PROGNOSIS SYSTEM

Martlet - Optimus

Resources

Fleet:

- 100 heavy trucks (50% are 20 to 10 years old)
- 200 four wheeles (3-3.5 ton) including 10 mobile repair units (60% are 20 to 10 years old)
- 100 light SUV (service and emergency) (Less than 5 years old)

Operators:

- 1200 - 600 drivers (with level 1 repair capability)
- 50 Repairers level (2-3)
- 100 security operators.
- The rest is stoking area and logistic activity.

Based on current customer requirements

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Common Process

1. Monitor and track relief operation lifecycle (Convoy preparation, tracking, delivery, return)
2. Monitor and track mission operation
3. Monitor Hostile and critical conditions and provide warning and alternatives
4. Manage criticality and accidents involving the mission
5. Generate activity reports
6. Define operators schedules and turnover
7. Monitor and reporting on stocking areas

8. Prognostic based logistic ?????

Based on current customer requirements

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What we need

8. Prognostic based logistic ?????

Based on current customer requirements

plan-check-act-monitor-check-assess

-prognostic data input

-prognostic data output

-Plan and define mission parameters

-Check current vehicles conditions, identify how to reduce variations for current missions vehicles

-Act sending resources for the mission

-Monitor current condition

-Check current vehicles conditions

-Asses results and resources by the end of the mission, identify critical damage vehicles

Based on current customer requirements

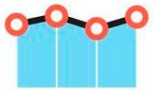
PROGNOSIS

PROGNOSIS

Uncertainty is fundamental in Remaining Useful Life (RUL) estimation

Based on *Diagnosis and Prognosis of Automotive Systems: motivations, history and some results*
by Giorgio Rizzoni , Simona Onori , Matteo Rubagotti

PROGNOSIS



Data-driven applications
Span a large number of techniques, from probabilistic ones to neural networks.

Model-based approaches
Useful to obtain more precise results, but their design requires a deep knowledge of the system.

Based on *Diagnosis and Prognosis of Automotive Systems: motivations, history and some results*
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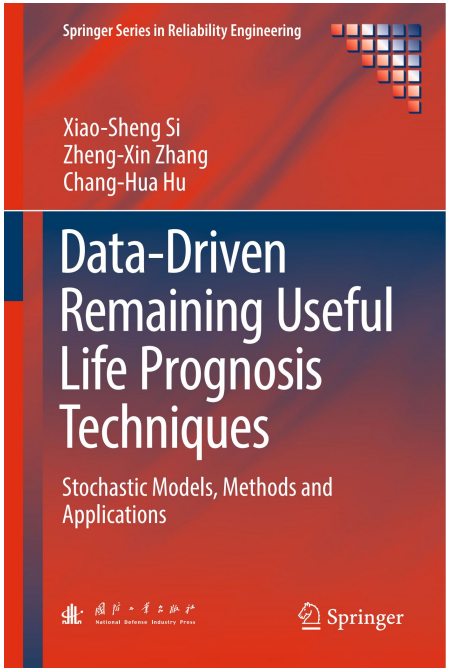
Data-driven Prognosis for fleet-military maintenance

The main aim is to reduce costs and the impact on the environment as well as improving resource productivity, efficiency and asset management.



Based on Data-Driven Remaining Useful Life Prognosis Techniques, Stochastic Models, Methods and Applications

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AIC	Akaike information criterion
BM	Brownian motion
CBM	Condition-based maintenance
CDF	Cumulative distribution function
CM	Condition monitoring
CTMC	Continuous-time Markov chain
EKF	Extended Kalman filter
EKS	Extended Kalman smoother
FHT	First hitting time
FPK	Fokker–Planck–Kolmogorov
FPT	First passage time
HMM	Hidden Markov model
HSMM	Hidden semi-Markov model
INS	Inertial navigation system
KF	Kalman filter
ME	Measurement error
MLE	Maximum likelihood estimation
MSE	Mean squared error
MTTF	Mean time to failure
PDF	Probability density function
PHM	Prognostics and health management
PMS	Phased-mission system
RE	Relative error
RSL	Residual storage life
RTS	Rauch–Tung–Striebel
RUL	Remaining useful life
STF	Strong tracking filter
TMSE	Total MSE