Black box for Transport Vehicles

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Abstract: **The system is designed around modern vehicle which is capable of handling various parameters like position, fuel tank level, speed, engine parameters such as temperature and pressure. It can be used for vehicle mapping with the help of GPS technology. The system inputs the information about the same and records it in the database. Total journey is monitored and can be observed at the end of the trip. In short, the device will record data concerning the vehicle's technical condition, the way it was driven and provided and analysis as feedback to the driver and/ or other parties.**

I. INTRODUCTION

Data Recorder is a device installed in a motor vehicle to record technical vehicle and occupant information for the purpose of monitoring and assessing vehicle safety system performance.

Data Recorders monitor engine and vehicle operating parameters. The primary function of the Data Recorder is to control the engine, but it can also serve the secondary function of recording engine and vehicle information to indicate on the overall trip safety. The data recorded by a Data Recorder is mostly used for vehicle diagnostics, maintenance and fleet management, but may also be used in accident investigation. The engine Data Recorder is the first place to look for "black box" data on a heavy truck, although there may be other sources as well. Tracking driver performance on the total trip was a feature attractive to trucking companies and firms.

I. DRIVE DIAGNOSTIC SYSTEM.

The system incorporates four layers of data collection and analysis: measurement, identification, analysis, and reporting.

II. MEASUREMENT

The first layer in the system is the measurement module, which collects the pressure and speed of the vehicle. The system also records the position of the vehicle with GPS.

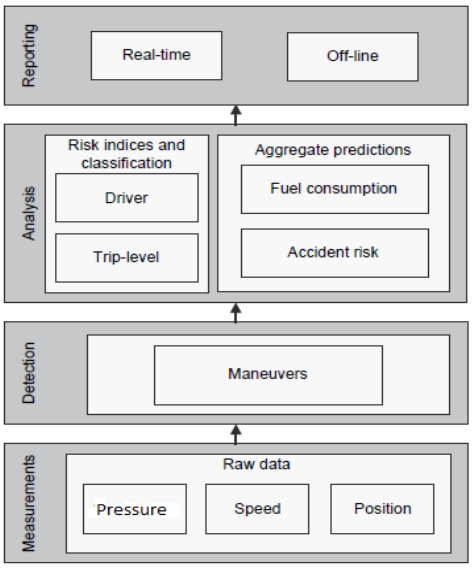

FIGURE 1 Overall framework of DriveDiagnostics system.

III. DETECTION

Detection and evaluation, incorporates pattern recognition algorithms to identify and classify maneuver types in the raw measurements. This maintains a database with vehicle-specific and driver.

IV. ANALYSIS

Analysis layer which resides in the application server, synthesizes the specific maneuvers that were identified to evaluate an overall driving risk index at the level of the individual trip and of the vehicle overall performance.

V. REPORTING

The final layer is a reporting layer that provides feedback on the basis of the information collected in the database. This feedback may be done both off-line and in real time.

I. HARDWARE

The first three components convert the analog parameters into electrical signals which are given to the ADC of the microcontroller PIC18F452. These analog signals are converted into digital signals by analog to digital converter Microcontroller stores these values in its memory.GPS receiver detects the location of the vehicle. All the values of parameters and location of the vehicle are fed to PC via a USB to serial port. These parameters are stored in database using C#. Thus, position (using GPS receiver), speed, temperature, pressure, fuel level of the truck can be monitored. Values are taken for every lap and this process continuous till truck comes to its final destination. After journey parameters can be analyzed for performance purpose.

a) Pressure sensor: To measure the pressure of the engine.

b) Temperature sensor: To check the temperature of engine.

c) Tachogenerator: To measure the speed of the vehicle.

d) Fuel tank: To measure the fuel level.

e) GPS receiver: To detect the location of the truck.

I. MICROCONTROLLER.

The name PIC initially referred to "Peripheral Interface Controller"' now it is "PIC"' only PICs are popular with both industrial developers and hobbyists alike due to their low cost, wide availability, large user base, extensive collection of application notes, availability of low cost or free development tools, and serial programming (and re-programming with flash memory) capability.

II. TEMPERATURESENSOR-LM35.

Used to measure temperature with an electrical output proportional to the temperature (in ^{o}C).Measures temperature more accurately than a using a thermostat. The sensor circuitry is sealed and not subject to oxidation, etc. Generates a higher output voltage than thermocouples and may not require that the output voltage be amplified.

I. Voltage regulator.

Voltage regulator is reliable and stable. Provides a stable, low voltage supply to the microcontroller. are reasonably priced and produce simple and reliable power supplies if used correctly.

II. Pressure Sensor: MPX10 Motorola

This is a Silicon piezoresistive pressure sensor. Provides a very accurate and linear voltage output is directly proportional to the applied pressure. Own external temperature compensation and signal conditioning Networks can be added.

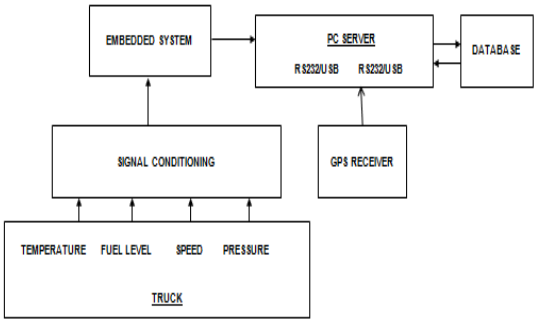

Figure 1: Process Model

III. PC/LAPTOP.

This data is feed to PC, where it is presented in user friendly form which can be understood by any layman.

IMPLEMENTATION

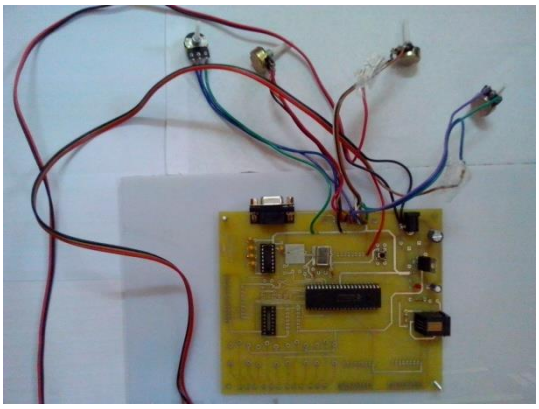

Figure 2: Embedded System.

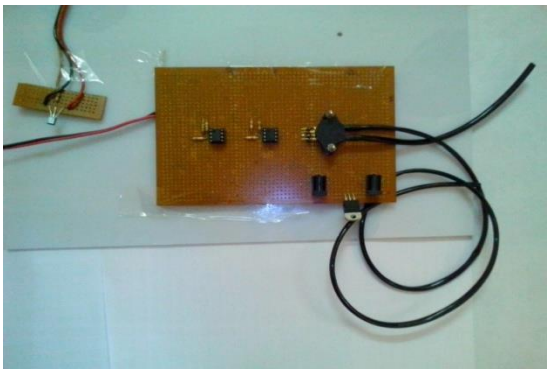

Figure 3: Temperature and Pressure Sensor.

I. ADVANTAGES.

The alert message includes the location in latitude and longitude. Reports that shows trip times, speeds at various times, average cruise speeds, gear engagement times, total idle time and the existence and number of hard stops can help a company save fuel. The truck driver action recorded is not only for the last trip, but for many trips. Data, if not deleted, can show months' worth of measurements, such as the time spent in each speed range or gear – habits that make up regular driving style, not just what happened on one trip.

II. DISADVANTAGES.

It increases cost of vehicle. Extra maintenance is required to keep sensor in accurate shape & proper reading.

III. APPLICATION.

Data Recorder is used in trucks to monitor and control driver performance and to increase the efficiency and life of the vehicle. The recorder may be used in Public Transport System like private and commercial cars, taxies, buses to get accurate readings.

IV. CONCLUSION.

From above proposed system we can control and monitor driver performances, reduce wear and tear of vehicle thus increasing the efficiency and life of the vehicle, provide key management reports and provide vehicle security. We can apply our system in public Transport System, Transport system and Volvo Truck.

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