



MSc thesis subject:

Discovering causes of alarms on naval vessels using data science.

Introduction

“Damen Schelde Naval Shipbuilding” (DSNS) is a shipyard specialised in designing and building naval vessels and highly complex commercial ships. DSNS is part of the larger Damen Shipyards Group which delivers over 150 vessels per year. Damen is expanding its data science activities and has the ambition to install a data logging system to all vessels sold. Data science is used to improve operation, maintenance and design of the vessels.

The [Holland class](#) “Oceangoing Patrol Vessels” (OPV) of the Royal Netherlands Navy is a class of vessels designed and build by DSNS. These vessels are equipped with an “Integrated Platform Management System” (IPMS). The IPMS monitors and controls the state of non-combat and non-navigational components on-board such as gearboxes or diesel engines. The IPMS includes a data logging system to store data long term.

Problem definition

When a component on-board enters an undesirable state, an alarm is raised in the IPMS. For example, an oil temperature alarm is raised when the oil temperature is above a certain threshold. It is not generally known what causes the oil temperature to be at an abnormally high temperature. To determine this, the following questions can be investigated by analysing the data:

For 1 component on-board:

- What is the state of a component prior to an alarm?
- Can a change or degradation of the state or performance be detected prior to an alarm?
- What is the correlation between different signals and alarms?
- What is the influence of environmental (e.g. air temperature) conditions on the likelihood of an alarm?
- Which signals of other components have a strong influence on an alarm?
- How can an alarm occurring be predicted?

Tasks

- Explore the data-set
 - Get acquainted with which data is available and which missing data might be collected in other ways
 - Choose a suitable component for analysis
- Literature study
 - Which analysis methods can be applied to this problem
- Implement the analysis method
- Validate the analysis method
- Report on:
 - Analysis method used
 - Results
 - Possible improvements in components

Contact:

Jochem de Graas

J.de.Graas@damenaval.com

+31 118 48 2122

Joep Broekhuijsen

J.Broekhuijsen@damenaval.com

+31 118 48 2650

Company website:

<http://www.damenaval.com>