

**tinámica**

maritime & ports technology  
for intelligent decisions

# our areas of excellence





## Artificial Intelligence Image Recognition

Training image set based on business requirements with image tagging tools for object detection



## Machine Learning Route analytics applied to price prediction

Route Analysis based on positioning clusters and graphs



## Big Data Commercial & Financial Reporting

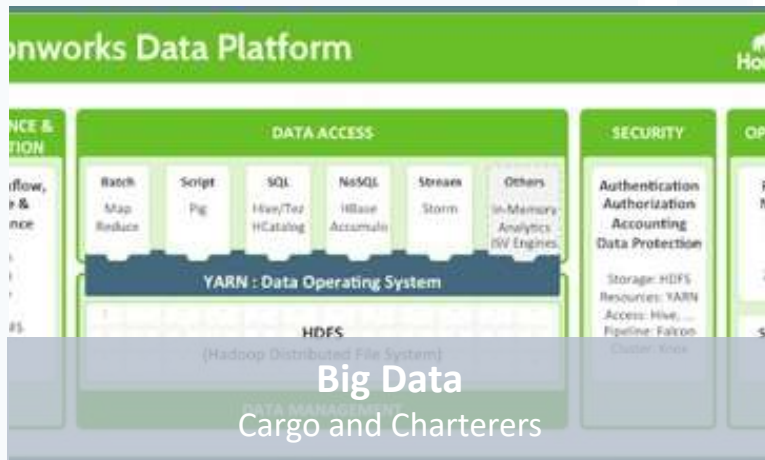
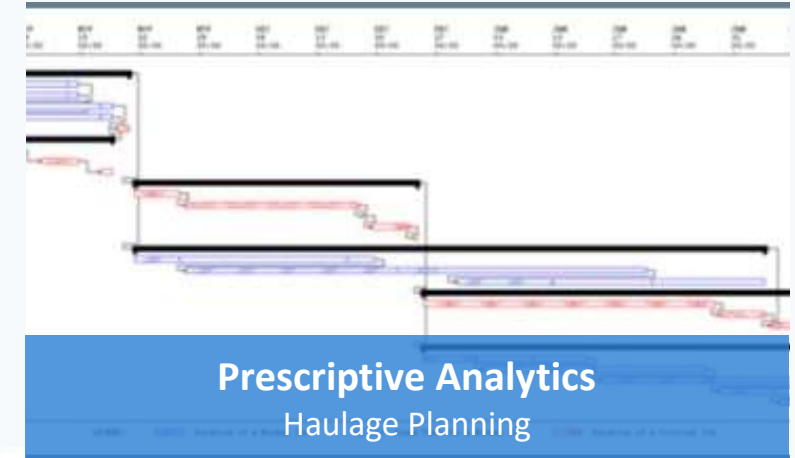
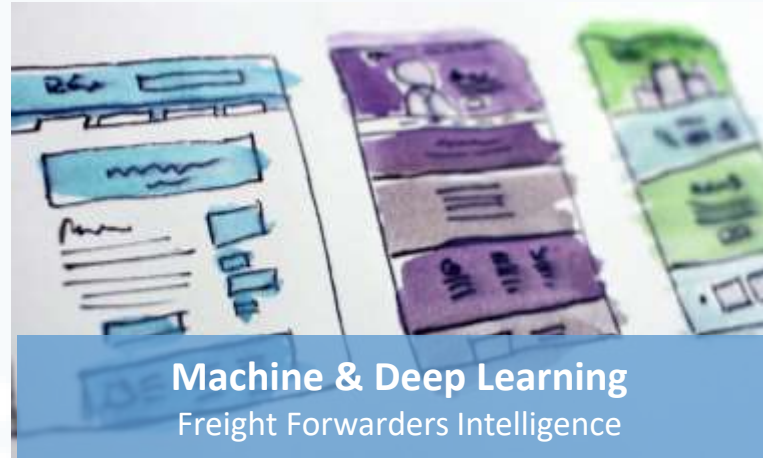
Reporting adapted to the need of each one with their business KPI's



## Heuristic System Terminal Management

Intelligence management of terminals and berths

# references





## Objectives

- Terminal Management Digitalization
- Minimize vessel Demurrage at Terminal
- Service Downtime Management (planned and unplanned)
- Product Unavailability, Lab Tests and Weather Impact Reduction
- Reduce CO2 emissions



## What?

- Berth Programming Optimization using AI
- Terminal and Berth in-time Reassignment
- Demurrage Prediction and Quantification
- Smart ETA Adjustments to avoid Demurrages
- Real Time Alert and Restriction Updates
- Analytical Based Process Reengineering
- CO2-Equivalent Calculation



## How?

- Multivariable Restriction Rule Based Expert System
- Smart Heuristic Analysis and Forecasting System
- Cost Function Minimization
- KPIs Analytical Reporting and Tracking
- Visual Scenarios Comparison Dashboards

# route analytics applied to port demand prediction



## Objectives

- To predict port demand, for better scheduling future unloading and loading operations
- Understanding port and vessel operations and cluster them accordingly in order to model expected vessel availability
- To understand maritime flows and how ship owners operate.



## How?

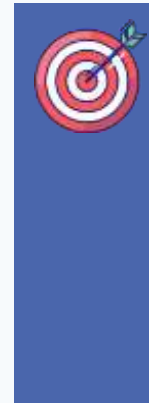
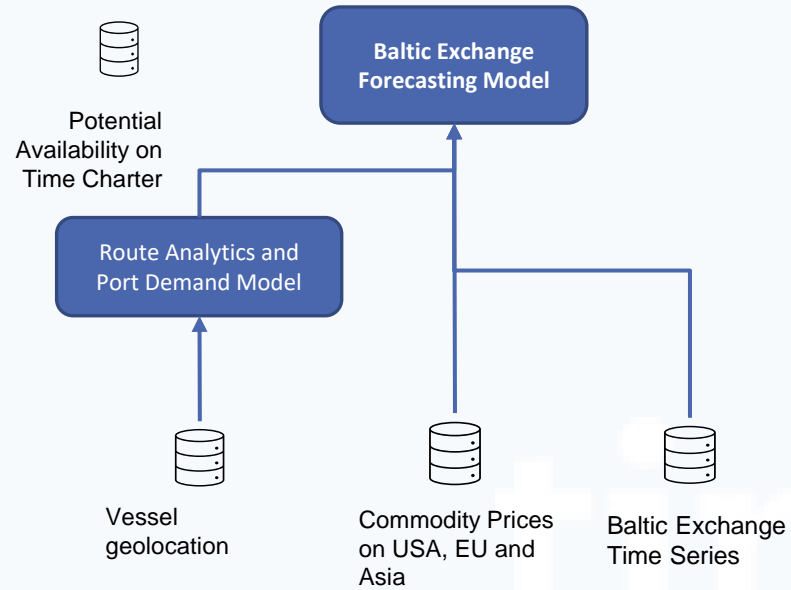
- Arrange data about ports, historical trips including its geolocalization.
- Exploratory Data Analysis about historical vessels trips
- Time series analysis about voyage duration among ports.
- Ports clustering analysis to group them according to unloading/loading operations.



## What?

- Development Time series model, by means of state-of-the-art python library for time series analysis.
- Development of next port prediction model.
- Development of time of arrival prediction model.
- Building a probabilistic graph model, based on historical vessel trips around the world, to predict vessels positions.

# commodity freight price forecast



## Objectives

- Achieve a time series prediction of Baltic Exchange stock price
- Allow a commodity trading Front Office to hedge the price risk exposure



## What?

- Arrange ship geolocalization data and commodity price time series

Baltic Exchange will be determined by:

- Unbalances in the Demand over different Geographic Regions
- Product Prices on different hubs



## How?

- Time series Forecasting Model: Predict weekly Baltic Exchange over several weeks
- Built on top of Route Analytics and Port Demand Model
- Deploy model on Azure Cloud and deliver interpretable results in a comprehensive PowerBI dashboard

**PROPHET**

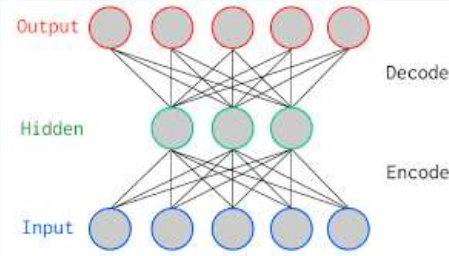


# abnormal behavior detection

Normal Clip

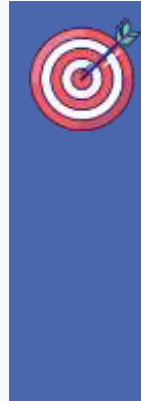


Abnormal Clip



<https://towardsdatascience.com/prototyping-an-anomaly-detection-system-for-videos-step-by-step-using-lstm-convolutional-4e06b7dcdd29>

[https://commons.wikimedia.org/wiki/File:Autoencoder\\_schema.png](https://commons.wikimedia.org/wiki/File:Autoencoder_schema.png)



## Objectives

- Detection of abnormal behavior on video sequences in video recording facilities
- Reduce the amount of human watching-video time



## What?

- A deep neural network that combines convolutional (specialized in image understanding) and LSTM (able to extract patterns from sequences of frames) in a single layer
- This special layer is the foundation of an autoencoder architecture, that is SoA algorithm for unsupervised learning
- This model learns expected behavior from a sequence of frames and yields a “reconstruction cost” as a metric of abnormality



## How?

- When this reconstruction cost is too high an unexpected sequence happened and a human may watch the recorded video
- Deploy deep-neural network on Azure Cloud
- Prediction on Near Real Time that allow to significantly reduce human monitoring keeping cost on check





A glowing crystal ball is the central focus, held by two hands. The word "thanks" is written in a dark, sans-serif font in the center of the crystal ball. The background is a soft, out-of-focus blue. The hands are positioned on either side of the crystal ball, with fingers slightly curled as if holding it. The crystal ball has a bright, white glow emanating from within, creating a halo effect. The overall mood is one of appreciation and gratitude.

**thanks**