AN INVESTIGATION ON BLACK BOX FOR VEHICLES

Anto Jose[1], Anumol Antony[2], Helena Vraghese[3]

Department of CSE
Sahrdaya Engineering College Kodakara, Thrissur

Abstract:—Automobiles and computing technologies are creating a new level of data services in vehicles. The Automobile Black Box has functions similar to an airplane black box. It is used to analyze the cause of vehicular accidents and prevent the loss of life and property arising from vehicle accidents. The main purpose of the paper is to investigate a prototype for vehicle diagnosis system that can be installed into any vehicle. This can contribute to construct safer vehicles, improving the treatment for crash victims, helping insurance companies with their vehicle crash investigations, and enhancing road status in order to decrease the death rate. This paper aims to achieve a system that should objectively analyze what occurs in vehicles. This paper also aim to find out which all are the best ways to secure the data in the equipment.

Keywords: Black box, Prototype, Accident analysis.

I. INTRODUCTION

World Health Organization(WHO) says more than a million people in the world die each yearbecause the transportation related accidents. The black box system can play a major role to solve problem. Like flight data recorders in aircraft "Black Box" technology can now play a keyrole in motor vehicle crash investigation.

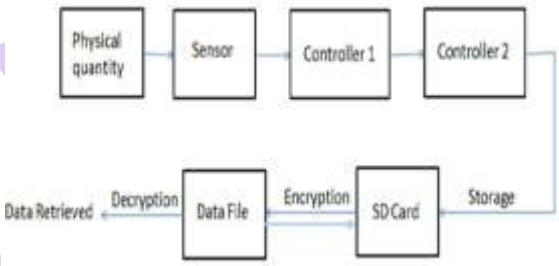
Black box sends an alert message to a pre stored mobile number in case of an accident. It also sends short message indicating the position of vehicle by GPS system to family member emergency medical services and nearest hospital. So that the first aid can be provided as early as possible. The details of the accident is stored inside the SD card along with black box. This system have a security module which employs data encryption to secure the stored data on the SD card. To prevent falsification of the data, encryption algorithm is used[1].The system can be designed with minimum number of circuits. This can contribute to construct safer vehicles, improving the treatment for crash victims, helping insurance companies with their vehicle crash investigations, and enhancing road status in order to decrease the death rate. Mainly in all accidents evidences are collected directly from victims, but more efficient way is introduced by black box. Here whole system divided in to two sections. First section many types of sensors are used, while the second section was implemented by using the python programming. This programming helps in not only recording the data but also retrieving the data from microcontroller memory to an LCD to display it, belt status lane detection and CAN failure etc are discussed under this paper. Details of vehicles status is saved inside EEPROM of the black box additional 10 seconds of events after this accident will be saved.[2].Weather forecasting is one of the main challenges for climate researchers. Predicting the variables like temperature, wind, speed, humidity leads to ideal weather forecasting. Environmental issues can be easily solved by this concept. In this paper, a consistent features set for all of the stations and for all days in the particular time period, is taken into consideration. Real measured values of features are gathered from the weather underground website. Elastic net which is combination of L1- norm and L2-norm is used as the feature selection method[3]. A black-box method for modeling the time-domain response of integrated circuits (ICs) based on echo state networks is proposed[4].The number and value of the input and feedback delays required for modeling nonlinear systems with memory are detected automatically, and the training procedure is very fast and robust. The resulting models can be implemented in any hardware description language. The proposed modeling approach is applied to three test cases that cover a wide range of analog behavior. The achieved accuracy is comparable to the reference modeling method, and, depending on the complexity of the modeled IC, the simulation speed-up factor is in the order between 10 and 100.

MapReduce has revealed as a paramount platform and disruptive technology for the execution of high performance applications that process very large volumes of data. Hadoop is one of the most popular and widely adopted open source MapReduce implementation. Companies that execute large applications over hundreds or thousands of machines every day spend large efforts in performance tuning and optimization to reduce infrastructure costs. However, the framework has around 190 parameters which can be adjusted in a large number of different configurations that can significantly impact the performance of applications. The task of optimizing Hadoop parameters requires deep knowledge about a myriad platform details. In this paper, we propose and evaluate the use of derivative-free (DFO) methods for the automatic setup of Hadoop parameters to optimize the performance of applications. DFO methods provide a simple and efficient manner for automatic optimization of Hadoop MapReduce programs. Parameter changes are deployed through DevOps tools which are used to efficiently reconfigure the cluster according to DFO decisions. In the best scenario in our experiments, the automatic optimization leads to a reduction of 71% in the execution time over the default setup of parameters (i.e., an acceleration of 3.5 times) on a cluster of 28 nodes with very

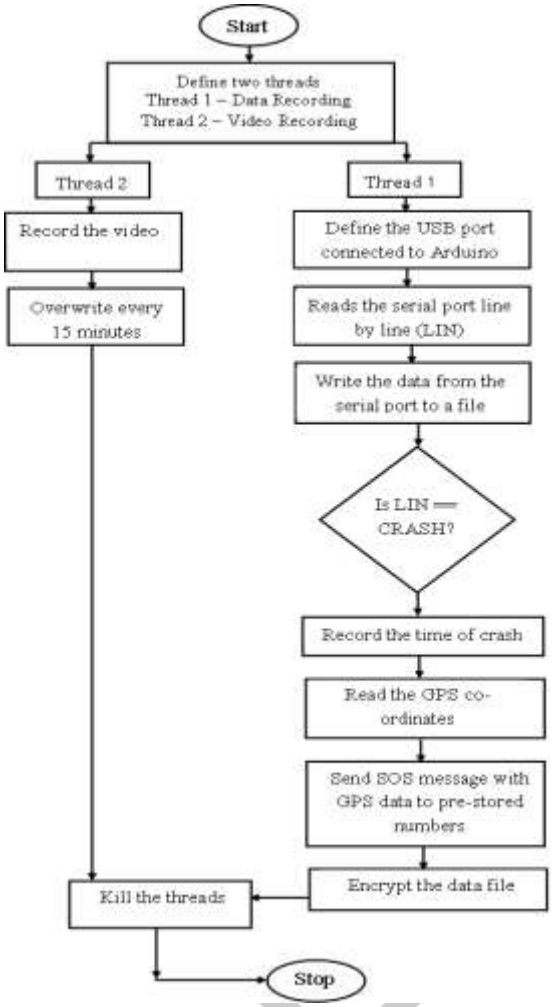
low overhead for production environments. Such results show that DFO methods and automatic optimization provide a promising tool for optimizing performance and reduction of costs for Hadoop applications which do not present dramatic variation in their behavior in daily production environments.The in-vehicle black box camera (dashboard camera) has become a popular device in many countries for security monitoring and event capturing. The readability of video content is the most critical matter, however, the content is often degraded due to the windscreen reflection of objects inside[5]. In this paper, we propose a novel method to remove the reflection on the windscreen from in-vehicle black box videos. The method exploits the spatio-temporal coherence of reflection, which states that a vehicle is moving forward while the reflection of the internal objects remains static. The average image prior is proposed by imposing a heavy-tail distribution with a higher peak to remove the reflection. The two-layered scene composed of reflection and background layers is the basis of the separation model. A non-convex cost function is developed based on this property and optimized in a fast way in a half quadratic form. Experimental results demonstrate that the proposed approach successfully separates the reflection layer in several real black box videos[6].

This paper presents a security scheme to detect the data forgery in the vehicle black box system. The proposed scheme uses chained hash and symmetric-key encryption to check whether the data is forged or modified. Experimental results show that the proposed scheme can find and notify the point of the falsification. Based on our experiment, we believe that the proposed scheme could be a practical solution to improve the reliability of the black box data[7]. This paper[8] propose a black-box modeling framework for connected vehicle networks comprised of conventional vehicles and vehicles equipped with wireless vehicle-to-vehicle (V2V) communication. First, we identify the link length that is the number of vehicles between the broadcasting and the host vehicle. Based on the estimated link length, a linear model is used to approximate the dynamics of the vehicle network. The proposed framework does not require priori information about the dynamics of the vehicle network, and hence can be implemented in real traffic. Numerical simulations are used to demonstrate the effectiveness of the estimators in capturing the link length and predicting the time evolution of the vehicle network. The estimated model can be used when designing connected cruise control (CCC) algorithms[8].Most cars sold in the United States (US) come with an event data recorder (EDR), a black box that, like commercial airplanes, records data from crash or near-crash accidents situations. The idea of equipping every motor vehicle with a device that could record several data points about a vehicle's operation immediately before and during an accident. A US Office of Technology Assessment (OTA) report published in the mid-1970s had already concluded that national motor vehicle crash databases at the time were inadequate to resolve the uncertainties of current and proposed federal motor vehicle safety programs. The process of ensuring that all cars and light trucks sold in the US were EDR-equipped was jump started in December 2012 when the national highway traffic safety administration (NHTSA) published a notice of proposed rulemaking that would require EDRs to be installed in all passenger vehicles manufactured for sale in the US[9].

This paper presents a novel black and white box method for diagnosis and reduction of abnormal noise of the hub permanent-magnet synchronous motors (HPMSMs). The black and white box method is divided into three steps. In the first step, a black-box method is used to identify and diagnose all of the abnormal noise sources and corresponding working conditions including rotational speeds and loading moments of the HPMSM. The proposed black method is independent of the detailed internal parameters of the HPMSM. In the second step, considering the abnormal noise sources and the corresponding working conditions diagnosed by the black-box method, a white-box method is used to propose and verify the electromagnetic field model, the structure vibration model, and the acoustic computation model of the HPMSM. Then, the components of the HPMSM whose vibrations and/or acoustic emissions are the most important are predicted. In the third step, the noise reduction method, which is aimed at the diagnosed abnormal noise source under the corresponding working conditions and the diagnosed components, is proposed. The proposed method in this paper observably raises the efficiency of diagnosis and optimization for abnormal noise of the HPMSM.



[1] Figure 1: Schematic of Automobile Black Box System



[1]. Figure 3: Flowchart of the system

II.HARDWARE RESOURCES

The hardware part consists of the components and the sensors used in the black box system. This part mainly collects the status of the sensors and temporarily stores it into the raspberry pi

A. Sensors.

1) Ultrasonic Sensor

The ultrasonic sensor is to measure the minimum distance in front of the vehicle Ultrasonic sensors work on a principle similar to radar or sonar which evaluate attributes of a target by interpreting the echoes from radio or sound waves respectively. Ultrasonic sensors generate high frequency sound waves and evaluate the echo which is received back by the sensor.

2) Pressure sensor

A pressure sensor measures pressure, typically of gases or liquids. Pressure is an expression of the force required to stop a fluid from expanding, and is usually stated in terms of force per unit area. This pressure sensor is mainly used to find whether an accident has occurred or not.

3)Temperature sensor

This sensor is mainly used to detect the temperature of the engine of vehicle. It detects two types of temperatures one is abnormal temperature and other is engine temperature

III.CONCLUSION

By observing these papers it seems that topic is more social relevant.Many kinds of safety measures are discussed through these papers. Ultimate aim of each paper is to provide security to vehicles and drivers in a user friendly manner. The proposed system is equipped with various pressure, temperature, oil sensors to check the engine status records in black box. We know mainly accidents are occurred because uncontrolled speed. If there is a system to control the speed according to the other vehicles that will be perfect to prevent the accidents. According to the analysis of the given papers there is no such efficient system to control speed. smart box will undoubtedly help both police and insurance companies in reconstruction of the event before the accident. Main application of this system is if we are involved in an accident that was not caused by you on an isolated road without any witness present, the proposed system will help us to get the exact details of the incident. When we refer these papers absence of an centralized server was noticed. Actually in flight recorders the black box they created have well defined shield in order to resist temperature and pressure. The construction these guards are not economical to a common man. So while introducing this to automobiles it must be cost effective. Eventhough the Blackbox is destroyed after accident, stored data must be available .So data should be carried to a server in a periodic manner. By this analysis, we reached up to the outline of proposed system.

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