

# ANTWERP INSPIRE HACKATHON 2018

TEAM 15: API for Analysis and Prediction of Vessels  
Fuel Consumption

# TEAM MEMBERS / PROJECT

Core Team: Christian Zinke-Wehlmann (InfAI), Jörg Schliesser (InfAI), Willy Steinbach (InfAI), Moritz Engelmann (InfAI)

Further support: Pekka Siltanen (VTT), Zigor Uriendo (UPV/EHU), Marcin Krystek (PSNC)



# TEAM

## WORKING GROUP ET: EFFICIENT TECHNOLOGY INTEGRATION



# PROJECT IDEA AND RESULTS

## Overall Objectives

- **Improve vessels energy efficiency** - reducing costs and environmental impact by lowering fuel consumption on board while keeping the number of catches.
- **Predicting machinery faults** (Proactive maintenance based on machinery sensors) in order to reduce maintenance costs and downtime of ship with precise event prediction prior to fault occurrence. Increase also safety of ships and crew on board due to reduced unexpected failures in remote areas.

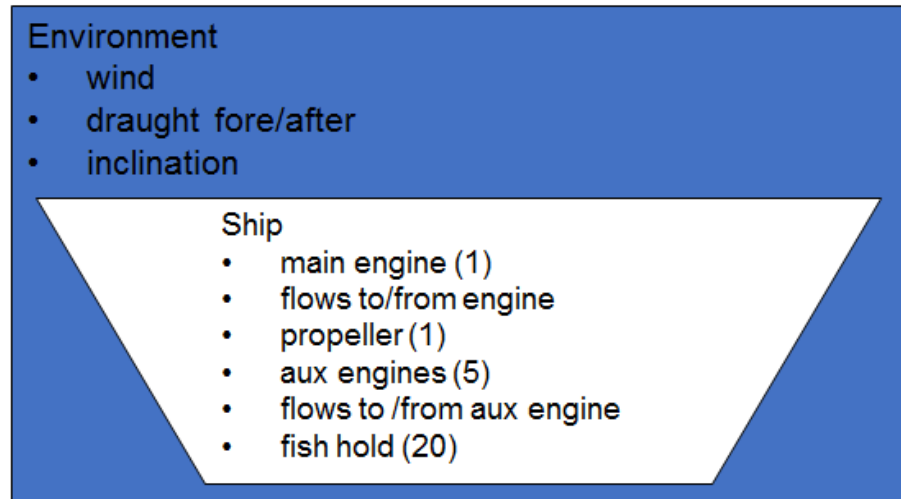
# PROJECT IDEA AND RESULTS

## Hackathon Objectives

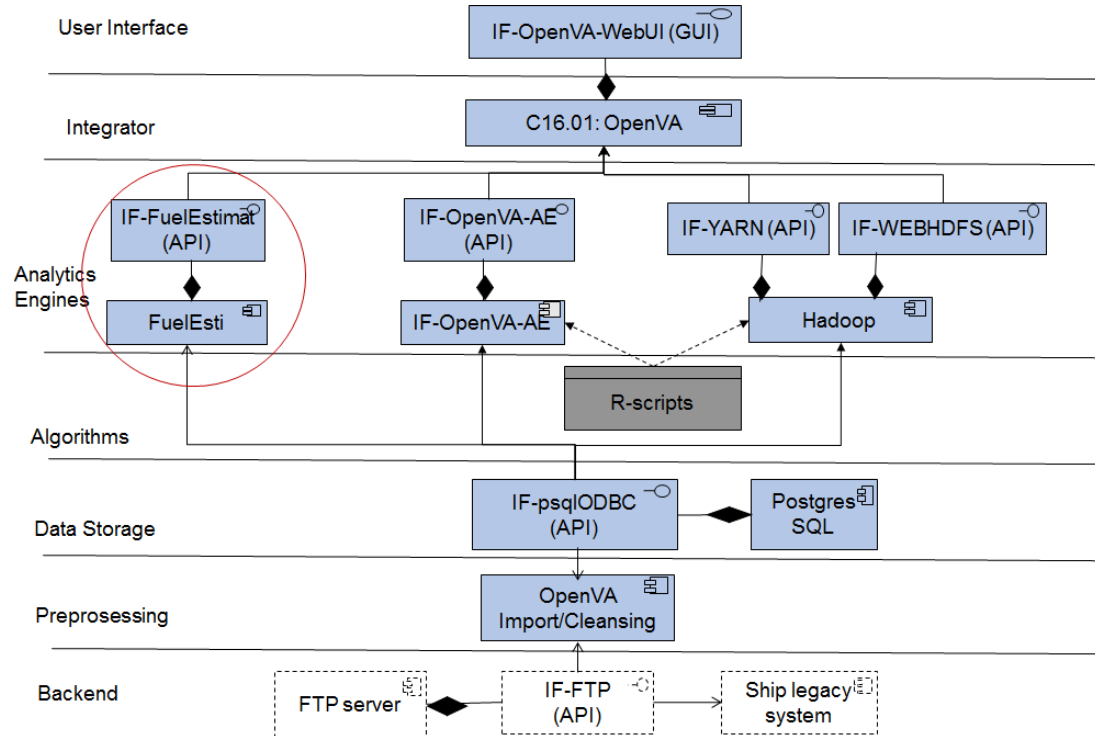
- **Provide API to estimate on fuel consumption**
- **Define key features** for the prediction of fuel consumption based on real data (1-3 year per vessel – overall 3 vessels)
- Visualise the results

# INPUT / DATA

Overall 117 measurements from the engine and propulsion system every 10 seconds.



# USED OR GENERATED SOFTWARE/TOOLS







# Predict Fuel Consumption API - Features

16 features available

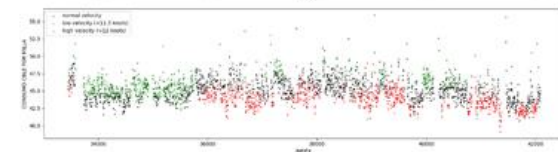
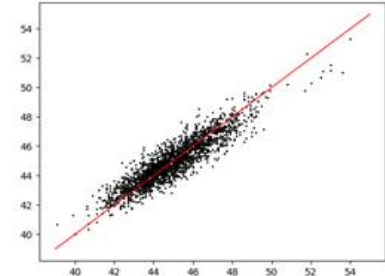
Test results (test vessel 1):

number of tested rows: 300000  
 r2: 0.9947444492506428  
 MSE: 0.20994275339064097

Model data from 2016, test data from 2017  
 number of tested rows: 30000  
 r2: 0.9953121497087969  
 MSE: 0.0566815999608191

```

JSON Rohdaten Kopfzeilen
Speichern Kopieren Alle einklappen Alle ausk
Features:
0:
  TIME:
    working:      true
    used_by_prediction: true
1:
  INDEX:
    working:      true
    used_by_prediction: true
2:
  POP:
    working:      false
    used_by_prediction: true
3:
  T_FO_in:
    working:      true
    used_by_prediction: true
4:
  LOAD_rel:
    working:      true
    used_by_prediction: true
5:
  FORACK:
    working:      true
    used_by_prediction: true
6:
  
```



# Predict Fuel Consumption API - Visualisation

## Albatross

Linked (Open) Data Processing and Analysis  
Created by the DataBio Linked Data Group

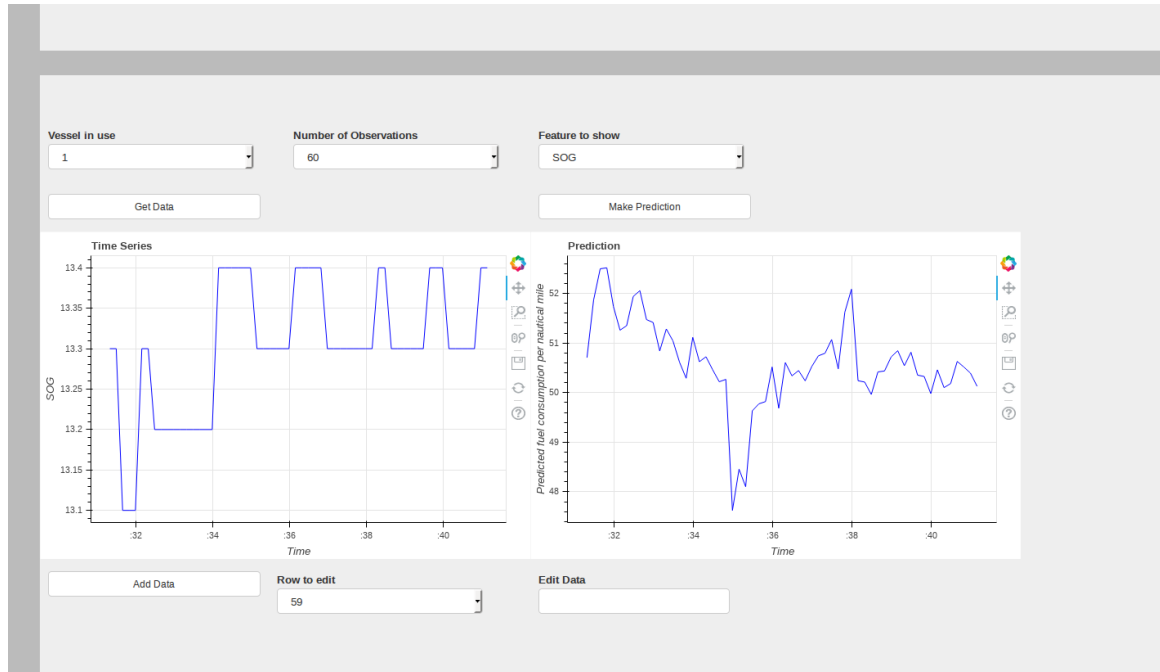
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Vessel in use:

Number of Observations:

Feature to show:

# Predict Fuel Consumption API - Visualisation



# FOLLOW-UP

- Implementation in real environment
- Testing
- well...
  - Live detection of outliers without comparison to ground truth data
  - Optimize the models
  - Overall goal: automated process --> input raw data, preprocessing, verify existing models, feature selection, model creation

# Thank you

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