., for this incident there is some solutions to recover it. In this project we are using some electronic components by this whenever truck load is out of limited height, limited weight, and any person inside the truck means suddenly that information is passed to Engine then it causes lock (or) not ON condition Mode. This work explain advantage and disadvantage of foregoing pothole detection techniques have been developed and proposes a cost effective solution to identify potholes and humps on roads and provide aware timely to motorist to avoid accidents or vehicle damages. To identify potholes and humps cargo limits Ultrasonic detectors are used. This information is displayed in LCD and sent to Notification to users mobile phone by using IoT(ESP8266) Wi-Fi Module. They also measure their depth and height respectively.IR Sensor senses to detect the object. This provides a valuable source of information to the Government authorities and to motorist. Alerts are given in the form of a flash message with an audio beep and long beep alarm to the drivers. The Arduino mega is an open-source microcontroller board based on the Microchip microcontroller and developed by Arduino AT mega 2560. Ultrasonic sensors are emitting sound waves at a high frequency for humans to hear. Then they wait for the sound to be reflected back, calculating distance based on the time required. This is related to how radar measures the time and it takes a radio wave to return after hitting an object.**

Keywords—**micro controller, micro chip, arduino, cargo, radar, detector, vehicle**

I. INTRODUCTION

The idea of ideal the proposed work substantially concentrates in the forestalment of damage of roads by humans because of overloading and unauthorized, unlicensed driving. Common transportation profited by the public is the highways. Every Existent is penetrated to the highways by all means of communication. Piecemeal from transportation [1] highways helps in the developing the frugality and ameliorate the life of public. As per the National Highway Traffic Safety Administration (NHTSA), due to truck accidents around 3900 losses and 104000 injuries happened in 2012. Substantially the accidents are passing as the truck collision takes place due to motorists control is out of

focus. Although there are laws executed by the central and state government on the truck load, there's no strict compliance to maintain the real script. If the truck load rules aren't followed it ends in a serious truck crash. The Victim will file a reprisal claim. Fairly loaded weight vehicles were plant to be get a fairly small quantum of dislocation to road payment structure, as compared to overloaded freight vehicles that are responsible for nearly 70% of roadway network damage and injuries. In utmost cases the penalties presently executed by the courts on those condemned of overfilling heavy vehicles are negligible compared with the damage caused to the roads and are relatively obviously effective. Still, overloaded vehicles come a business hazard, particularly about the retardation system of the heavy truck and taking increased retarding power. This situation becomes worse when considering the soak up ward inclines and sharp bends. In a perpendicular pitch or pitch area, these vehicles more veritably sluggishly creating business traffic occasionally the vehicles [2] may slide back. The vehicle which is overloaded drives a grade or pitch at a faster rate than the anticipation of the driver. These overloaded vehicles need fresh retardation necklace to control or to cease the vehicle. Distribution of loads in the truck has to be done slightly which doesn't be get unbalance. When the cargo is not distributed un evenly, it results in multivehicle accidents, crashing etc., Indeed though goods loaded with a admissible weight if. Occasionally exceeds losses its control in balancing the vehicle at pitch area. Goods vehicle carrying passengers by violating the government rules are ending up in the mortal life. Overstrain is a safety hazard that affords to gratuitous loss of life, as well as our roads rapid-fire deterioration leading to increased conversation and transportation.

Current Script of India, utmost of the road accidents occurs due overfilling of goods. If an accident occurs in a trace it affects the girding surroundings too. To reduce the below problem, this idea is proposed. For illustration, consider a truck [4] that has a maximum capacity of 20 tones it makes a suggestion like overfilling to the dashboard. When the motorist ignites the truck without disburdening the goods, the machine won't start and the energy famishing to the locomotive will be cutoff. The loading and unloading of the goods [4] should be done by keeping ignition in ON condition. This conception can be applied to mini bus; mini

exchanges thereby avoid cheating too 9consider the person A is working under B. B wants to transport his goods from Salem to Chennai. Without the proprietor's [12] knowledge if A loads the goods in the truck in between any of these two places incontinently B knows that). The main ideal of this is to shirk similar catastrophe by overfilling of exchanges leads to mishap and contretemps in hilly regions.

Due to overloading of goods, machine losses it's pulling power which leads to break down. As a consequence, eventually the motorist losses his total controls. The areas of operation in Ghats's road utmost of the accidents are being in this region only due to overfilling.

Therefore, overloading a vehicle incorporates so various that result in loss of human life, road and vehicle damage. This proposed idea suggests suitable measures to minimize the loss and sustain the admissible weight. This paper is arranged as literature check, methodology of the proposed work, then results and discussion.

II. LITERATURE SURVEY

The main cause for increase in accidents is because of vehicle overloading, drunk driving. The overloading is either because of single mandrel or combination of tractor-caravan arrangement. It causes the problem to the owner, the motorist and the authorities due to an increase in the number of accidents, damages to the road and public property. If the difficulty of overcapacity isn't controlled, this burden is transferred to the road stoner; in terms of charges for the energy Charges, vehicles risk freights, and fine by RTO. In this design, the weight or cargo of the vehicle is measured with the cargo cell that's placed under the lattice. Measured data is transferred to the pall with the help of Garcon. With the advanced mobile app, the information about the vehicle is covered by the proprietor. Controlling is done through the ignition circuit used to turn off the machine. To control overloading of the passenger vehicle, automatic control system for overfilling passenger vehicle was dissembled using Lab VIEW. The Sensor circuit substantially consists of the cargo cell, interface module dc motors and processing circuit. In this design, the cargo cell sensor and regulator module were set up at the bottom of the Axle above the lattice. The rated truck's capacity (2.5 Kg) was enciphered in the microcontroller. When the cargo is within the limit, the machine will typically enkindle. When the cargo exceeds the rated capacity, the ignition won't do. This prevents overloading and contributes to further compliance with mass regulation. It helps in reducing the number of overloaded exchanges, which contributes to the more effective and more effective use of highways. A reduction in load truck is also conducive to a reduction in crashes and serious damage to people's lives and property. IoT based Data processing is the unborn work of the proposed system. [1]

We propose a methodical frame of truck load intelligent monitoring system under the conception of internet of effects (IOT) to break the truck's ever- adding serious load problem in China. First the overviews of general conception of IOT and its Chinese interpretation, Seeing China, are introduced to give the background information. Next, the serious truck load problem in China is explained in details including data summary of casualties and financial cost caused by load. Also, to break the problem, we designs a frame of intelligent system which can cover truck's cargo information in real time. The proposed system includes the weight detectors installed in vehicles, wireless metamorphosis device transferring data to the GPS installed in motorist's hack, and remote control terminal to admit and reuse the information transferred by the GPS. The suggested system provides an effective approach to help truck load during the transportation. Truck load problems in China are a big challenge. Traditional approaches bring too important mortal coffers and nation coffers to catch the overfilled. Still, by using truck load intelligent monitoring system, we could descry the truck load on time and make everyone who tries to load be penalized. [2]

Currently, robotization plays an important part in our day-to-day life. Artificial operations may profit greatly from new robotization ways. In Truck-Loading Energies Outstations, applying effective robotization ways gives further control on batch- cargo operations which in turn increases their outturn. This paper presents a advanced Terminal Robotization Software System for Truck-Loading Energies Outstations, TAS. New design approach in developing the presented TAS was followed, in order to offer better system stability and enhanced system performance. The developed Outstation Robotization System for Truck-Loading Energies Outstations, TAS, was presented. The system design advantage was stated with practical results. It should be noted that the work done in this paper, and to the extent of the author's knowledge, applied a new approach in developing and studying the presented content.[3]

Safety for the inhabitants of medium-heavy truck is a high consideration for hack structure design. Among front, hinder impact and rollover accident, it's rollover that results in severe Casualty for inhabitants. Especially during the whole process of 180 ° rollover accidents, including two way, the first step is 90 ° rollover, the alternate step is 90 ° rollover up to 180 °. A new further legal and strict rollover safety test demand is specified by ECE R29-03 (1) of emendations to ECE R29-02 (2). The non-direct unequivocal finite element program LS-DYNA was introduced; the operation of this numerical system by the illustration of a real heavy truck of FAW having been passed according to ECE R29-02 is presented and compared with new conditions of ECE R29-03. The most important is a good doable laboratory test system is plant by comparison of simulation result. Eventually, the paper gives a low- cost and reduced- weight enhancement measures for cabin structure Optimization design in order to pass the blessing test of ECE R29-03. This cabin type belongs to hack-over machine vehicle, its design idea is grounded on Japanese-series which its advantage is reduced- weight. Assaying by the numerical simulation as over, some conclusion is made as followed for cabin structure optimization design. In general, the truck

hack is softer than passenger auto during simulation process because their strength and rigid of sword panel is different. Thus truck cabin material has to use high- strength and high-yield sword panel as the same as passenger auto. The simulation suggestion measure of perfecting design is a pass from a low- cost and reduced- weight point of view. Its advantage comparing with adding some underpinning corridor is making the whole truck reduced- weight in order to reduce vehicle energy consumption and the quantum of CO2 emigrations. Of course, in order to make dummy have enough survival space and save further passengers, the hinder- wall should be welded one transversal ray and two longitudinal ray to support it, also the hack's distortion can be bettered heavily. [4]

During this situation over load of truck or other vehicles are totally damage the whole truck and driver also, due to avoiding this type of incidents there are more electronic or Embedded Components to avoid give intimation of over load in the truck, the listed components like GPS for point outing the vehicle place, Load Cell to monitor the weight, Infrared Sensor to detect the human or any other Movements into the load keeping place. [5]

From above literature, they are concentrating on truck loading weight but not on height of goods. In our proposed method we concentrate on both load weight and height by using sensors.

III. PROPOSED METHOD

The proposed system executing to the system vehicle will do load stabilize and accident detection. To Fulfil the state-of-the-art problem, we've to develop a brand new setup with high accuracy, and cheat-free mechanisms must be adopted. During this proposed project we've got resolved the matter using the embedded system. Initially, we've fixed approximate weight and height to live the load within the overloaded vehicles. The overloaded vehicle should be found automatically engine is off condition with the assistance of the embedded system. In the second stage, we have analysed the people within the load vehicle using image Embedded system. Because the govt. has passed an order that no goods or luggage carrying vehicles are allowed to hold passengers and charge them for the identical. Its necessary verification to avoid accidents. In final, we've got prevented accidents for overloaded vehicles inefficient embedded methods.

The results presented in this paper indicate we can easily stop overloaded vehicles to cause accidents and also stop people to avoid great danger. Controlling is finished through the ignition circuit accustomed to put off the engine. Therefore, the result shows that a surplus load is often monitored and controlled. Design load stabilize system, which will track the load of the vehicle using load cell sensor. Design vehicle load detection system, which will

detect the stop the engine of the vehicle using ultrasonic sensor and then the IR Sensor that can be detect the person and then the monitoring system load cell. Ultrasonic sensor is pass the ultra sound waves to measure the distance whenever the load limit is cross the particular distance means automatically truck engine will not get ON, then the buzzer sound will get on this all moments are display in LCD display with weight percentage and Height limit then the information is passed to our Mobile Phone also by using IoT (ESP8266) Wi-Fi Module. In this design, Design cargo balancing system, which will track the cargo of the vehicle using cargo cell detector. Design vehicle cargo discovery system.
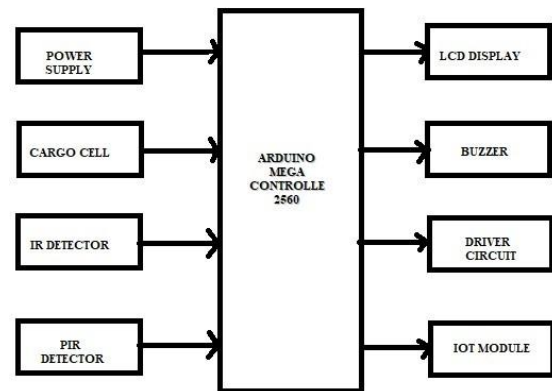

Fig 1. Block Diagram of cargo overloading and control

A. Ultrasonic Detector

Ultrasonic detectors in Fig.2are substantially used in Ultrasonic- grounded stir sensors. Also, it is used in security admonitions and automatic lighting operations. The below image shows a typical leg configuration of the Ultrasonic detector, which is relatively simple to understand the inputs. The Ultrasonic detector corresponds to 3pins.Pin1 corresponds to the drain outstation of the device, which is connected to the positive force 5VDC.Pin2 corresponds to the source outstation of the device, which is connected to the and terminal via a 100K or 47K resistor. The Pin2 is the affair leg of the detector. Pin 2 of the detector carries the detected IR signal to an amplifier. Pin3 of the detector connected to the ground. Generally, a Ultrasonic detector can descry beast/ mortal movement in a demanding range. Ultrasonic is made of a hydroelectric detector, which is suitable to descry different situations of infrared radiation. The sensor itself doesn't emit any energy but passively receives it. It detects infrared radiation from the terrain. Formerly there's infrared radiation from the mortal body flyspeck with temperature, fastening on the optic system causes the hydroelectric device to induce an unforeseen electrical signal. Simply, when a mortal body or any beast passes by, also it intercepts the first niche of the Ultrasonic detector. This causes a positive discrimination change between the two bisects. When a mortal body leaves the

seeing area, the detector generates a negative discrimination change between the two bisects. Here we use this Ultrasonic detector to check the movement of person in garage area.

Fig 2.Ultrasonic Detector

B. IR Detector

IR detector in (fig 3.) is an electronic device, that emits the light in order to perceive some object of the surroundings. An IR detector can measure the heat of an object as well as detects the stir. Generally, in the infrared diapason, all the objects radiate some form of thermal radiation. These types of radiations are unnoticeable to our eyes, but infrared detector can determine these radiations. Here IR detector is used to detect the goods height.

Fig 3. IR Detector

C. Single Channel Relay

Relay is an electrically behave a switch. A introductory electromagnetic relay be made up of a coil of line wrapped around a breakable press centre a press yoker that gives a low seductive flux disinclination way, a portable iron architecture, and one or further contanct stes. The relay being used in our design a rd it works on 5v DC, its static current is 5mA, working current is 190mA. It's a typically unrestricted relay. The interface has a estimate current of 16A.

D. Cargo Cell

A cargo cell could be a transducer type which could be a contrivance interchanging vitality from one from to another. Cargo cells are a kind of force transducer. They change over a force's active vitality like force, reduction in size, weight, or necklace into electrical vitality; further particularly as a quantifiable electrical flag. Signal quality replace fairly to the restraint connected.
There are three feature of mound cells grounded on the flag given in force-driven, curvaceous and strain hand. Single point cargos cells are isolated in such a way that

they can control out-center loads, which placed on the scale all-over, thereby accept them to be largely specific in artificial operations. In our design a single point cargo cell is used with a capacity to measure 20 kgs the cargo. Its affair is 2mv.

E. Ultrasonic Detector

Power the Ultrasonic Detector using a regulated 5V through the Vcc ad Ground pins of the detector. The current consumed by the detector is lower than 15mA and hence can be directly powered by the on board 5V pins (If available). The Detector and the Echo pins are both I/ O pins and hence they can be connected to I/ O pins of the microcontroller. To start the dimension, the detector pin has to be made high for 10uS and also turned off. This action will trigger an Ultrasonic wave at frequency of 40Hz from the transmitter and the receiver will stay for the wave to return. Once the wave is returned after it getting reflected by any object the Echo pin goes high for a particular quantum of time which will be equal to the time taken for the wave to return back to the detector. Here Ultrasonic detectors are used to identify the potholes and hump limits.

In Fig4 shows the circuit illustration of the detector and controlling, a constant 12v force from the battery is fed to a voltage controller (5v) which is the input voltage needed for the microcontroller. For initiate relay and motor another 12v force is taken independently from the battery. The measured cargo value from the cargo cell is amplified with the help HX711 cargo cell amplifier and also given to the regulator and the cargo value is displayed using LCD.
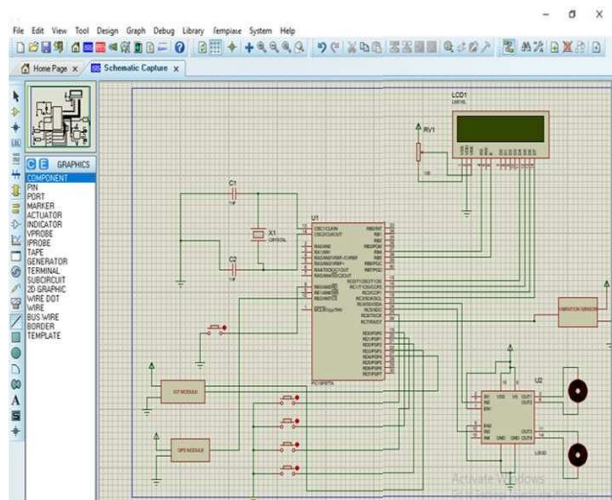

Fig 4. The circuit illustration of the Detector and Controlling

IV. RESULT AND CONCLUSION

To measure overloading of the passenger vehicle, automatic control system for overfilling passenger vehicle was dissembled using lab view. The detector

circuit substantially consists of the cargo cell, interface module dc motors and processing circuit. In this design, we have monitored the truck using sensors and a wireless network.Arduino mega controller is used to control all the sensors. Here cargo cell is used to monitor truckload. The cargo exists the truck limitation, then it will alert through buzzer and IOT.IR detector is used to measure the goods height and aultrsonic detector is used to check person movement in the goods garage area. If these three conditions are satisfied Engine will be started, otherwise, Engine will not start.

Overloaded vehicles are getting the major cause of mishappenings. Because of load, it reduces the motorist's effectiveness to break and steer and it can lead to an accident. Due to gratuitous stress on the machine, Increase the Chances of tires failure. It reduces the vehicles stability. This paper has succeeded in designing and applying to prevent controller devices and monitors by using the Arduino AT mega 2560 as an information processing centre and using the IR sensor as a sensor to detect the persons. Ultrasonic sensors detect distance. Relay can be monitoring engine in ON/OFF in the high load. The outputs monitoring in the LCD Display. To identify the truck weight (Load), Height, and Theft Detection by using this there are more advantages to avoid accidents in our nation as possible. whenever truck weight, height or anyone theft the Truck means at sudden time engine will not get ON, then the alarm will get ON, and the all detecting values are displayed in LCD, Finally, all detecting data and engine on-off conditions are also sent to mobile phone through Notification by using IOT concept.

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