LEVERAGE THE VALUE OF YOUR DATA
MACHINE LEARNING IN MARITIME LOGISTICS

OPPORTUNITIES BASED ON DATA

As a form of Artificial Intelligence, Machine Learning (ML) provides new opportunities for actors along the maritime supply chain. ML algorithms can solve tasks by learning from large amounts of data, in order to obtain valuable information on a variety of business-related problems.

Exploiting the value of data with machine learning is an increasingly important basis for gaining and maintaining competitive advantages in all segments of the maritime industry from shipping, ports, shipbuilding and the maritime supply industry to off-shore wind and marine engineering.

BENEFITS IN PRACTICE

Machine Learning can facilitate the auto-mation and optimization of processes and enable data-based decision support for key operations. Incorporating ML in day to day decision making allows companies to leverage the value of existing data resulting in:

- Reduced costs through optimized operations,
- Improved quality control through condition-based monitoring,
- Captured knowledge hidden in past business records,
- Increased safety through incident predictions, and
- Identification of decision-relevant information in large data sets.

CUSTOMIZED SOLUTIONS

Fraunhofer CML helps companies to close the gap between theoretical advances in maritime digitalization and practical application of data-based methods. The process of integrating ML into real-world applications involves a high degree of customization.

Fraunhofer CML has substantial experience in building ML solutions for data-based predictions and decision support systems in maritime logistics from proof-of-con-cept to implementation. Solutions are specifically tailored to the requirements of the maritime industry and individually adapted to the needs of the customer.

MACHINE LEARNING AT FRAUNHOFER CML – EXPLORE NEW OPPORTUNITIES

1 ANALYSIS OF MACHINE LEARNING POTENTIALS

- The first step in getting started with ML is to identify solutions that add the most business value
- Fraunhofer CML supports companies in analyzing the potential of different ML use cases
- The approach has a low entrance barrier and aims at quick but evidence-based results
- It includes an exploratory analysis of the current database and moderated workshops
- Findings support strategic management decisions on which data-driven improvements to focus on

2 PROOF OF MACHINE LEARNING CONCEPTS
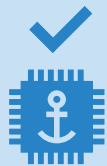
- Once a promising application for ML in maritime logistics is selected, its actual feasibility must be confirmed
- Fraunhofer CML carries out proof of concepts to verify the practical feasibility of data-driven solutions
- The approach explores the viability of a promising idea with minimal financial expenditure
- A main question in most cases is whether available data actually suffices in terms of quantity and quality
- Result is a demonstrator application plus recommendations on next steps as a basis for decision-making

3 IMPLEMENTATION OF MACHINE LEARNING SOLUTIONS

PREDICTIVE ANALYTICS

- ML-based predictive analytics promises a new level of accuracy in forecasting
- Fraunhofer CML develops ML-based solutions to support decision making under uncertainty
- The approach uses advanced methods of predictive and prescriptive analytics to provide reliable forecasts
- It can consider both extensive datasets as well as informal knowledge and expertise of experienced employees
- Result is a customized solution for time series forecasts, demand predictions, or ETA estimations

ML-DRIVEN OPTIMIZATION

- The use of ML to improve the accuracy of input data for optimization algorithms opens up considerable opportunities to increase efficiency
- Fraunhofer CML develops decision support systems that combine advanced mathematical optimization with the predictive power of ML
- Reinforcement learning techniques can be considered as another option for particularly complex real-world problems
- Result is a customized decision support software that helps improve operational planning and execution

DEEP LEARNING MODELS

- Digital images, text, or audio files contain immense informational value that was previously inaccessible for machines
- Fraunhofer CML develops deep learning models that enable automatic interpretation and processing of images, text or audio recordings
- This allows a redesign of processes, which currently involve several manual, time-consuming steps
- Result is a software module which can be integrated with existing solutions to improve efficiency, speed or accuracy of business processes

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