# Effectual Consignment Supervision and Anti-Cheating Monitoring System for Heavy Loaded Vehicles

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***Abstract*— In speedy moving world, mainly accidents are occurring due to over loaded heavy duty vehicles. To meet the state of the art problem we have to develop a new setup with high accuracy, and cheat free mechanisms has to be adopted. Devices designed have to be even fast and convenient. The devices that are available in the market are much prone to errors. The electronic truck scale is much more applied to weighing measurement systems [1] in all walks of life. The main problem with that of the existing setup is that the fabrication and that the devices values could be easily altered. Owners of the heavy duty vehicles do such things for mere profit but the problem is that when the driver of the overloaded vehicle is not in a position to have control over the vehicle, which results in road accidents. A perfect system required to have a control over the problem, in proposed system, many cheating methods are analysed and anti cheating monitoring system of the electronic truck scale is designed. The added advantage of our setup is that the information about the accident is also sent o the owner and the nearby emergency centre using GSM and GPS. According to a survey made more than 73%of the highway accidents are due to over loaded vehicles and we assure that our proposal satisfies our requirements.**

***Index Terms: Anti cheating monitoring (ACM),* (Global Positioning System) GPS, (Global System for Mobile Communications) GSM.**

## I. INTRODUCTION

In recent years along with the rapid development of economy, trade volume is increasing rapidly. With the virtue of accuracy, quickness and convenience, electronic truck scale is more and more applied to weighing measurement system of all walks of life. Since it is the very important measurement equipment in trade settlement, lawbreakers make many kinds of electronic truck scale cheating system to seek for illegal profit. They try to reduce vehicle weight and increase payload to obtain a few tons of payload [2]. Many companies have brought significant economic losses and even cause some serious economic disputes. With the technological development, the cheating methods of the electronic truck scale are more and more sophisticated. The wireless remote control cheating method is more convenient and concealed, so it is brought more serious consequences. The wireless remote control signal detection system is designed for the cheating method of the electronic truck scale.

Global Status Report on Road Safety that more people die in road accidents in India than anywhere else in the world, including the more populous China. Calling road fatalities an epidemic" that will become the world's fifth biggest killer by 2030, the report said while rich nations had been able to lower their death rates, these were sharply on the rise in the third world.

## II. SYSTEM ARCHITECTURE

Based on TPMS (Tire Pressure Monitor System), an overload calculating module [3] is added in it, a portable truck overloading automatic detection system is developed. Overall scheme of the system is analyzed, related solution of software and hardware are advanced, and also calibration and matching experiment of the system is theoretical analyzed. For the sake of monitoring truck loading imbalance, a truck loading balance detection system based on TPMS (Tire Pressure Monitoring System) is developed. A judging module for loading balance is added in the TPMS processor, which can calculate the corresponding wheel load according to the change of tire pressure signals before and after loading, so that the balance of each wheel load sharing can be judged. The solving method of judging load balance is proposed in the thesis, the method of matching and calibration of the system are considered, and the results shows that the monitoring system is practicable and can Judge lorry loading balance exactly.

Modern heavy-duty vehicles are equipped with a compression braking mechanism that augments their braking capability and reduces the wear of the conventional friction brakes. We consider a vehicle speed control problem using a continuously variable compression braking mechanism. The variability of the compression brake is achieved through the control of the brake valve of the vehicle's turbocharged diesel engine. An adaptive controller is designed to ensure good speed tracking performance in brake-by-wire, or vehicle-

following, driving scenarios even during large variations in mass and road grade. Our approach is to first consider the model without compression brake actuator dynamics and derive a Model Reference Adaptive Controller using the Speed-Gradient procedure. Then, the actuator dynamics are included in the design via the use of the back stepping procedure. The back stepping controller is implemented with a simplified numerical differentiator-based approximation.

A systematic framework of truck overloads intelligent monitoring system under the concept of internet of things (IOT) to solve the truck's ever-increasing serious overload problem in China. First the overviews of general concept of IOT and its Chinese version, Sensing China, are introduced to provide the background information. Next, the serious truck overload problem in China is explained in details including data summary of casualties and monetary cost caused by overload. Then, to solve the problem, we design a framework Of intelligent system which can monitor trucks load information in the real time environment.

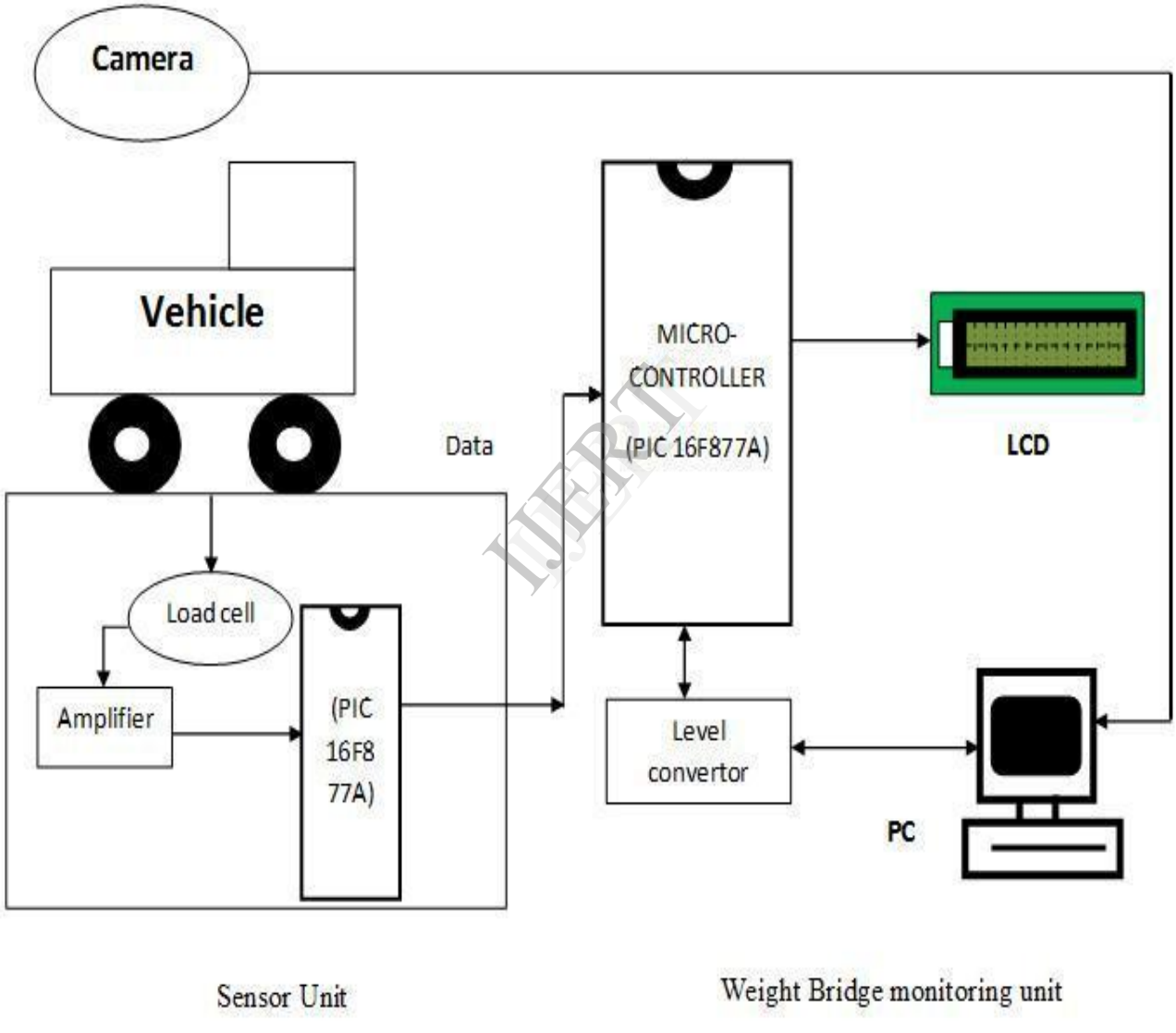


Fig.1 Block diagram of Weight Bridge Block

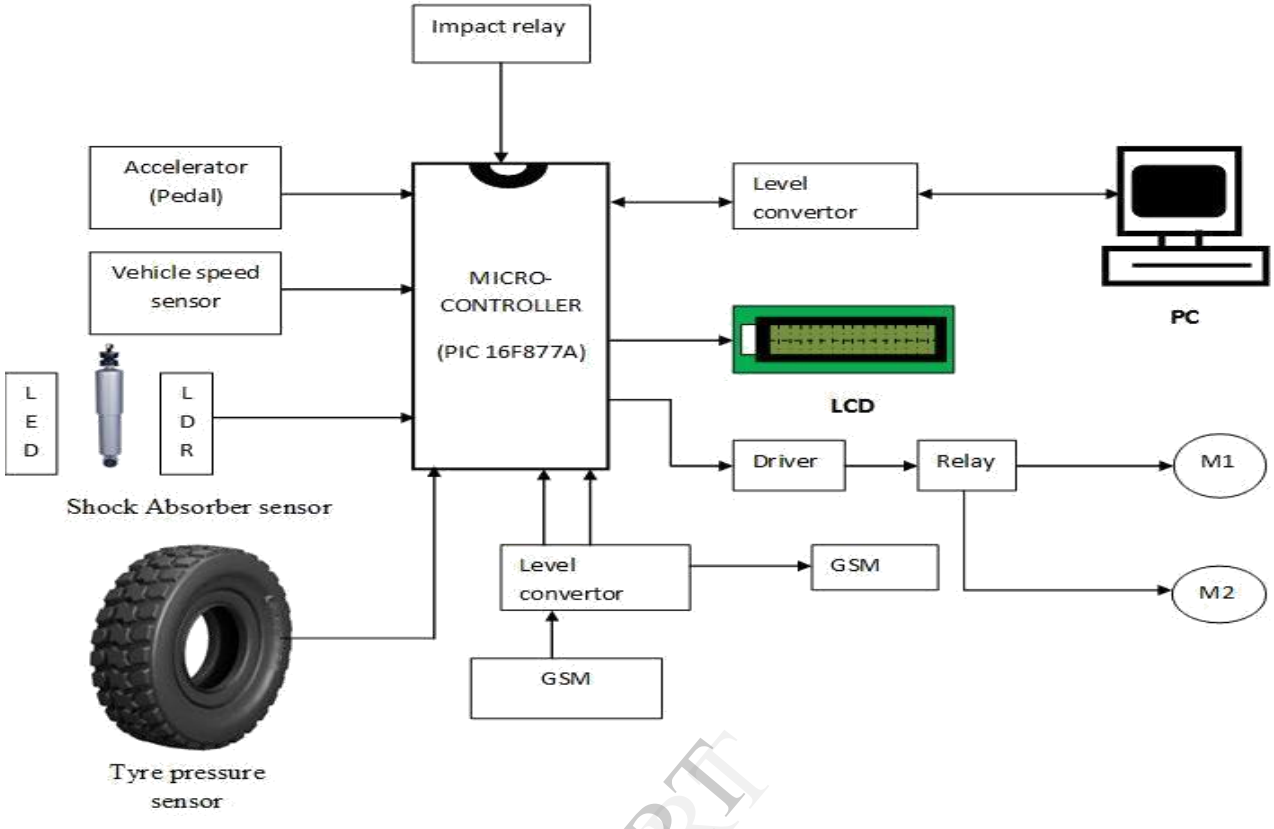


Fig.2 Block diagram of Vehicle Unit

The system includes the weight sensors installed in vehicles, wireless transformation device sending data to the GPS installed in driver's cab, and remote control terminal to receive and process the information sent by the GPS. The suggested system provides an effective approach to prevent truck overload during the transportation.

Three cheating ways that is being analyzed.

I. Change can be made in the circuit that calculates the weight.
II. Operator can enter the wrong data.
III. Vehicle is not placed correctly on the Weight Bridge.

## III. THE CHEATING METHODS OF THE SYSTEM

There are various cheating methods of the electronic truck scale; it can be divided into three kinds

### A. THE TRUCK POSITION CHEATING METHOD

It can be divided into two kinds. The one is that the truck is not on the platform entirely. That is to say the back wheel of the truck is not on the platform in order to reduce the truck actual weight. The other is that many trucks are on the platform. That is to say the front wheel of the other truck is on the platform while the truck weighing in order to increasing the truck actual weight.

### B. THE OPERATOR CHEATING METHOD

The internal parameters of the electronic truck scale include the weighing coefficient, tare weight and the others. These parameters can influence the measurement result. If these parameters can be changed by the operator at all times, the measurement result is out of accord with the actual weight.

### C. THE WIRELESS REMOTE CONTROL CHEATING METHOD

The wireless remote control cheating system is installed artificially on the communication cable of the sensors. The input voltage of the sensors is changed using the cheating system in the weighing processing so that can be reached the goal of the changing the weight of the truck.

These cheating techniques can be overcome by our proposed method.

## IV. GSM MODEM

Global system for mobile communication (GSM) is a globally accepted standard for digital cellular communication.

GSM is the name of a standardization group established in 1982 to create a common European mobile telephone standard that would formulate specifications for a pan-European mobile cellular radio system operating at 900 MHz

A. GSM Network

The GSM mobile telephony service is based on a series of contiguous radio cells which provide complete coverage of the service area and allow the subscriber operation anywhere within it. The functional architecture of a GSM system can be broadly divided into the Mobile Station, the Base Station Subsystem, and the Network Subsystem. Each subsystem is comprised of functional entities that communicate through the various interfaces using specified protocols. The subscriber carries the mobile station; the base station subsystem controls the radio link with the Mobile Station. The network subsystem, which is the main part of which is the Mobile services Switching Center, performs the switching of calls between the mobile and other fixed or mobile network users. The Mobile Station (MS) represents the only equipment the GSM [4]. It actually consists of two distinct entities. The actual hardware is the Mobile Equipment (ME), which is anonymous and consists of the physical equipment, such as the radio transceiver, display and digital signal processors.

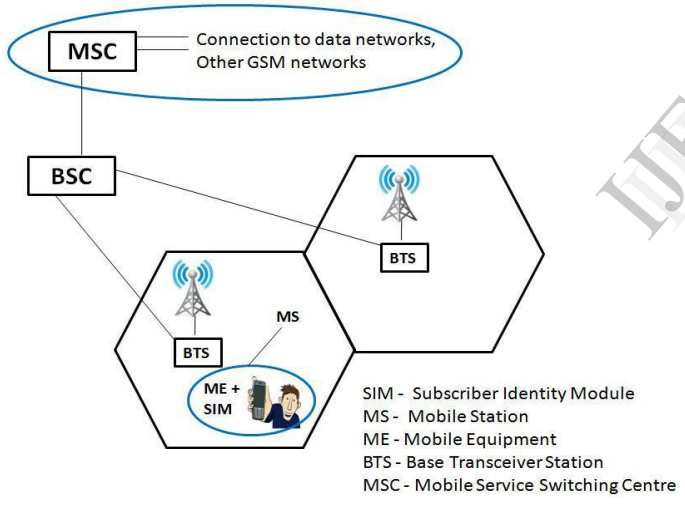


Fig.3 GSM Network

The subscriber information is stored in the Subscriber Identity Module (SIM), implemented as a Smart Card.

GSM architectural equation, MS = ME + SIM (1)

The ME provides generic radio and processing functions to access the network through the radio interface as well as an interface to the user (microphone loudspeaker, display and keyboard). The SIM contain all the subscriber-related information stored on the user's side of the radio interface. The MS is operational only when a valid SIM is placed in a ME.

The Base Station Subsystem is composed of two parts, the Base Transceiver Station (BTS) and the Base Station Controller (BSC). The BTS houses the radio transceivers that define a cell and transmits and receives signals on the cells' allocated frequencies with the mobile station. A BSC operates with a group of BTSs and manages the radio resources for one or more of them. The BSC is the connection between the MS and the Network Subsystem. It manages the radio channel as well as handovers and the transmission power levels and frequency translations of the voice channel used over the radio link to the standard channel used by the Public Switched Telephone Network.

The central component of the Network Subsystem is the Mobile services Switching Center (MSC). It acts like a normal switching node of the normal telephones of the land lines and in addition provides all the functionality needed to handle a mobile subscriber, including registration, authentication, location updating and inter-MSC handovers.

## V. PERFORMANCE ANALYSIS

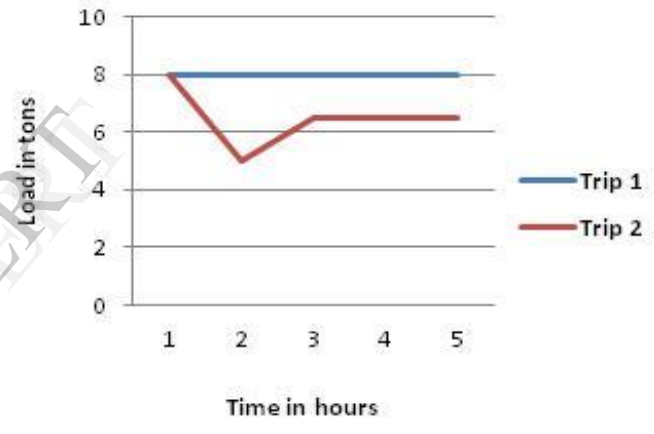


Fig.4 Graph between Load in tons and Time in hours

The graph shows the relationship between variations in weight of the truck over different trips as variation with time with respect to the load in tons.

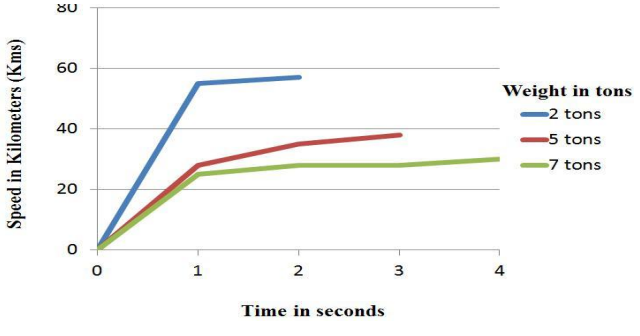


Fig.5 Graph between speed in kilometer and Time in sec

The graph shows the relationship between variations in speed of the truck over different weights with respect to time in sec

## VI. RESULTS AND DISCUSSION

Present paper is designed using PIC microcontroller. It is proposed to design an embedded system which is used for automotive security. In this paper PIC microcontroller is used for interfacing to various hardware peripherals. For doing so a PIC microcontroller is interfaced serially to a GSM Modem. An EEPROM is used to store the mobile number. The hardware interfaces to microcontroller are LCD display and GSM modem. The design uses RS-232 protocol for serial communication between the modems and the microcontroller.

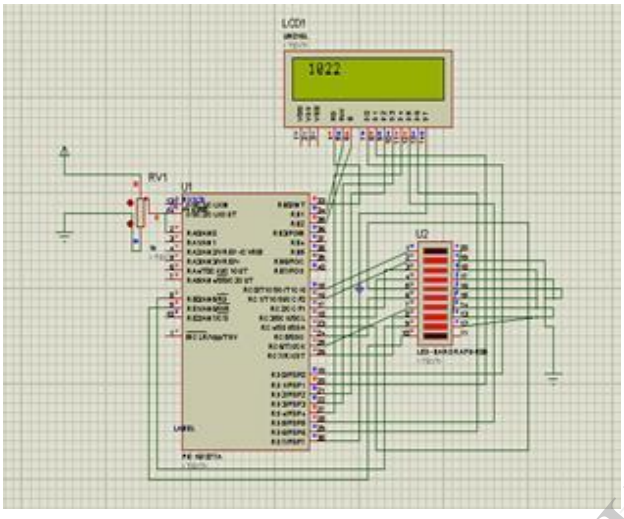


Fig.5 Simulation results

The experimental result showed in the figure.5 shows that it sent an alert message to the owner as it weights 1022 kilograms of weight.

The results show that, it will work well for all kinds of vehicles and responds immediately to the user's commands. In the old system, they are easy to steal, and the average motorist has very little knowledge of what it is all about. To avoid this kind of steal we are going to implement this paper which provides more security to the weight theft of the vehicles.

## VII. CONCLUSION

From the proposed system Anti-Cheat Monitoring System (ACMS), its results and discussions proved that this system works well, and can be put forward to practical applications. The electronic truck scale cheating signal monitoring system is designed. The system mainly includes two parts: weighing system and the anti-cheat system. Three types of cheating methods are analyzed. The experiment is carried out; the experimental results show that the system can complete the weighing work, detect on real-time a variety of the cheating methods, so the monitoring system improves the system safety and the measurement accuracy. The weighing system must be calibrated at regular. The administrator opens the interface of the calibration option, inputs the weighing coefficient.

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