LogDynamics

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Log*Dynamics* Newsletter April 2020

Projects

Consumer-Centered Sustainable Last Mile Logistics

Online shopping and e-commerce has significantly affected the way how goods are moved from retailers to end-users' homes. This process is known as consumer logistics. Thereby we can observe that this form of retailing requires on one hand more packaging and more delivery trips, but on the other hand an increased consumers' environmental consciousness. This leads to the central motivation of this research project, which is to combine the convenience of online shopping with environmental awareness. Therefore we develop a methodology that allows consumers to identify their individual preferences towards CO_2 emissions, plastic packaging, delivery times, due dates and costs for ordering groceries. By this, the methodology enables consumers to design their last-mile-logistics individually.
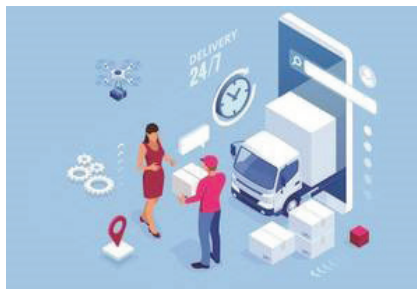
The suggested interdisciplinary methodology is a combination of socio-scientific discrete choice experiments with computer simulations as a well-known method from engineering. Discrete choice experiments are used to recognize consumer preferences in regards to delivery options (e.g. small vans, e-vehicles, delivery bikes, etc.). These individual qualitative results are then used to derive up-scaled simulated order and delivery scenarios, which are returned to the respondents. This feedback allows consumers to reflect their preferred logistics options and consumers may change their delivery preferences. The approach extends existing discrete choice experiment designs by a simulation-based analysis in form of a feedback loop leading to a consumer-centered and sustainable design of last mile logistics.

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Photo: Golden Sikorka / adobe stock. com

DFG Project: How Does a Computer Calculate?

The research group of Computer Architecture in the Department of Mathematics/Computer Science at the University of Bremen is working together with the Albert-Ludwigs-University of Freiburg on a project for the fully automated verification of arithmetic circuits in computers. The DFG is funding the project for three years.
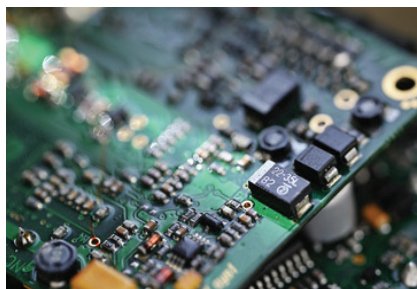
Computers are omnipresent. For example, smartphones accompany us

Bremen Research Cluster for Dynamics in Logistics

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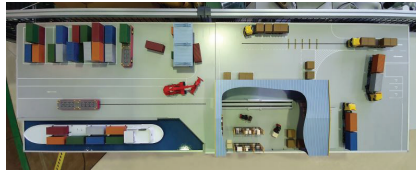c/o BIBA
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through the day when we listen to music, manage our appointments or get woken up in the morning. Whether we are watching movies or whether an artificial intelligence provides us with specific information, everything is mapped inside the machine with very simple commands. Several million of these commands can be executed simultaneously per second. Arithmetic plays a central role in this: as is already taught in school, plus, minus, times and divided are the basis for all complex calculations. In order for these operations to be carried out in a computer very quickly, but at the same time in a small space and with low energy consumption, new architectures have been developed in recent years. „This does not involve performing one calculation after the other, but rather working in highly parallel mode," explains Professor Rolf Drechsler, who heads the project at the University of Bremen. However, this makes calculations in the machine difficult to understand and the correctness of the overall system is not obvious.

In the project for the verification of arithmetic circuits (VerA), funded by the German Research Foundation (DFG) with more than half a million Euros, a fully automated formal methodology for verification is being developed. The result is comparable to a proof performed by a human being by hand, except that in this case the proof is performed fully automatically by a computer program. This goes far beyond the approaches used in industry to date .

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Photo: lapis2380 - stock.adobe.com

Ensuring Production and Quality: New System for Continuous Monitoring in Supply Chains

Being able to act proactively instead of reactively: If goods required for production are damaged or delivered too late, this can lead to reworking, express transports or even production downtimes. The effort and costs involved can be significantly reduced by means of seamless quality monitoring in the supply chain. This is precisely what the successfully completed SaSCh (Digital Services for the Design of Agile Supply Chains) project has been dealing with.

The research partner in this joint project was BIBA - Bremer Institut für Produktion und Logistik GmbH at the University of Bremen. Development and application partners were the companies BLG LOGISTICS, Bosch and queo as well as the standardization organization GS1 Germany. The project had a total volume of 4.5 million euros. It was funded by the Federal Ministry of Economic Affairs and Energy in the technology program „PAiCE - Digital Technologies for the Economy" and supervised by the DLR project management agency in the German Aerospace Center (DLR, Bonn).

After three years of research and development work, the consortium has come up with a technical innovation: a cyber-physical system that integrates mobile sensors and gateways, 3D image processing, cloud platforms and digital services. It enables the continuous digital recording of quality and condition-relevant data in the supply chain. The project results have been successfully tested using the example of supplier parts for the automotive industry and are also transferable to other industries.

A model demonstrator was created to illustrate the complex processes. It shows the use of mobile sensors on products, cargo and transport equipment in various supply chain processes such as transport, storage and transshipment. Several model trucks and containers move model small load carriers equipped with real sensors. The sensors record the status of the goods .

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Photo: Sabine Nollmann

Wireless Sensor Technology in Technical Textiles for Fibre-Plastic Composite Components

An essential step towards Industry 4.0 is the digitalization of production and the associated sensor integration in materials. For fibre-reinforced composite (FRC) components, which are gaining an ever larger market share due to their enormous lightweight construction potential, the integration of sensor technology serves to monitor the production processes. In addition to regular recording, it is also possible to directly adjust deviations in production parameters, such as the flow rate of the epoxy resin or the degree of curing, in order to guarantee reproducible production quality. In addition, the use of e.g. strain gauges makes it possible to implement integrated structural health monitoring (SHM) for the utilization phase of the component. A major challenge with wired sensor systems is the removal of the wires from the FRC component. One solution for this is the use of wireless sensor technology based on passive Radio Frequency Identification (RFID) sensortags.
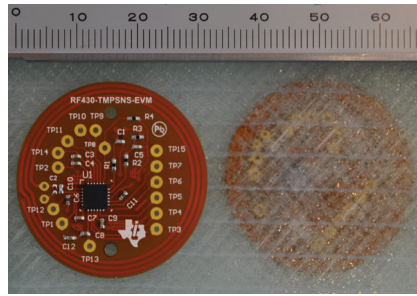
BIBA - Bremer Institut für Produktion und Logistik GmbH, together with the Institute for Microsensors, -Actuators and -Systems (IMSAS) of the University of Bremen, will investigate in the research project „READSET" the development of an RFID sensor tag especially designed for the integration into FKV components as well as its automated application in an industrial environment.

The aim is the development of a method and a corresponding handling system for the precise positioning and component-specific sensor application. The handling system is to be implemented in an existing CNC cutter in order to use existing systems and infrastructures. In addition, communication between the RFID sensortag and the handling system is to be realized in order to use the sensor technology of the RFID sensortag during application. The project is funded by the Federal Ministry of Economic Affairs and Energy (BMWi) for the period of December 2019 - February 2022.

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Photo: IMSAS

New DFKI Project to Make Deep Learning Processes More Reliable

When people are faced with a problem, they can either look at it logically and calmly, or decide spontaneously and emotionally. The computer has a similar situation: modern deep-learning methods, thanks to their training with large amounts of data, deliver quick results, but these are not comprehensible. Scientists at the German Research Center for Artificial Intelligence (DFKI) are now investigating how these results can be verified by formal procedures and thus become more reliable - without sacrificing speed.
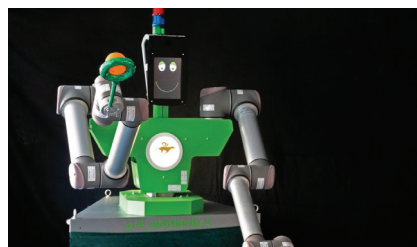
While deep learning methods lead to fast but rationally unjustifiable results, formal calculations can provide comprehensible and mathematically correct answers - which, however, require more time. In the „Fast&Slow" project,

which started in November 2019, DFKI scientists are investigating how the two methods can be combined. At the Cyber-Physical Systems research unit, headed by Prof. Dr. Rolf Drechsler, the aim is to enable artificial intelligence to make both fast and reliable decisions. This is because deep learning methods alone provide only sub-symbolically calculated solutions based on millions of parameters and vast numbers of test examples. In many areas of application, however, this approach does not meet the requirements of reliability and trust-worthiness - for example in the area of autonomous driving.

The scientists at DFKI are aiming to develop the foundations for a safer and more reliable use of deep learning methods in order to be able to use the potential of machine decision making even in demanding areas. The Federal Ministry of Education and Research (BMBF) is therefore funding the „Fast&Slow" project with approximately 1.2 million euros over a period of three years.

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Photo: DFKI GmbH, Lisa Jungmann

Simulation-based Training for Accident Prevention in the Automotive Industry

In the manufacturing and assembly processes of automobiles, employees can suffer physical damage due to incorrect handling of components or working in an unergonomic posture. Besides the health risks, improper handling of tools, or erroneous contact with sensitive surfaces can cause significant damage to the product and cause additional costs. Maintenance processes that include the handling of electrical equipment can be another cause for risks to health and resources. Training is required to sensitize the employees regarding the existing hazards. Currently, training courses for the prevention of scratches and dents, as well as the proper handling of electrical equipment, are held at regular intervals. The use of new technologies such as Virtual Reality (VR) can improve the learning effects, as it offers the employees an interactive and immersive learning experience.

In the VR-SUSTAIN project, a training environment is developed, which familiarizes trainees and skilled workers in a safe environment with the prevention techniques of accidents and damage to manufactured products. VR is used as a technology to provide participants with a realistic immersive learning experience in a purpose-built safe environment. Two learning scenarios are depicted: the prevention of incorrect physical stress in the manufacturing process in connection with the prevention of scratches and dents on the car, and the prevention of accidents in the handling of electrical equipment. The project aims at improving the quality and efficiency of the addressed learning scenarios by using innovative VR technologies. It is funded by the EU / EIT Manufacturing for one year, the BIBA - Bremer Institut für Produktion und Logistik GmbH is one of the research partners.

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Digital Intelligent Assistant for Predictive Maintenance

Predictive maintenance is one of the central topics of Industry 4.0, using data from the utilization phase of machines and systems to determine their condition and derive maintenance tasks. Predictive maintenance is usually supported by software systems that can provide tools for data evaluation and suggest maintenance measures. Using these systems requires specialist knowledge that a company can build up through employee training. These training courses represent capital

expenditures that may argue against the introduction of predictive maintenance. Reducing this expenditure is therefore a sensible goal.

A digital intelligent assistant, similar to Google Assistant or Siri, could provide easier access to predictive maintenance software systems, particularly for field personnel. Instead of graphical user interfaces, employees could use natural language queries to obtain information on maintenance tasks and the diagnosis of problems. A dynamic conversation process should guide the request in a natural way, without the need for special training to use the assistant. Since the assistant should be usable via a smartphone, complex relationships can be provided via the screen.

DIAMOND - a new project funded by the EU within the framework of EIT Manufacturing - aims at reducing the barriers to the introduction of digital intelligent assistants in predictive maintenance. For this purpose, BIBA - Bremer Institut für Produktion und Logistik GmbH and Delft University of Technology are working together on the requirements, the ICT infrastructure and the exploitation of the digital intelligent assistant. DIAMOND focuses on the production of household products (Whirlpool EMEA) and the manufacturing of medical products for trauma treatment (Stryker Trauma GmbH).

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RAINBOW: Fog Computing Platform for the Management of Heterogeneous and Secure IoT Services

The EU project RAINBOW, in which BIBA - Bremer Intsitut für Produktion und Logistik GmbH has been involved since January 2020, pursues a vision to design and develop an open and trustworthy fog computing platform that facilitates the deployment and management of scalable, heterogeneous and secure IoT services and cross-cloud applications (i.e. microservices). RAINBOW falls within the broader vision of delivering a platform that enables users to remotely control the infrastructure that may be running on hundreds of edge devices (e.g. wearables), thousands of fog devices on a factory floor or in the sky (e.g. drones), and millions of vehicles that are on the road in a specific area or across Europe. RAINBOW aims to enable Fog Computing to reach its true potential by providing the provisioning, orchestration, network structure and data management for scalable and secure edge applications, addressing the need for timely processing of the ever-growing amount of data continuously collected from heterogeneous IoT devices and facilities.

The solution proposed in the project offers significant benefits for popular cloud platforms, fog middleware and distributed data management systems and will extend the open source ecosystem by pushing intelligence to the edge of the network while ensuring security and privacy across the entire device fog cloud application stack. To evaluate its broad applicability, RAINBOW will be demonstrated in various real-world scenarios, such as automated manufacturing (Industry 4.0), networked vehicles and monitoring of critical infrastructures by drones.

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Photo: ubitech

Digital Innovation Centers for Interoperability of Embedded and Cyber-Physical Systems in European SMEs

The project DIH4CPS (Fostering DIHs for Embedding Interoperability in CyberPhysical Systems of European SMEs), in which BIBA - Bremer Institut für Produktion und Logistik GmbH is a partner, supports European companies in overcoming obstacles to innovation and establishes Europe as a leading innovator in the field of the fourth industrial revolution. DIH4CPS creates a comprehensive, interdisciplinary network between Digital Innovation Hubs (DIHs) and technology and solution providers in the field of cyber-physical and embedded systems. The project thereby links different fields of knowledge and technologies and raises regional networks to a European level. Small and medium-sized enterprises can further develop their products in open calls for tenders and use the competences and services of the DIH4CPS community.

BIBA supports this project by formalizing and developing the different competences, technologies and services within the DIH4CPS network by modelling the network and providing an intelligent navigation interface for companies. The three-year project started in January 2020 and is funded by the EU in Horizon 2020.

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Manufaktur 4.0 for More Quality in the Gourmet Food Industry

The food industry is an important sector which includes more than 5,500 companies in Germany. In order to ensure the competitiveness of the companies in the future and to contribute to the climate goals, the food and its production must be sustainably developed. The aim of the project „Manufaktur 4.0" is the development of a digitalized, quality-based production planning and control for food production. Currently, production control at the project partner Deutsche See is mainly based on individual experiences. The project aims to improve the capacity utilization of the production facilities and optimize the energy consumption of the production plants. Furthermore, the traceability of raw materials in production is to be achieved and product quality is to be increased through optimized production control (e.g. reduction of the service life of sensitive raw materials). Additionally, production waste is to be reduced.

In order to achieve these goals, raw material-specific quality-time profiles will be developed and their influence on the final product quality will be investigated by means of sensory analysis. Based on this, an AI-based prognosis algo-

rithm is derived, which predicts the achievable product qualities on the basis of quality time profiles and develops a procedure for quality-oriented production planning and control. As a basis for the implementation of quality-oriented production planning and control, digital twins (containers with raw materials, production plants, overall system) as well as a container management system with digitally authenticatable containers are used.

BIBA - Bremer Institut für Produktion und Logistik GmbH is working on this two-year-spanning project together with the project partners Deutsche See GmbH and food technology specialists from the Bremerhaven University of Applied Sciences. The project is funded by the BIS Bremerhaven via the state funding PFAU - Program for the Promotion of Applied Environmental Technologies .

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Camera System for Automatic Quality Inspection

The goal of the new project „SealingQuality" at BIBA - Bremer Institut für Produktion und Logistik GmbH is the development of a mobile documentation and inspection system for the application and evaluation of sealants with pseudometric freeform surfaces. The system is to be developed on the basis of the application and quality inspection of soft seals and is also to be used in various other applications. By using deep learning algorithms, a „universal" inspection system for soft seals will be developed, which offers high reliability under different environmental conditions. The system is to be designed as a mobile system which is worn on the body in direct human-technology interaction and operated in real time. The execution of the work task is to be evaluated in the process and, if necessary, corrected by appropriate feedback.
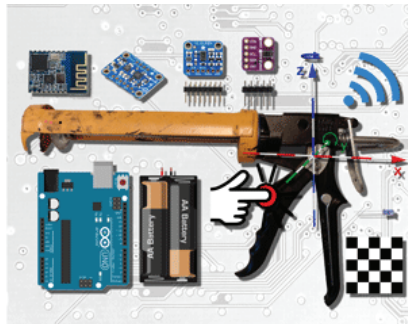
The „SealingQuality" project is funded by the German Federal Ministry of Economic Affairs and Energy (BMWi) as part of the ZIM program from March 2020 to September 2021.

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Holistic Control for the Energy Self-Sufficient Operation of Large Infrastructures

In the project „GEREGELT", in which BIBA - Bremer Institut für Produktion und Logistik GmbH was involved, a holistic control system for the energy-efficient operation of energy and building services engineering in large infrastructures was developed using Bremen airport as an example. This control system networks the existing energy sources, energy storage and energy consumers and includes external

data (e.g. environmental data, passenger data, aircraft arrivals, weather). The project was funded by the Federal Ministry of Education and Research under the KMU Innovativ program.

The control system was implemented for the exemplary application scenario „apron lighting" at the airport. Here, higher-level data on aircraft arrivals and parking positions as well as brightness information are automatically imple-

mented in the lighting control system. The proportion of artificial light provided by the dimmable LED floodlights supplements the natural brightness in such a way that the required amount of light (e.g. traffic route lighting, boarding lighting, maintenance lighting) is achieved for each specific position. In a second application scenario the control system for the BIBA auditorium was implemented.

The environment and one's money already benefit from the lower energy consumption due to the new energy systems (heating, LED lighting). The project has also used the example of the major infrastructure of Bremen Airport to investigate future-oriented options for energy-efficient operation of energy and building services engineering, such as the use of storage technologies and electromobility, by means of a simulation study. The study examined various system configurations and derived corresponding timetables for the operation of the systems. The achievement of the desired smoothing of the load curves to reduce the costs for external energy procurement was demonstrated.

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Concepts for Autonomous Shunting on the Port Railway

On November 28, 2019, the project completion meeting of the research project „Rang-E - Autonomous shunting on the port railway" with the project execution organization TÜV Rheinland took place at the ISL in Bremen. The project consortium Rang-E consisted of experts from ISL, BIBA - Bremer Institut für Produktion und Logistik GmbH and IVE Braunschweig.

Since August 2017, researchers have been analyzing the shunting processes using Bremerhaven as a historically grown port as an example. The project team recorded the knowledge gained on the basis of shunting in process models and extracted from them recurring tasks that had previously been carried out manually, which would first have to be automated for possible autonomous operation. A challenge for the future is to integrate already available autonomous technology concepts into the processes of the port railway. For example, modern automatic couplers would be required for autonomous operation for coupling and uncoupling freight cars. For visualization purposes, ISL experts have implemented the considered automation levels into a H0 railway model.

Furthermore, the research team identified another way to save time and costs in port railway operations. The concept of a so-called „ideal type of port" requires a terminal-clean block train. For this purpose, it is necessary that each terminal in the port has a sufficient number of straight loading tracks of at least 700m length and that the trains are assembled terminal-clean in advance. However, an implementation of the concept of an ideal typical port in Bremerhaven seems hardly feasible due to the grown infrastructure. Rather, the central project result from Rang-E - the concept of an ideal-typical port - is more suitable as a Bremen research impulse for the future development of new port facilities.

The Rang-E project was funded by the Federal Ministry of Transport and Digital Infrastructure as part of the Innovative Port Technologies Initiative (IHATEC).

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Augmented Reality on the Construction Site - How the Future of Craft Trades Benefits from Augmented Reality

It seems disconcerting: the air conditioning technician in the blue suit wears AR glasses, grabs imaginary objects in front of his eyes with his fingers and moves them. He orientates himself interactively on the construction site and moves in the computer-planned world. This is possible with the help of Augmented Reality (AR). It supplements the perception of reality, for example through glasses, with virtual elements such as construction plans. BIBA - Bremer Institut für Produktion und Logistik GmbH at the University of Bremen spent two years researching this together with development partner AnyMotion (Bremen) in the „KlimAR" project. Now they have presented their results.
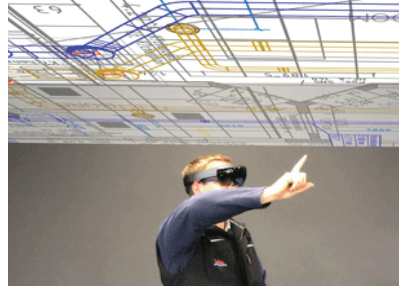
The project had a total volume of almost 450,000 euros and was funded by the Federal Ministry of Economic Affairs and Energy (BMWi) in the „Central Innovation Program for small and medium-sized enterprises (SMEs)" (ZIM). In addition to BIBA as an expert for AR assistance systems and AnyMotion as a specialist for visual concepts and communication, among other things, the craftsman's company Funke (Twistringen) supported the development of the system as an associated partner and first customer with its practical knowledge. During the installation of a new air conditioning and ventilation system at its customer KMH-Kammann Metallbau (Bassum), the „Team Funke" tested and used the new technology.

The aim of this project was to support the service technicians in the work flow during the maintenance of complex heating, ventilation and air conditioning systems. The use of AR data glasses enabled the preparation and provision of technical documentation in the work process, orientation and work support with the help of virtual additional information as well as an adaptation of the documents used by interacting with the displayed contents. This significantly reduced the search effort in the maintenance process and supported documentation tasks.

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Photo: AnyMotion

Awards ⏏

AI: Bremen University Scientists are among the most Influential in the World

In the field of artificial intelligence (AI), four scientists at the University of Bremen are among the world's leading experts. This is the result of the current ranking „AI 2000 Most Influential Scholars" by the renowned Tsinghua University in China. It is based on an analysis of contributions to the most important specialist publications and conferences of the past ten years.

The ranking lists the 2,000 most influential researchers in the field of artificial intelligence - divided into 20 categories. The best ranking of the Bremen scientists was achieved by Professor Michael Beetz with 4th place in the robotics category. Beetz is head of the Institute of Artificial Intelligence and the Collaborative Research Center EASE (Everyday Activity Science and Engineering) at the University of Bremen. The aim of the SFB's research is to develop robots that are capable of performing everyday tasks with the competence of humans, such as cooking and setting a table.

Professor Carsten Lutz from the Department of Mathematics and Computer Science is listed in the ranking in two areas at once: In „Knowledge Engineering" - knowledge processing - he is ranked 30th, in the interdisciplinary category „AAAI/IJCAI" 94th, and the category „AAAI/IJCAI" was named after the two largest international AI conferences. Professor Rolf Drechsler, Dean of the Department of Mathematics and Computer Science, and Dr. Moritz Tenorth from the Institute of Artificial Intelligence are also represented in the categories Chip Technology and Robotics respectively. All four are involved in the SFB EASE.

The Bremen location is well positioned internationally in AI-based robotics: The interdisciplinary basic research in the Collaborative Research Center EASE is ideally complemented by the application-oriented research of the German Research Center for Artificial Intelligence (DFKI) and the Knowledge-4Retail consortium.

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Photo: Institut für Künstliche Intelligenz / Universität Bremen

Gamification Software Award for the Beaconing Project

The EU project Beaconing „Breaking Educational Barriers with Contextualised Pervasive and Gameful Learning", in which BIBA - Bremer Institut für Produktion und Logistik GmbH was involved, was awarded the Gamification Software Award. The tool created in the project, which enables teachers to create gamified lesson plans, convinced the jury. In teaching, this tool opens up new possibilities for designing and providing teaching content and for experimenting beyond the formal framework of the classroom.

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Details: www.gamificationawards.org/blog/gamification-software-award-winner, www.beaconing.eu

Crystal Cabin Award

BIBA - Bremer Institut für Produktion und Logistik GmbH, in cooperation with Airbus, entered the Crystal Cabin Award 2020 with an innovative concept in the Cabin Systems category. The Crystal Cabin Award is an international innovation prize for outstanding products and concepts in the field of aircraft cabin interiors and is awarded annually in April in Hamburg.

The concept submitted is an inventory management system for the aircraft cabin, a system for the administration and digitalization of catering goods, taking into account the entire supply chain up to the consuming passenger in the aircraft. The application made it to the shortlist through the selection process.

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Details: www.crystal-cabin-award.com/cca-news-realeases/article/the-future-of-flight-from-luxurious-to-sustainable-the-crystal-cabin-award-shortlist-2020.html
Photo: crystal-cabin-award.com

Internationalization ⏏

International Center in Logistics Management and Engineering - a Cooperation between the University of Bremen and Zhongyuan University of Technology in China

Zhengzhou, China, located within the Maritime Silk Road, is an important multimodal logistics hub with access to all transportation systems such as railway, highway and airplane connections. By this, it enables connections to the major seaports of China which overall makes Zhengzhou a strategical important location and an important international transport corridor to Europe. Nonetheless, Zhengzhou's biggest university, the Zhongyuan University of Technology (ZUT) offers very few courses in logistics. Thus, there is a lack of well-educated international logistics managers, which makes the demand for a strengthening of the international collaboration for both countries obvious.
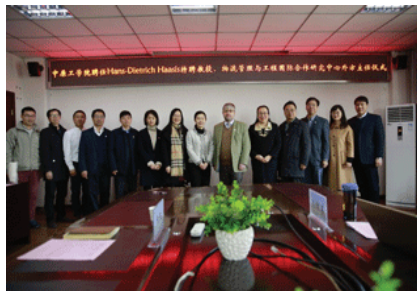
This was one of the reasons why a joint international center in Logistics Management and Engineering (IRC-LOG) between the University of Bremen, Germany, and the Zhongyuan University of Technology, China, was founded in March of 2018. In early 2019, the team of IRC-LOG mutually agreed to reach the following goals within the framework of the project "GreenSilk":

- Improvement of the courses of study in logistics management in the curriculum of the Zhongyuan University of Technology that are appropriate to the local context and correspond to the state of the art
- Exploitation of new experiences and insights through the developing cooperation, especially through the new international working group of IRC-LOG at ZUT
- Enlargement of the subject-related academic network between project partners and beyond, reinforced by the international association of the "Asian-German Knowledge Network for Transport and and Logistics e.V".

The center and the realization of these goals is supported since the beginning of 2020 by the DAAD funded project „GreenSilk" for the next 4 years. Professor Dr. Hans-Dietrich Haasis will be happy to answer any further questions.

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International Logistics Researchers as Guests in Bremen - LDIC 2020 Provided the Setting

About 120 people interested in logistics from 18 countries met for three days in Bremen to present, discuss and exchange ideas at this year's LDIC conference. The program of the 7th International Conference on Dynamics in Logistics included 51 scientific presentations as well as four key note speeches, which impressively documented the broad spectrum of current logistics research and practice in terms of content and methodology. The participants were also able to take part in an exciting additional program. In the forefront of the conference, a doctoral workshop was offered as a satellite event. The accompanying program during the LDIC included guided tours of the Robotics Lab of the Institute of Artificial Intelligence and the Log*Dynamics* Lab as well as the workshop „B2B Platforms for Supply Chain Management and Logistics" from the EU project NIMBLE. The presentations as well as the subsequent exchange of ideas between the scientists took place on a very high level and testified to the high quality of the contributions and presentations. The organizers were able to award the best contributions with a Best Paper Award and two Commended Awards. All contributions to LDIC 2020 will be summarized in a Springer conference proceedings, which is expected to be published in May 2020 in the series Lecture Notes in Logistics.

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Photo: Aleksandra Himstedt

Events ▲

Training as a Scientific Innovation Ambassador

Date: **Starting in August 2020**
Venue: Bremen

The logistics sector - one of the most important driving forces for the Bremen economy - is characterized by small and medium-sized players. Aligning their organization to innovations presents SMEs with challenges that they often cannot meet. Even if potentials are known, companies are not necessarily able to exploit them on their own. This is where the BreLogIK project comes in, in order to exploit previously unused opportunities in close cooperation between Bremen's science and logistics industry.
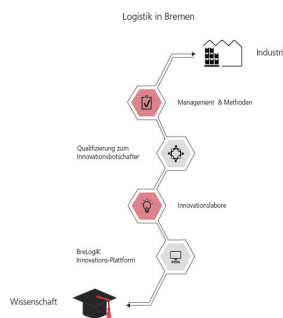
For this reason, the BreLogIK project partners offer scientists in the state of Bremen further training to become scientific innovation ambassadors for the Bremen logistics industry:

● Participate in a series of workshops and benefit from the know-how of our team of experts
● Establish further contacts with Bremen's economy and gain in-depth insights into the world of logistics
● After the workshops, you can test your new specialist knowledge within the framework of accompanying projects in cooperation with Bremen companies.

Become a scientific innovation ambassador for the logistics industry in the state of Bremen!

Start of the training is August 2020 and ends expectedly winter 2020/21.

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ISL Maritime Conference 2020

Date: **October 27, 2020**
Venue: Bremen

The Institute of Shipping Economics and Logistics invites to the ISL Maritime Conference 2020 on October 27, 2020, in Bremen and continues its traditional series of events. As in previous years, the participants can expect exciting lectures and discussions about the current situation and perspectives of the global maritime industries. The ISL Maritime Conference, which is organized every two years in Bremen, has a long history. It follows the tradition of the former Liner Shipping Conferences, which were already organized by ISL in the seventies and eighties and were already then a fixed date for the maritime economy, politics and science.

The ISL Maritime Conference 2020 will again be organized in cooperation with the Mittelstand 4.0-Kompetenzzentrum Bremen. Within the scope of this project supported by the Federal Ministry of Economics and Energy, it is again possible to organize the established ISL Maritime Conference 2020 as a free offer for small and medium-sized enterprises. The Mittelstand 4.0-Kompetenzzentrum Bremen supports and promotes small and medium-sized enterprises (SMEs) in their digital transformation. The aim is to increase the digitalization status of SMEs through individual support measures. As a partner in the competence center, the Institute of Shipping Economics and Logistics (ISL) represents the subject area „Digital Transhipment".

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Details: www.isl.org/de/isl-maritime-conference-2020

5th International Conference on System-Integrated Intelligence - Intelligent, Flexible and Connected Systems in Products and Production - SysInt 2020

Date: **November 11 - 13, 2020**
Venue: Bremen

The International Conference on System-Integrated Intelligence is a cooperation event between the Universities of Bremen, Hannover and Paderborn. The fifth edition has been postponed due to Covid19 and will take place in Bremen from November 11 to 13, 2020. Log*Dynamics* is one of the co-organizers. Thematically, the SysInt deals with the integration of new intelligent functionalities in materials, components, systems and products. The conference offers a forum for science and industry and focuses on six main topics:

- Intelligent Systems: Enabling Technologies and Artificial Intelligence
- The Future of Production: Cyber-physical Production and Logistics Systems
- Pervasive and ubiquitous computing
- Structural health surveillance
- System engineering
- Robotics and Human-Machine Collaboration.

Deputy Minister for Science and Ports Visits Log*Dynamics*

Tim Cordßen, Deputy Minister for Science and Ports, visited the research cluster Log*Dynamics* on February 28, 2020. He was welcomed by the spokespersons of the network and the International Graduate School for Dynamics in Logistics (IGS): Prof. Thoben and Prof. Haasis. Contributors were Prof. Freitag, Dr. Rügge, Dr. Burwinkel and international doctoral students of IGS.

Among other things, the interlocking of science and logistics in the international context of the research network was discussed. The intercultural encounter with the international scientists at IGS was a source of enthusiasm. In the Log*Dynamics* Lab in the BIBA hall, the technology transfer at the interface between business and science was made tangible by the demonstrators.

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Details: www.logdynamics.de/fileadmin/Upload/Staatsrats_Besuch_bei_Log-Dynamics.pdf
Photo: Aleksandra Himstedt

Publications ⏏

New Publication "Ripple Effect Quantification by Supplier Risk Exposure Assessment" in the International Journal of Production Research

Prof. Dr. Aseem Kinra (Professorship of Global Supply Chain Management), in collaboration with Prof. Dmitry Ivanov (Berlin School of Economics and Law), Prof. Ajay Das (Zicklin School of Business) and Prof. Alexandre Dolgui (IMT Atlantique), has published an article on the „ripple effects" in global supply chains in the International Journal of Production Research.

In this paper, the authors propose a new model for assessing such ripple effects and validate it by simulations on actual company data. The results of the validation show that the developed model can be useful in detecting high-risk supplier relationships and in prioritizing risk mitigation efforts in situations characterized by insufficient probabilities. The proposed performance indicators can be used by practitioners to analyze the impact of the disruption propagation and to identify the key suppliers to be included in the disruption risk analysis.

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IMO 2020 Makes Ships More Environmentally Friendly

From January 2020, new environmental guidelines of the International Maritime Organization (IMO) apply to global shipping. Since the beginning of the year, all ocean-going vessels must reduce sulphur oxide emissions by 85%, and only fuels with a maximum sulphur content of 0.5% may be burned; before that, the upper limit was 3.5%. Shipowners have various options to comply with the new sulphur limits: Switching to low-sulphur fuels that comply with the new regulations, installing exhaust gas cleaning equipment (so-called scrubbers) or using alternative fuels such as LNG, methanol and others. According to Clarkson Research, at the beginning of January 2020, 1,740 of the total of almost 56,000 ships in the world merchant fleet were equipped with an SOx scrubber. Installation is planned for a further 1,560 units already in service. Some 540 ships with an exhaust gas scrubber are on the order books, which corresponds to 20 % of the total order backlog.
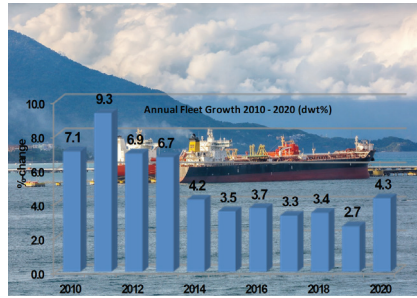
The number of merchant ships that can be operated with liquefied natural gas (LNG) as fuel has tripled in the last ten years, but their share in the total fleet is rather insignificant at around one percent. 555 ships in the fleet and 395 ships on order have been equipped with LNG-compatible engines. This means that the majority of merchant ships run on expensive low-sulphur fuel. Upgrading with exhaust gas purification systems or switching to LNG (still) plays a minor role.

The complete issue of the SSMR 1/2 2020, dealing with the development of the World Merchant Fleet including a huge number of statistics concerning the topic is available via the ISL Webshop.

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Photo: ISL

Fact Sheet „Climate Change Consequences for Bremen Companies: Focus Maritime Economy & Logistics"

As part of the BREsilient project, the factsheet „Climate change consequences for Bremen companies: Focus Maritime Economy & Logistics" was published. On six pages, the most important findings from the interviews, workshops and scientific studies of the model area „Maritime Economy & Logistics" are summarized and presented in a visually appealing way.
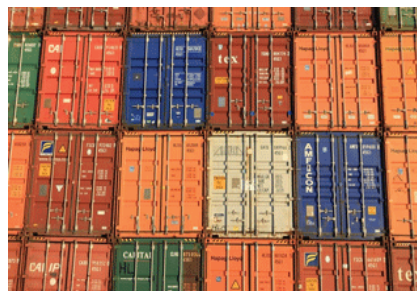
In the factsheet, the ISL authors Rainer Müller and Matthias Dreyer describe the experiences of companies with extreme weather events and the effects of climate change on the sector „Maritime Economy & Logistics" in the federal state of Bremen.

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Factsheet: www.bresilient.de/wp-content/uploads/2020/01/BREsilient_FactSheet_MaritimeWirtschaft.pdf
Photo: pixabay

New Position Paper: CO2-Neutral Shipping

What contribution can LNG make to reducing greenhouse gas emissions from shipping? What further measures are needed to realize the vision of „zero emissions by 2050"?

Maritime transport has increased steadily in the past decades on a world scale. Currently, about 90 percent of intercontinental trade is handled by sea transport. Along with this, vessels increasingly emit air pollutants with effects on health, environment and climate. With the adoption of the Kyoto Protocol in 1997, the IMO was mandated to initiate measures for reducing harmful greenhouse gas emissions to the global climate. An extensive bundle of measures to achieve the ambitious goals has since then been discussed and developed. But have these measures been implemented early enough and ambitiously enough in anticipation of technologies and fuels to be developed in the future?

In its current position paper, the ISL deals with this topic and shows how the climate targets in the shipping industry can possibly be achieved and where there are partly considerable deficits in the implementation of actually known measures for more energy efficiency and more climate protection.

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Download Position Papier: www.isl.org/en/node/562
Photo: pixabay

Universität Bremen