Attention! Starting from issue 3/2024, our newsletter will only be available digitally. To receive it please register via our homepage: www.cml.fraunhofer.de/en/press.html

Dear readers,

In the first newsletter of the year, we present the Smart-Stack and Pin-Handling-mR projects: Smart-Stack is about optimizing the planning of container movements at CT terminals with the help of artificial intelligence (AI). In Pin-Handling-mR, the abbreviation at the end stands for "mobile robotics". Here, we are developing an automatic alternative to the still manual and strenuous process of moving the pins that secure containers onto carrier wagons.

We will also inform you about the current status of the marFM® project – our innovative speech recognition technology.

Our Maritime Innovation Insights (MII) event this year will take place on the 2nd of May. I would be delighted to welcome you there in person. Further information can be found on our homepage: www.cml.fraunhofer.de/en.html

Yours sincerely,
Prof. Carlos Jahn
Head of Fraunhofer CML

Data exchange and AI make it possible – Handling processes mathematically optimized

At intermodal terminals often more than 20 percent of container movements are unproductive. These include so-called restackers. They occur when a container is picked up from the terminal that has been stowed under other containers. The reason for this is a lack of information about the pick-up dates of the containers. In view of today's possibilities through digitalization and data evaluation, this does not have to be the case.

Against this backdrop, the IHATEC research program of the German Federal Ministry of Transport (Innovative Port Technologies) is funding the Smart-Stack project. Over the course of three years, the project partners TriCon Container-Terminal Nürnberg, cargo support and the Fraunhofer CML will develop a decision support system that minimizes reshuffles.

Data exchange between the terminal and the freight forwarders plays a central role here. The freight fortwarders receive information about the pick-up time – long before the containers in question have arrived at the terminal. The exchange of this data enables the terminal to estimate a time period in which the container in question will be collected. As not all freight forwarders are connected via the interface, a different method must be used to estimate the pick-up time for some of the incoming containers. At this point, an AI-based forecasting method is used. This involves collecting various data about the container in order to identify the underlying pick-up patterns and, based on this, make a prediction about the pick-up time.

In combination, the data from the freight forwarders and the AI forecast result in what is known as the container removal sequence. This is a central building block for using mathematical optimization methods to calculate the handling decisions. It includes both the initial storage of incoming containers and the so-called "housekeeping", the re-sorting of containers that have already been stored. The goal is clearly defined: To minimize the number of restackings required. This also reduces waiting and processing times for trucks and trains, thus increasing the efficiency of combined transport and encouraging a modal shift to rail.

Oliver Schmitz, project manager of Smart-Stack at the CML, is delighted: "With Smart-Stack, we are taking a step towards connected logistics and can show how cooperation along the supply-chain creates the basis for optimizing processes and thus achieve added value for all parties involved."

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DMEA from April 9-11 in Berlin

For the first time the CML is attending the central trade fair for digital healthcare.

We will show our SCEDAS® software for workforce optimization at the joint Fraunhofer stand in Hall 2.2, Stand D-108: Originally developed to support crew planning, SCEDAS® is also ideal for personnel planning in clinics.

MARISSA Symposium 2024

The CML will once again be exhibiting at the IV. International MARISSA Symposium from June 5-6 in Bremerhaven. This year we will be presenting our solution for maritime speech recognition, marFM®.

Experience live at our stand how difficult-to-understand maritime radio messages are immediately converted into text that can be shared among emergency services in a search and rescue situation, for example.

Making rail handling better and safer – using robots at the terminal

Many containers are transported by rail. For the sake of a safe placing on carrying wagons, they are placed with all four corner castings on the container pins. Before loading the containers on the train, terminal employees adjust the pins by flipping them up or down in accordance with the related train loading scheme.

This task is repetitive, exhausting and implies certain risks for the terminal employees. The terminal operator Hamburger Hafen und Logistik AG (HHLA) is developing a mobile robotics application for the automated pin setting together with the CML in the Pin-Handling-mR project. The developed solution is supposed to be transferable to other rail terminals.

A demonstrator built at the CML already shows that the pins can be reliably flipped up and down using a robot arm with a magnetic gripper. Further key functions of the applications are reliable localization and positioning of the robot on the terminal site, error-free detection of common pin types and possible obstacles

as well as collision-free movement of the robot arm. The robot receives information about the mission, such as the lane location and the loading plan, by radio from a control station developed by HHLA-Sky, which is already used to control and monitor drones. HHLA expects the pilot application to be a major step forward in the automation of its rail terminals. Starting at the end of 2024, the mobile robot will be tested for several weeks at one of HHLA's container terminals.

The Pin-Handling-mR project, which is funded by the IHATEC funding program of the Federal Ministry of Digital and Transport, has a duration of 30 months and runs until March 2025.

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marFM®: Testing the functionalities of automatic speech recognition

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In recent months, we have further developed and optimized our already proven speech recognition technology marFM®.

marFM® reliably transcribes maritime radio communication with the help of AI - and thus solves problems of communication at sea, which is characterized by special acoustic and linguistic challenges.

Our text-to-speech functionality now makes it possible to automate the transmission of radio messages by creating audio files based on any user or text input. This makes it possible, for example, to create and broadcast standard radio messages from Vessel Traffic Service (VTS) centers such as weather reports or nautical warnings easily and efficiently in an automated manner. This function saves time and ensures that important information is transmitted quickly and accurately. We have set up server access so that interested parties can easily test our marFM®

technology for themselves and get a concrete picture of the benefits. A simple message to us is all it takes and we will set up the appropriate access.

We are also available to present the solution in person. This gives our customers the opportunity to experience the functionalities of marFM® at first hand and see the added value for themselves. In addition to the server solution, marFM® can still be used as an offline speech recognizer. In the coming months, we plan to use marFM® in other domains as well. This shows that marFM® not only offers added value in the maritime industry, but also in other areas in which information is currently exchanged quickly and precisely by radio.

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TOC Europe 2024

At TOC Europe from June 13-15 in Rotterdam, our Port Technologies team will be presenting its solution for the use of mobile robots in container loading onto rail.
The demonstrator for pin handling will show how the pins on container carrying waggons can be manipulated autonomously in the future.

Make a note of MII 2024 now!

What added value can the maritime industry derive from research? You will receive answers at our lecture event Maritime Innovation Insights (MII) on May 2, 2024.
Register now without obligation on our homepage to receive the latest information about the MII.

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