Vehicle Load Detection and Stoping System

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Abstract- *In this paper, the vehicle load detection and control system for tollgate using RFID and GSM technology. Weigh-In-Motion (WIM) technology has become a key technology for measuring traffic loads. A two-degree-of-freedom direct yaw moment control scheme is proposedRFID is used to identify the vehicle number and GSM is used for control and alerting process.*

Keywords- Weigh-In-Motion (WIM); Electric Vehicle; RFID; GSM controller; load cell.

I. INTRODUCTION

The number of vehicles exponentially increases due to growth in the automobile industry. As the number of vehicle increases, the accident also increases. The reasons of most of the road accident are heterogeneous traffic and lack of traffic separation. Overload vehicle detection is already a serious problem ,which is likely to emerge as one of the most significant problems in near future .the system implemented by us aims at reducing the road accident in the near future due to overload vehicle. The system detects the presence of load in the vehicle and immediately locks the engine of the vehicle.

II. RELATED WORKS

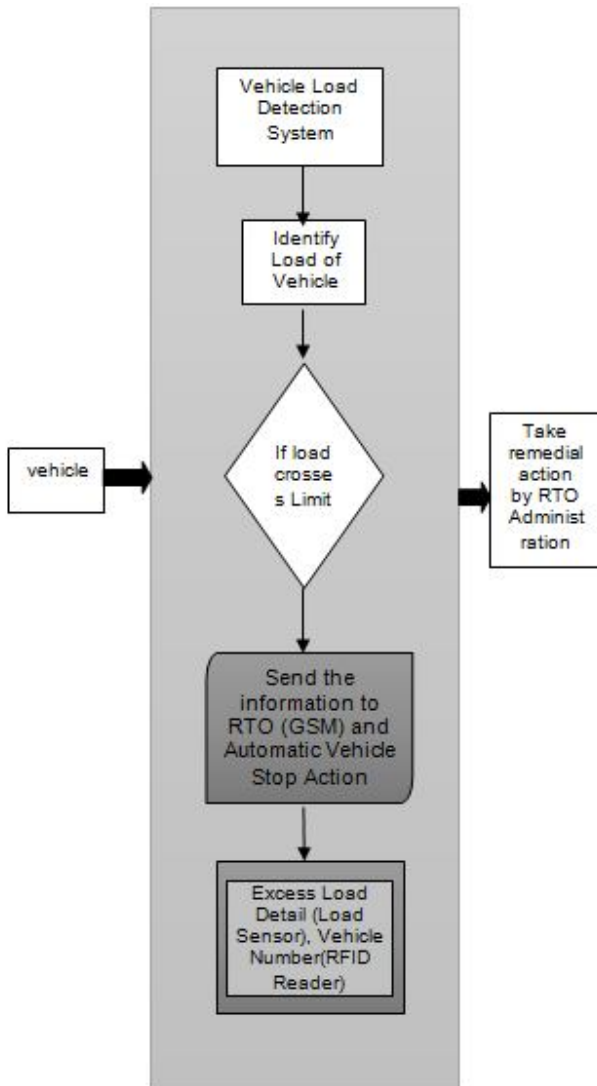The concept of Weigh-In-Motion (WIM) was introduced more than fifty years ago [1].

A rear wheel drivein-wheel motor electric vehicle was employed for a practical evaluation of the scheme. Because of the robust control framework, the presented system can overcome model uncertainties, side wind disturbances, and parameter variation problems. Experiments were conducted to illustrate the feasibility and effectiveness of the proposed controller[2]. these conditions vary from site to site, each specific installation has its own characteristics so that sensors with known quality of performance will not show the same performance in every installation. For instance, the study of survivability, reliability and accuracy of Kistler Lineas® sensors under highway traffic conditions in Connecticut showed failure in application of this type (four sensors failed) in States [3]. Many such systems are still in use, including some developed in recent years. Wear and tear is severe, often

resulting in a short lifespan. Unless the approach pavement is particularly smooth, these systems are often inaccurate because the devices are subject to large load fluctuations depending on vehicle speed, vehicle suspension characteristics and road roughness [4].Thus the accuracy of a WIM system with one sensor is limited fundamentally by the dynamics of the vehicles being measured, and typical RMS errors of existing single-sensor systems are 12 to 29 percent [5]. Improvement in transportation system results into the better lifestyle in which we succeed amazing freedom for movement, vast trade in manufactured goods and services, as well as higher rate of employment levels and social mobility. In fact, the monetary state of a country has been firmly identified with effective methods for transportation [6].It loses its propelling function because of traction force saturation, and the vehicle consequently spinsun controllably. To improve the stability of two-dimensional steering, an active compensation of the yaw moment for wheeled vehicles is essential. Many investigations have demonstrated that direct yaw moment control (DYC) [7]. Design and improvement of a ''RFID technology based automatic toll plaza'' [8].

III. PROPOSED SYSTEM

In this existing problem vehicle identification system based on number plate and load detection is manual control process. The proposed system implements force sensor for weight detection .RFID card is placed under the vehicle. It is used to identify the vehicle details. When the vehicle entering the toll gate, load sensor measuring the vehicle load and rfid reader to read the vehicle details. If the vehicle load is high, control code and vehicle details are send to control room using GSM. When the vehicle receive the engine off command from controller room, the high load vehicle is immediately stopped.
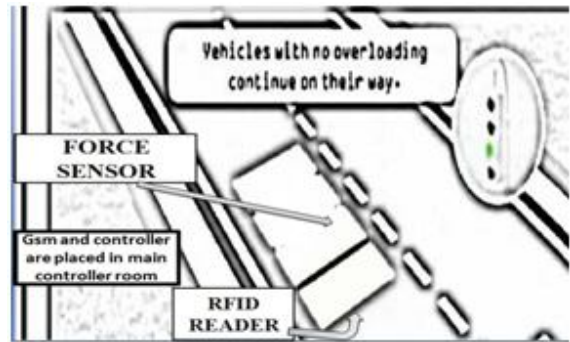
IV. FLOWCHART

Figure 5.1 force sensor design

This RFID card design has a GSM,it function for sending notification message for identifying the overload of the vehicle with the help of RFID Reader, we can collect details about the particular weight of the vehicle.
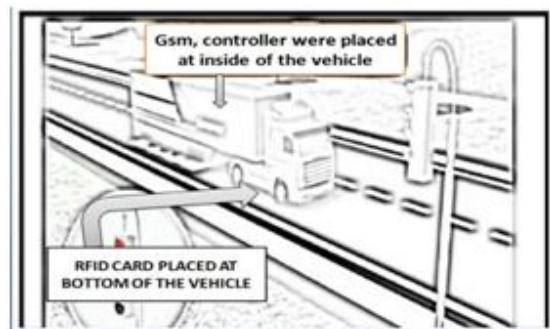

Figure 5.2 RFID card design

VI. ARCHITECTURAL DIAGRAM

Architectural design contains GSM, power supply, switch, RFID card, motor, Arduino uno.

V. DESIGN

The design diagram constitute of force sensor, RFID reader ,vehicle overloading detector machine which can be used to detect the weight for overload of the process which has in that way of detecting process. Then the process can be controlled by GSM controller in the main controller room.
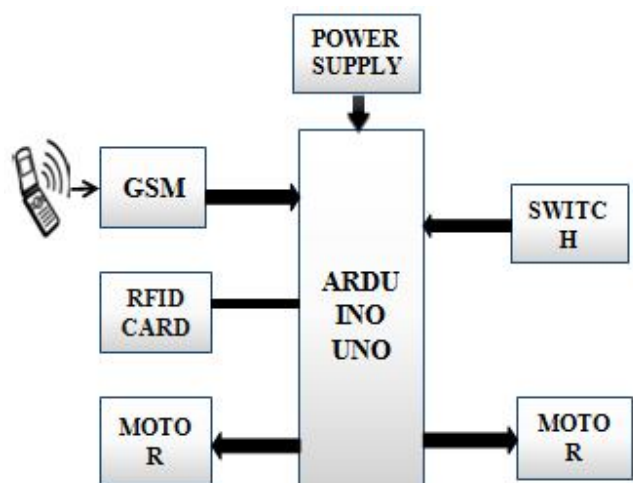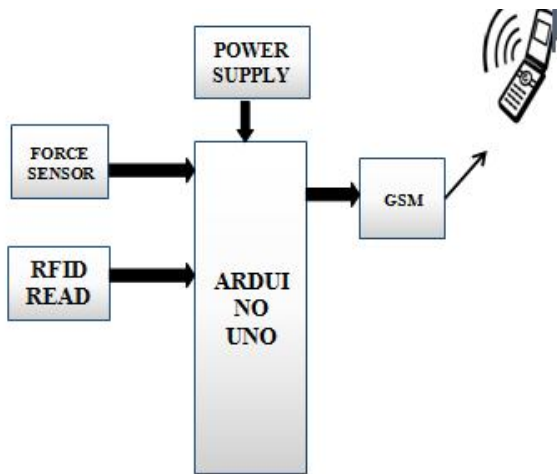

Figure6.1Vehicle Block

Figure 6.2 Load Detection

In this project we using Arduino controller. We are using two motors and two motor driver . The load sensor can be used to detect the weight. If weight is identified then the message will be send by using GSM. It will be send message to RTO Office.

VII. SYSTEM COMPONENTS

7.1Arduino Uno

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs. A pre-assembled Arduino board includes a microcontroller, which is programmed using Arduino programming language and the Arduino development environment. In essence, this platform provides a way to build and program electronic components. Arduino programming language is a simplified from of C/C++ programming. This is the heart of system which controls.

Figure 7.1 Arduino Uno

7.2 RFID TAG and READER

Radio-frequency identification (RFID) uses electromagnetic fields to automatically identify and track tags attached to objects. The tags contain electronically stored information. Here RFID reader is deployed in the ground to detect the vehicles that are overloaded and it has RFID card to recognize the vehicle.

Figure 7.2 RFID Tag and Reader

7.3 GSM

GSM/GPRS TTL UART Modem is built with Dual Band GSM/GPRS engine- SIM900, works on frequencies 900/ 1800 MHz. The level The baud rate is configurable from 9600-115200 through AT command. The GSM/GPRS Modem is having internal TCP/IP stack to enable you to connect with internet via GPRS. It is suitable for SMS, Voice as well as DATA transfer application in M2M interace.GSM is used to send the message about the vehicle RTO the shaft per minute and is termed as RPM .The gear assembly helps in increasing the torque and reducing the speed. Using the correct combination of gears in a gear motor, its speed can be reduced.

Figure 7.3.1 GSM module interfacing

Figure 7.3.2 GSM Coding Snapshot1

Figure 7.3.3 GSM Coding Snapshot2

Figure 7.3.4 GSM Coding Snapshot 3

7.4 Motor

A geared DC Motor has a gear assembly attached to the motor. The speed of motor is counted in terms of rotations of
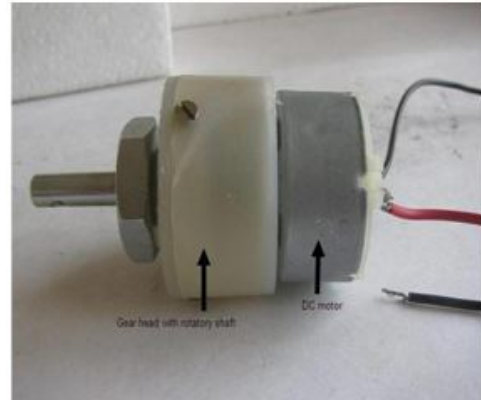

Figure 7.4 motor diagram

7.5 Force Sensor

A force-sensing resistor is a material whose resistance changes when a force, pressure or mechanical stress is applied. When a force is applied to the sensor, this resistance decreases. The resistance can be measured by a multimeter, then applying a force to the sensing area.

Figure 7.5.1 Force sensor diagram

VIII. CONCLUSION

In this paper, we have presented the load sensor based load detection of tollgate system GSM technology. The load can be detected easily & it does not give the false output. GSM base load detection system automatically detects the weight without any human interface. This method having many advantages on traditional detection techniques. The main advantages of this system like less cost, low power consumption, on time data operation and minimum analysis time. This is often the function load detection.

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