

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/301887709>

# Technology Advancement in Vehicle Monitoring System for Accident Prevention

Article in *Journal of Civil Engineering, Science and Technology* · December 2012

DOI: 10.333736/jcest.99.2012

CITATION

1

READS

2,025

4 authors:



**Neeping Chai**

University Malaysia Sarawak

4 PUBLICATIONS 1 CITATION

SEE PROFILE



**Wan Azlan Wan Zainal Abidin**

University Malaysia Sarawak

61 PUBLICATIONS 183 CITATIONS

SEE PROFILE



**Wan Hashim Wan Ibrahim**

University Malaysia Sarawak

29 PUBLICATIONS 446 CITATIONS

SEE PROFILE



**Kismet Hong Ping**

University Malaysia Sarawak

43 PUBLICATIONS 139 CITATIONS

SEE PROFILE

Some of the authors of this publication are also working on these related projects:



hydronic radiant cooling with renewable water source [View project](#)



Wireless Communication [View project](#)

# Technology Advancement in Vehicle Monitoring System for Accident Prevention

N.P. Chai, W.A.W.Z. Abidin, W. H. W. Ibrahim and K. Hong Ping

**Abstract** - Significant development in urbanized cities causes vehicle ownership to grow with rapid rate. As a result, the saturation of vehicle in dense cities leads to insufficient transportation infrastructure, which causes an increase in road accident occurrences. The condition of vehicle and driver such as poor engine operation system, speeding, reckless driving, drowsy driving, drunken driving are the factors of accidents. Vehicle monitoring system is thus very important to be deployed as an effort for accident prevention to reduce the number of road accidents. This paper reviews the recent progress and development of technologies in vehicle monitoring system for accident prevention. Various technologies in the system include Global Positioning System (GPS), Geographical Information System (GIS), Global System for Mobile (GSM), General Packet Radio Service (GPRS), image processing, Fuzzy Logic, data fusion and so forth. The issues and challenges in vehicle monitoring system are also presented in this paper.

**Keywords:** Vehicle Monitoring System, accident prevention, technologies, issues and challenges

## I. INTRODUCTION

IN most of the developing countries, drastic increase of vehicle ownership generates a great demand on transportation infrastructures. However, the road and rail network construction could hardly fulfill the requirement of ever-increasing traffic demands and thus worsen traffic environment and road safety issues [1].

The world car registration is found increased by 29% since 2000 to 2010 and the countries with five highest average annual percentage change of car registration are found to be developing countries, namely China, Indonesia, South Korea, India, and Malaysia [2]. Within the timeline, China had contributed the most to car production with a dramatic increase in percentage of 1470% [2].

Since year 2000, Beijing with an average annual growth rate of 3.64% of urban road length could not support the number of vehicle with average annual growth rate of 10.91% [3]. Insufficient transportation infrastructure with excess vehicles will bring adverse impacts such as the increase in road accidents. With the implementation of Intelligent Transportation System (ITS), the road capacity can be improved and the number of traffic accidents can be reduced.

The Malaysian Institute of Road Safety Research (MIROS) statistic showed that the number of registered vehicles and road accidents in Malaysia have been increasing since year 2007 onwards [4]. Road accidents cause deaths, casualties and economy losses, affecting Gross Domestic Product (GDP) of a country. In order to prevent road accidents, vehicle monitoring system as a kind of ITS is suggested to be developed.

Vehicle monitoring system is an intelligent system that integrates hardware and software and utilizes surveillance, communication and information technologies to observe the condition or situation of a vehicle by the user, and third party over the time. The system can provide warning to the driver if any possible dangerous or hazardous condition is detected while the third party can observe and alert the driver when any driver abnormal condition is discovered.

Normally, the vehicle monitoring system consists of vehicle terminal, communication link and monitoring centre. The system collects various data at vehicle terminal in real time and then transmits the data via communication link to the monitoring centre for surveillance purposes. The general block diagram of vehicle monitoring system is shown in Figure 1.

N.P. Chai is with the Department of Electronic Engineering, Faculty of Engineering, Universiti Malaysia Sarawak (UNIMAS), 94300 Kota Samarahan, Sarawak, Malaysia (phone: +60 168649206; fax: +6082583410; e-mail: chaineeping@gmail.com).

W.A.W.Z. Abidin is with the Department of Electronic Engineering, Faculty of Engineering, Universiti Malaysia Sarawak (UNIMAS), 94300 Kota Samarahan, Sarawak, Malaysia (e-mail: wzaazlan@feng.unimas.my).

W. H. W. Ibrahim is with the Department of Civil Engineering, Faculty of Engineering, Universiti Malaysia Sarawak (UNIMAS), 94300 Kota Samarahan, Sarawak, Malaysia (e-mail: wiwhashim@feng.unimas.my).

K. Hong Ping is with the Department of Electronic Engineering, Faculty of Engineering, Universiti Malaysia Sarawak (UNIMAS), 94300 Kota Samarahan, Sarawak, Malaysia (e-mail: hpkismet@feng.unimas.my).