Digitalization: Seizing Opportunities for the Maritime Industry

Digitization holds a great deal of potential for industry: Products and processes are being changed or reinvented, and innovative solutions are increasing performance and efficiency. In the maritime sector, however, there are very specific requirements and framework conditions that need to be taken into account when integrating new smart services. The MARIA research project was launched in 2021 with the aim of harnessing the benefits of digitization for the maritime sector. The project consortium, which consists of a total of nine partners, is focusing its work on new solutions for the operational phase of maritime systems. These are to be developed in various case studies using the key technologies augmented reality, intelligent assistance systems and machine learning. The goal is to strengthen the maritime economy through innovative service products. MARIA is funded by the German Federal Ministry of Education and Research (BMBF).

Within the scope of the MARIA project work, Fraunhofer CML specializes in the targeted evaluation and use of data. In doing so, it can draw on a broad arsenal of methods: Data Mining, Big Data Analytics, Machine Learning, Artificial Intelligence and Learning Decision Support are some examples of analysis tools that can be used to link data islands and create the basis for further use. The core idea here is to convert the data volumes into new information through which maritime service tasks can be better planned and controlled.

For example, data analysis can provide information on how to better predict anomalies occurring in the operation of components. Such information greatly simplifies control and planning. In addition, intelligently analyzed data could be used to find new ways to better support the crew on board in maintenance measures or coordination processes with shipping companies and other service providers. The principle of decoding valuable information from data generated by digitization processes and integrating it into further planning thus promises a real blaze of optimization potential. Demonstrating this through prototypical demonstrators is one goal of the Fraunhofer CML in collaboration with the project partners.

Our experts will be happy to explain more about the project and the CML's contribution at the Fraunhofer booth 327 in hall B6 at SMM 2022!

Practical Application Example for Computer Vision - Image-based Container Inspection

With the AI-supported software COOKIE, Fraunhofer CML presents a project at its booth at SMM 2022 that promises great potential and a significant increase in efficiency in the practice of maritime logistics. The cooperation partner is the Hamburger Container- und Chassis-Reparatur-Gesellschaft (HCCR), a subsidiary of HHLA. Thousands of containers are inspected every year by HCCR's workers, who are known colloquially as „checkers". Behind this is currently a time-consuming and costly process in which „checkers" inspect every container and, by means of individual photographs, identify damaged or


Preface

Dear Readers,

at this year's SMM we have especially many new developments to present. Therefore, we would like to inform you about our activities there with another newsletter especially for SMM.

Digitization as a buzzword has been on everyone's lips for years and yet often remains abstract. What lies behind it? How does it benefit the maritime industry? At the trade show, we will show you how the MARIA project is using key technologies to strengthen the maritime industry through innovative service products.

In addition, we will also introduce you to the „checkers". These inspect containers in a labor-intensive and costly way, but this can also be done by COOKIE, because the appealing abbreviation stands for „container services optimized by artificial Iitelligence".

Do you know what it means to coordinate and evaluate various radio messages on board a ship or on land under stressful conditions? The speech recognition software marFM offers an interesting solution for this. Read more about it in this newsletter and visit us at our booth to get to know even more research projects.

We look forward to seeing you!

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Fraunhofer CML
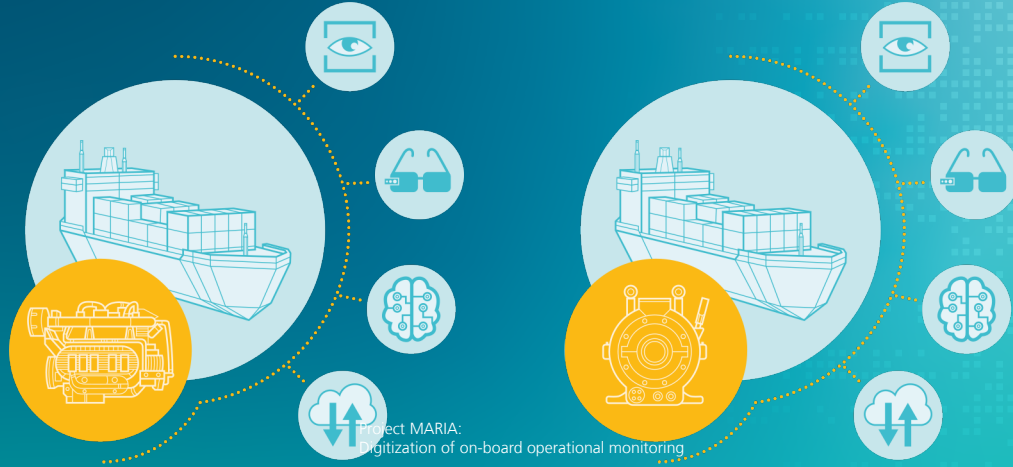
Project MARIA:
Digitization of on-board operational monitoring

contaminated areas and forward them so that a corresponding repair order can be created. The problem: A high double-digit percentage of the containers are not damaged at all and would be immediately suitable for shipping, but still go through the inspection process. The German Federal Ministry of Transport and Digital Infrastructure (BMVI) has provided 900,000 euros to develop a solution that automatically identifies intact containers and also makes the entire inspection process more efficient.

Fraunhofer CML can provide such a solution by relying on computer vision as a key technology from the field of machine learning. In the „Maintenance & Repair" (M&R) of empty containers, the aim is to use AI-based image recognition to support inspectors in their work and to better plan the reuse of containers. The software developed in the COOKIE project captures digital images of empty containers and can process them into numerical information that can be used as the basis for automated damage detection and repair prediction. Artificial intelligence can compare the condition of an empty container with stored damage images and thus detect intact containers at an early stage. This significantly increases efficiency.

To complement the software, the CML is designing an interactive dashboard that can visualize M&R processes - also with a view to their progression over time. This allows the user to specifically examine individual aspects, such as current capacity utilization or throughput times.

At the trade fair, you can get your own impression of COOKIE and talk to our experts.

Innovation of radio communication on board and on land

In shipping, a lot depends on radio communication. Especially in emergencies, communication between officers on board and those in charge in coordination centers on shore by means of VHF equipment is of crucial importance. However, there are often sources of interference of various kinds (engine noise, environmental conditions, dialects, etc.) that can severely impair the quality of radio communication and make the necessary exchange of information more difficult. Especially for the coordinators in the landside rescue stations, this context can lead to extremely confusing situations when it comes to receiving various difficult-to-understand VHF signals from the radios under stress, documenting them with pen and paper, and coordinating rescue operations.

To solve this problem, the CML has developed the marFM (short for „maritime VHF radio") speech recognition software. This simplifies radio communication in stressful situations with two essential components: The emergency signal can be localized by radio direction identification and the message can be reliably transcribed by artificial intelligence. Responsible officers thus receive all the information about who sent what from where and when in a comprehensible and clear manner and can act more quickly and in a more controlled way. The transcription of the language makes it easier to identify ambiguities and thus to understand the messages. The radio traffic is documented chronologically, which makes it easier to trace the course of the conversation and thus also the work of the sea rescuers. Last but not least, the localization signal ensures that emergency forces can quickly arrive at the scene of the incident.

marFM is therefore of interest to search and rescue services, commercial shipping companies and, in particular, Vessel Traffic Service Centers and Remote Control Centers. Want to learn more about the project?
Our experts look forward to talking to you at SMM 2022 at the Fraunhofer booth 327 in hall B6!