Fleet Monitoring Concept and New Statistical Evaluation Methods

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Time-Series Project Proposal for VERT-2016
Zeitreihen-Statistik VERT-Forum 18.03.16

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Overview

Aim

Present State

Project Proposal

Progress

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- **Aim:**
  - Tool for sales supporting fleet management
  - Seller's improved understanding of own product

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Present State:

Data logging 500 ophrs,10 secs each,

of pressure and of temperature

(rpm eventually)

- mean
- standard deviation
- excess upside and downside (limits)

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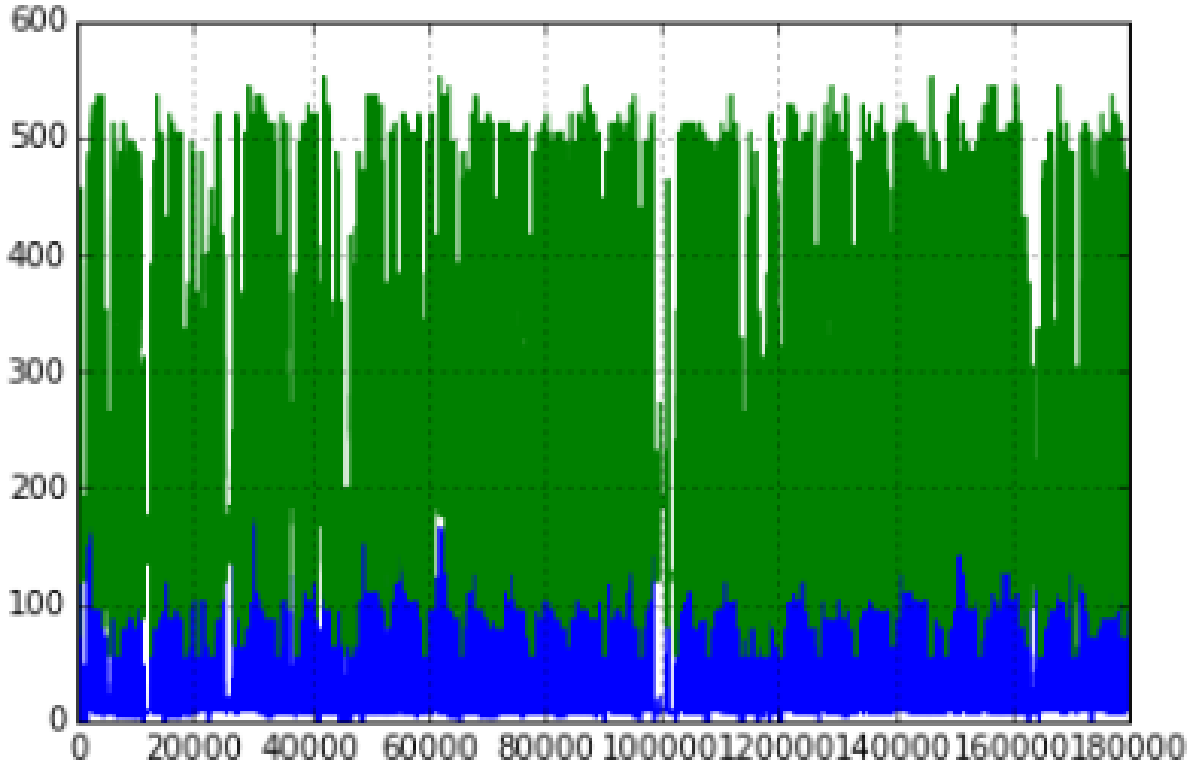

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Data logging, purpose:

- monitoring of function
- failure diagnostics
- proof of evidence
- drawback: Neglect of warning lihgts

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Project Proposal: Appl. of advanced methods of statistics (time series)

Reason: Plenty of experience stored, not utilised

Project: 3 levels,

a) adjust stat.progr.

b) analyse existing data

c) develop reliable prediction

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Progress, Present state of work

Standardisation of data *done*

Predictor programming *in progress*

very unwieldy!!

Correlation functions *not yet working*

Time frame: Standard analysis *June*

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Program testing, application and analysis of various DPF types

2nd half of 2016! Note: depending on your interest

Advanced time series program for hidden qualities 2017

Note:

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Thank your for your interest!

Some supplement has been prepared with more details inviting for discussion

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Supplement for interested

How should it work?

Fleet manager's window exhibits

vehicles marked green or yellow or red

yellow (caution) – red (failure, immediate action)

Next window:

vehicle no; logger no; failure type; rec.proceed

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Nöthiger's task:

Logger system check:

Voltage? Data-transfer? Signal/noise? Electronic-system? Computational function?

Sensor check:

Pressure? Temperature? Rpm? GPS? Lambda?

NOx-sensor?

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Legerer – (Schmid programming):

At present: Checks of malfunctions

plus

Extension into prediction

Checks presently: 4 categories

F-substrate; regeneration; engine; lubrication

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Requirements:

- knowledge of basic filter qualities, type of regeneration (FCB; burner; continuous r. etc.);
- experience (average intervals 6-10hrs in between regen.; operational type bus or construction;

Program to be adaptable for filter-types

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Matching: Malfunction with Log-Data

- **F-substrate;** regeneration; engine; lubrication

  leak in substrate: pressure decreasing

  dedectable via sliding down of mean pressure

  mean of intervals 5 to 15 minutes

  Warning single points increasingly below mean minus standard deviation

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Matching: Malfunction with Log-Data

F-substrate; **Regeneration;** engine; lubrication

Regeneration intervals within time frame?

pressure mean and standard deviation separately recorded normal w.& regeneration

regeneration dedect via p & T

p …. onset?

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Malfunction:

- Excess-pressure; far too high p> x mbar i.a. cleaning of filtersubstrate
- Pressure rising above $p_{caution} < p < p_{max}$ c
- caution Gradient < $\delta p/sec$?

Present perception with scheme provided by Dr Mayer – needs to be verified and quantification