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Carrying Out of Load Cells for the Robbery Recognition System

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Abstract: **In recent years, due to the increase of goods transportation system proportionally the theft also increases. In order to prevent these thefts, we need to monitor the entire transportation system until the goods reached its destination. Hence we need an electronic management system which detects the reduction in the weight and the location of the heavy vehicle. In this paper we introduced a new electronic management system which is accompanied with Load cell, Fuel sensor, GSM, GPS and LCD system for providing security to the goods in the heavy vehicles. Initially the weight of the goods is measured by the load cell and it is stored in the microcontroller. At the time of transportation, if there is a reduction in the weight of goods it will automatically intimated to the owner through GSM and its location through GPS module.**

***Keywords*- Heavy vehicle, Load cell, Fuel sensor, GSM & GPS Module**

I. INTRODUTION

Load cell is type of sensor which has a four equal resistance connected as a Wheatstone bridge used to measure the weight of the goods. The weight of the goods in luggage carrier is obtained by the change in the electrical resistance of the Wheatstone bridge will be appeared as the corresponding weight change. The range of the sensor can be available up to tons. Initially the exporting goods weight is measured. If any reduction in weight is identified, changed weight will be subtracted from the initial weight and the obtained weight value is sent as a SMS through GSM module

II. LOAD CELLS:

The load cells (40 kilograms) is attached to the base of the vehicle from one side and to the spring valid for 40 kilograms from the other side. The other side of spring is placed on the flat spring of the vehicle. When the weight of the vehicle increases, the spring is jammed and it produces a power towards the weight sensor and changes the output resistance. The pivot in the device changes the sensor resistance into voltage in a way that the pivot shows 1 voltage if there is no load on chassis and it shows 10 if there is the maximum weight on the chassis [1]. The load/weight data obtained from the weight sensor i.e. "analog output sensor" shows the incoming pressure on the spring, of the sensor, resulted from the distance changes from the suspension system of vehicle. The load/weight data obtained from the weight sensor is transformed to the digital data by a driver circuit. The output voltage is highly sensitivity. The output voltage is highly sensitivity. The strain gauges are of same material and should have a same resistance value.

Fig.1 load cells

III. FUEL SENSOR:

Fuel sensor is placed at the inlet of fuel tank. It is used to measure the fuel level periodically and transmitted to the owner of the vehicle. It also notify microcontroller about the fuel level in the fuel tank. As the disk of the flow meter rotates, due to the magnet present on the disk. It will make and break the reed switch, so square pulses will be available as an input to the microcontroller. By counting these pulses and multiplying it by a flow factor we will get exact amount of fuel. [7]

IV. ATmega8:

A microcontroller is used to act as a brain to the robbery recognition system. A microcontroller is a highly integrated chip where all the peripherals like CPU, timers, counters, RAM, ROM, registers, I/O pins, clock circuit, etc. are built in. Therefore, is a microcontroller is a combination of a microprocessor and peripherals. Microcontrollers are small, powerful and are used in embedded applications for specific tasks. ATmega8A microcontroller is used. It belongs to the Atmel's family of microcontrollers. Atmel AVR microcontrollers provide flexibility in terms of design and no other microcontroller offers better power efficiency than the AVR family. The mega AVR device family offers a good amount of memory and inbuilt peripherals and is suitable for general purpose applications [4]. It is fully Static Operation and has a 23 Programmable I/O Lines. Atmega8 has a n operating at 5volt. It executes the instructions at 1clock cycles

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per second whereas PIC, ARM executes at4 cycle per second. Its accuracy is high generally for this type of module, here both the sensor outputs are varying periodically. Both load cell and fuel sensor output is drived separately and given to the microcontroller. The output of microcontroller is given to the GSM module, LCD display, GPS module and motor with relay control. ATmega8 generally has a 3 ports namely port B, port C and port D. Port B and port D is bidirectional. Port C is only for input. ARM Controller, Relay circuit, GSM Module and LCD Display are interfaced on a single board and embedded on single board which is embedded to a vehicle as a control unit.[4].

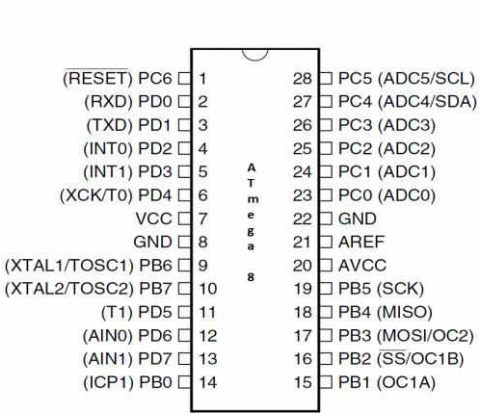

Fig.2 Pin diagram of ATmega8

V. BATTERY:

The two 6 volt battery of 4.5Ah can be used. Both batteries are seriously connected to form a 12 volt. For GPS, ATmega8 and LCD display operating volt is 5volt, so 12volt supply is regulated to 5volt and given to them and for relay, motor and GSM operating volt is 12volt and the supply is given directly from the series connection of battery. The regulator used here is a 5volt 7805 regulator for conversion.

VI. LCD DISPLAY:

LCD display used to display the reduction in the weight of the goods in luggage carrier of the vehicle. The LCD display used is 16 characters and 2lines display. The type of LCD display LM061 is used. Weight could be displayed to the driver on the LCD in vehicle cabin, or together with received data from positioning module (received from positioning satellites) including speed and position of vehicle and time [1].

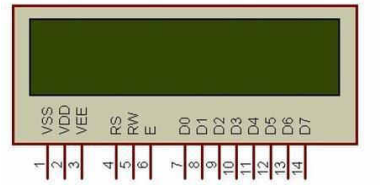

Fig.3 LCD display

VII. RELAY AND MOTOR:

Motor is used here for the wheel movement of the heavy vehicle. Relay is used here to control the movement of the wheel. Here transistor BC547 is used for relay switching. When the transistor becomes active, the relay switch changes its position from normally open to normally close and the motor starts to rotate.

VIII. GSM/GPS BLOCK:

Automated vehicle system is being used in a variety of ways to track and display vehicles locations in a real time [3]. GSM block is used here for sending the reduction of weight to the owner of the vehicle. The GSM block used here is GSM SIM900A. It can operates at 5volt and it also sends the exact location of theft place by tracking the latitude and longitude of the location using GPS block. The location and time information is anywhere on earth is provided by using GPS technology [3]. GPS modules are popularly used for navigation, positioning, time and other purposes. GPS antenna receives the location values from the satellites [6]. The GPS will be sending the location information to the controller continuously. The same will be routed to the GSM modem through the controller [8].

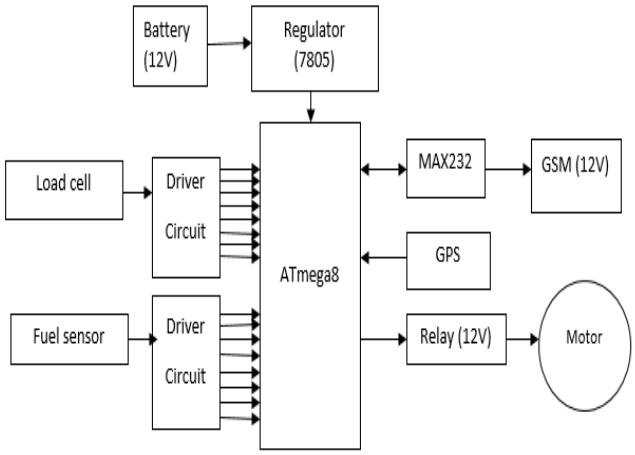

Fig.4 complete block diagram

The block diagram gives the whole setup of the module, the analog signal coming from the load cell and fuel sensor is converted to binary 8bit data and given to the bidirectional port of ATmega8.Then initial value of load is stored before starting the vehicle and if any reduction in the weight of the load compared with initial weight, then the reduced weight will be sent to the owner of the vehicle with the location of the place. Then the reduced weight is displayed on the LCD display. MAX232 is used as interface between GSM and the ATmega8. The relay is for switching purpose and the motor is for wheel rotation of the vehicle. The rotation of wheel can be controlled by the making a response message from the owner of the vehicle.

The transistor can be used here before relay connection to enable that relay to switch on and wheel will be rotated only when the transistor is in active region controlled by microcontroller. When the GSM receives

a response message, Design of ignition/fuel flow control module stops driving of the vehicle. This stimulus is obtained through an owner's message [5]. Upon receiving the location of the vehicle, the owner can either stop or start the ignition of the engine.

XI. CONCLUSION:

The theft monitoring and control system has been designed and developed to avoid the theft attack in moving vehicles. Thus the real-time monitoring of the theft attack can be viewed through LCD display. The system can be extended for monitoring the whole transportation of moving vehicle. This paper determines the area where the theft occur and come with the solution to avoid the theft. The sensor network was programmed with various interfaces to maintain the system easily and interacted simply. The load cell and microcontroller are used to find the weight of the goods during the transportation system. The fuel sensor is used to indicate the fuel level of the moving vehicle. In future the system is used to monitor the heavy vehicle.

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IX. RESULT AND DISCUSSION:

The load cell with 40kg is used initially and it can be tested for small applications. We are expecting the detection of weight from 50g to 40kg and then it can be implemented for large applications.

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