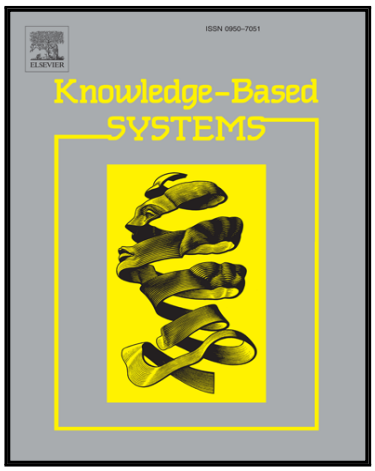
Accepted Manuscript



Detecting known and unknown faults in automotive systems using ensemble-based anomaly detection

Andreas Theissler

PII: S0950-7051(17)30107-7
DOI: 10.1016/j.knosys.2017.02.023
Reference: KNOSYS 3837

To appear in: *Knowledge-Based Systems*

Received date: 27 October 2016
Revised date: 16 February 2017
Accepted date: 17 February 2017

Please cite this article as: Andreas Theissler, Detecting known and unknown faults in automotive systems using ensemble-based anomaly detection, *Knowledge-Based Systems* (2017), doi: 10.1016/j.knosys.2017.02.023

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

Detecting known and unknown faults in automotive systems using ensemble-based anomaly detection

Andreas Theissler[1]

Esslingen University of Applied Sciences

Abstract

The massive growth of data produced in the automotive industry by acquiring data during production and test of vehicles requires effective and intelligent ways of analysing these recordings. In order to detect potential faults, data from the in-vehicle network interconnecting vehicle subsystems is recorded during road trials. The complexity and volume of this data keeps increasing since the degree of interconnection between the vehicle subsystems and the amount of data transmitted over the in-vehicle network is augmented with each functionality added to modern vehicles. In this paper, an anomaly detection approach is proposed that (a) is capable of detecting faults of known and previously unknown fault types, (b) functions as an out-of-the-box approach not requiring the setting of expert-parameters and (c) is robust against different driving scenarios and fault types. To achieve this, an ensemble classifier is used consisting of two-class and one-class classifiers. Without modelling effort and user parameterisation the approach reports anomalies in the multivariate time series which point the expert to potential faults. The approach is validated on recordings from road trials and it could be shown that the ensemble-anomaly detector is robust against different driving scenarios and fault types.

Keywords: anomaly detection, fault detection, one-class classification, ensemble methods, vehicle electronics

[1]andreas_theissler@web.de, Faculty of Information Technology, Esslingen University of Applied Sciences, 73732 Esslingen, Germany

ACCEPTED MANUSCRIPT

Download English Version:

https://daneshyari.com/en/article/4946309

Download Persian Version:

https://daneshyari.com/article/4946309

Daneshyari.com