Fraunhofer CML

News 2.24

Attention!
Starting from issue 3/2024, our newsletter will only be available digitally.

Dear readers,

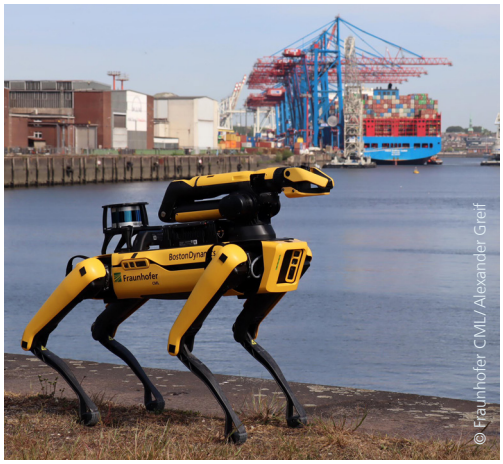
with this issue, we are discontinuing the printed version of the newsletter. From the next issue, we will be switching completely to online distribution – a small contribution to greater environmental friendliness and sustainability. If you do not automatically receive issue 3/2024 online, please register on our homepage under „Press".

In this issue, we present the DIOR IT and HUGIN2SCOUT projects as well as a new study for the first time. DIOR IT focuses on the benefits of combining mobile robotics and virtual/augmented reality for maintenance and monitoring. You can also read about how our HUGIN2SCOUT research project enables watercraft to communicate with each other and coordinate actions. And finally, we draw your attention to our current study THEO, which looks at the requirements and potential for remote-controlled vehicles in ports. Enjoy reading!

Yours sincerely,
Prof. Carlos Jahn
Head of Fraunhofer CML

Efficient, safe maintenance and monitoring with walking robots and VR/AR

If remote locations are difficult to reach or machines that are located in dangerous places need to be serviced, the time people spend there should be limited as much as possible. Such situations exist in ports in particular – including driving areas for Automated Guided Vehicles (AGVs).
Mobile robots enable a safe pre-inspection to keep the actual maintenance work as short as possible – for example, by bringing all the necessary tools and spare parts to the site in advance. This saves time and money. There is also a safety benefit when it comes to potentially hazardous work areas. After all, technology is less sensitive to toxic vapors and acids that can escape from defective transport containers. Another advantage: inspections can be carried out (partially) autonomously and employees can use their working time for other purposes or operate several robots.



As part of the DIOR IT project (digitization of existing infrastructure for optimization and maintenance using robotics and immersive technologies), the CML has developed remote control software that controls the Spot® walking robot with a VR application. The researchers are thus investigating the potential offered by the combination of mobile robotics and immersive technologies (virtual and augmented reality, VR/AR for short): A current 360° live image of the robot is streamed wirelessly to the VR headset and displayed on it.
The employee is shown the current position of the Spot® on a map at all times and can either control it manually or give it a movement order on the map so that the Spot® moves autonomously to this point. Relevant points can be marked in the VR view. The markers created can later be displayed on site using AR glasses. Following the successful tests to date, we can offer feasibility and potential studies. Get in touch with us.

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SMM 2024, September 3 - 6 in Hamburg

At the leading international industry trade fair, we will once again be presenting highlights of maritime research together with other Fraunhofer institutes. Get to know our solutions for shore-based remote support of ships, the voice recognition system for maritime radio communication and the damage detection of sea containers using image recognition.

The Fraunhofer Institutes IFAM, IGP, ITWM and LBF are exhibiting together with us. The topics range from manufacturing technology and applied materials research to innovative bonding and digital twins to greater production flexibility at shipyards and reliable operation of maritime components.

Visit us in hall B6 at stand 327.

Interaction of water drones – expansion of the area of application

In the HUGIN2SCOUT project, a group of watercrafts is enabled to coordinate internally, understand complex tasks, translate them into concrete plans and work on them cooperatively. HUGIN2SCOUT stands for Heterobous Unmanned Group of Intelligent Watercrafts to Scout Seaways and Infrastructure. Its area of application in the maritime environment is reconnaissance, for example in mine detection or defusing marine hazards from UXO (Unexploded Explosive Ordnance).
Fraunhofer IOSB and Fraunhofer CML are developing a manufacturer-independent software framework in the HUGIN2SCOUT research project so that different water drones can be used together and operate autonomously.
With its help, unmanned surface vehicles (USVs) from different manufacturers can communicate with each other and carry out coordinated actions, whereby the roles of the individual USVs can even be dynamically adapted to a situation. The technical prerequisite for this is a hardware solution that ensures the interface from the watercraft to the framework. The broad use of USV fleets offers a range of possibilities and advantages: Autonomous USV fleets reduce the risk for people on mine detection and clearance vessels, can be deployed quickly to new crisis areas, require fewer financial resources and can react flexibly to new threat situations involving people, infrastructure or merchant fleets. The funding of HUGIN2SCOUT within the framework of the Fraunhofer Future Foundation is aimed at supporting the post-war reconstruction of Ukraine – autonomously operating USV fleets could clear sea routes and enable safe transportation.
Even outside of crisis areas, there are many opportunities for the use of USV fleets in infrastructure inspections, search and rescue operations, accidents at sea and reconnaissance missions to ensure the safety and ease of shipping.

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Study: Where are teleoperated terminal vehicles possible and useful in ports?

In order to benefit from the advantages of automated driving while at the same time ensuring smooth operation and safety, remote control of vehicles is a suitable bridging technology.
A driver controls and monitors the vehicle remotely. Terminal operators, logistics companies and ports are also faced with the question of the extent to which the use of such vehicles could be possible and sensible.
The development of automated driving is progressing both in public transport and in closed operating areas and is increasingly being used in freight logistics. Aspects such as driver shortages, high safety needs and requirements on the road and the aim of optimizing traffic flow are promoting the introduction of automated driving.
In reality, the reliability of automated vehicles under all weather and environmental conditions poses a major challenge. In real-life operation, situations arise time and again in which humans have to intervene. For critical infrastructures such as port terminals in particular, the lack of complete reliability is preventing the widespread use of automated driving.
With their expertise in port and terminal processes, port technologies and in the field of (highly) automated driving, the Fraunhofer CML and the Fraunhofer IML examined these issues on the basis of a potential study. It identifies potential use cases and technical requirements for the use of remote-controlled vehicles in port terminals. The study THEO (Teleoperated Vehicles in Ports) can be found in the Fraunhofer-Bookshop. Further information is available on our homepage.

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Research live@CML

Robots, ship simulators, radio laboratory – our modern infrastructure inspires our customers and partners alike. Demonstrations of new, concrete solutions give rise to further ideas. We invite maritime professionals to exchange ideas in regular industry workshops.

Interested? Subscribe to our mailing list to receive relevant invitations.

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