



Conference Guide

INDIN 2017

2017 IEEE IES 15th International Conference on Industrial Informatics

University of Applied Sciences Emden/Leer, Emden, Germany
24th - 26th July 2017

Sponsored by the
IEEE Industrial Electronics Society

Co-sponsored by:
University of Applied Sciences Emden/Leer, Emden, Germany
Institut für Informatik, Automatisierungstechnik und Robotik (I²AR), Emden, Germany
Faculdade de Ciências Tecnologia, Universidade Nova de Lisboa, Lisbon, Portugal



Message from the General Chairs

It is our pleasure and honor to welcome you to the 15th International Conference on Industrial Informatics (INDIN`2017), sponsored by Industrial Electronics Society (IES) of the Institute of Electrical and Electronics Engineers (IEEE) and held between the 24th and the 26th July 2017 in Emden, Germany.

In response to the exigencies of "The Undergoing Industrial Informatics R-Evolution" industry experts, researchers and academics are coming together to share the excitement of engineering accomplishments, ideas and experiences surrounding frontier technologies, breakthroughs, innovative solutions, research results, as well as innovation initiatives related to industrial informatics and their applications.

The new disruptive advances on the cross-fertilization of concepts and the fusion of information, communication, automation and control technology-driven approaches in traditional industrial systems is already providing an innovation ecosystem for a broad range of industries, creating entirely new markets and platforms for growth. The technological, economic and social impacts of these developments, which are still at their dawn, are so enormous that the whole process is labeled as the Fourth Industrial (R)-Evolution. It is really more an "Evolution" than a "Revolution", since new products and services mainly based on the use and application of an existing big amount of data and information (now digitalized and understandable) are facilitating the creation of new functionalities and application based on the collaboration of interconnected heterogeneous systems in a cyber-physical space, the creation of new and retention of high-valuable jobs, and supporting the continuous improvement of the quality of life for the "citizens of an informatised and digitalized-networked society."

We are also proud about our exquisite host venue for the conference and the beautiful geography in which it resides (at the Wadden Sea, inscribed on UNESCO's World Heritage List). In this landscape, INDIN`2017 provides a forum with wonderful historic and industrial surroundings, interesting scientific and technical menus and a conference site with well- equipped rooms, to complement an interesting and attractive technical program, keynote plenary sessions and tutorials on current research, development and innovation results in industrial informatics related topics.

Equal important, the conference puts emphasis on promoting international understanding and cooperation through fostering of professional interaction. We trust that the atmosphere at INDIN`2017 indeed ignites a spirit of cooperation and sharing, and inspires new found friendships among scientists and engineers for achieving greater success for the benefit of mankind in the years ahead.

We believe that INDIN`2017 is important and pertinent to our role in shaping the informatised industrial eco-system of the future. For these reasons, all conference committees and volunteers, speakers, authors and attendees, have been working hard doing their best to make INDIN`2017 a remarkable and unforgettable event.



Prof. Dr.-Ing. Armando Walter Colombo and Prof. Dr.-Ing. Luis Gomes

INDIN'2017 General Co-Chairs



Message from the Technical Program Chairs

On behalf of the Technical Programme Committee, we welcome you to the IEEE 15th International Conference on Industrial Informatics (INDIN 2017). The conference has a rich programme focusing on key technologies and concepts that emerge in the field of industrial informatics.

The conference boasts a diverse and exciting program spanning 11 technical tracks, 12 special sessions, 4 tutorials and a 3-day Industry Forum. The technical program is well complemented with keynotes and industry visits, all of which are expected to contribute to an intensive but very interesting 3-day conference. New results will be reported, key industrial presentations will be made, critical discussions will be realized, new insights will be acquired, networking with a diverse international audience etc. are expected to make INDIN 2017 a fulfilling event for the curious minds.

We very much hope that you find the technical programme enjoyable, stimulating and precipitous of discussion. On behalf of the Technical Programme Committee, we would like to thank you all for attending and supporting INDIN 2017 and helping to make it a success. We hope you have a fulfilling and enjoyable time in Emden and will take away memories of both the scientific aspects of the conference as well as the people you will meet and the potential new ideas for your research and professional life.

Ren Luo, José Barata, Yang Shi, Olaf Sauer and Stamatis Karnouskos

INDIN'2017 Technical Programme Co-Chairs

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TT03 - Cloud and Wireless Systems for Industrial Applications

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TT04 - Cognitive and Computational Intelligence

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TT05 - Industrial Digitalization, Big Data and Analytics

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TT06 - Human, Computer and Machine Interface

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TT07 - Factory Automation and Communication, Mechatronics and Robotics

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TT08 - Distributed and Networked Control Systems

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TT09 - Technologies and Infrastructures for Smart Grids, Buildings, and Cities

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Thomas Strasser, Austria
Joern Ploennigs, Germany
Herminio Martínez García, Spain

TT10 - Education in Engineering and Industrial Informatics

Joao Martins, Portugal
Andreja Rojko, Slovakia
Erwin Schoitsch, Austria
Elena Mäkiö-Marusik, Germany

TT11 - Education in Engineering and Industrial Informatics

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SS02 - Intelligent Engineering of Intelligent Automation Systems

Valery Vyatkin, Sweden
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SS03 - Smart Data and Data Analytics for Automation and Manufacturing Systems

Birgit Vogel-Heuser, Germany
Benjamin Kloepper, Germany
Paulo Leitão, Portugal
Cesare Fantuzzi, Italy

SS04 - Evolution of Cyber Physical Production Systems and their Services

Birgit Vogel-Heuser, Germany
Alexander Fay, Germany
Armando W. Colombo, Germany

SS05 - Cyber-Physical Systems: Innovative Use Cases and Business Models

Juho Mäkiö, Germany
Jolanta Kowal, Poland
Elena Mäkiö-Marusik, Germany

SS06 - Advanced Methodology and Applications of Industrial Software

Takaaki Goto, Japan
Narayan Debnath, USA

SS07 - Industry 4.0: Keeping Humans in the Loop and in Control

Tullio Facchinetti, Italy
Giancarlo Iannizotto, Italy
Marco Porta, Italy

SS08 - Big Data Analysis and Diagnosis For Industrial Applications

Tommy W S Chow, Hong Kong
Jonathan Wu, Canada
Kai Liu, China

SS09 - Lifecycle Engineering of Cyber Physical Manufacturing Systems

Robert Harrison, United Kingdom
Bilal Ahmad, United Kingdom
Daniel Vera, United Kingdom

SS10 - Innovative Approaches for Re-Configurability of Industrial Production Systems

Jeffrey Wermann, Germany
Michael Gepp, Germany
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SS11 - Integrating Cloud Technologies, Context Sensitive Tools and Data Mining for Design of Product-Service Systems

Sebastian Scholze, Germany
Jose Barata, Portugal

SS12 - Information and Communication Technologies for Smart Water Management Systems

Gerhard P. Hancke, South Africa
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Rafael Priego	Thomas Otieno Olwal	Zhou Wu
Rainer Drath	Thomas Strasser	Zihaoyang Tian
Ralf Gitzel	Tiago Cardoso	

Sessions At a Glance

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Monday								
09:00-09:30	Opening							
09:30-10:15	KN 1							
11:00-13:00		IF 1	TT01	TT07	SS09	TT05	SS08	TU 1
14:00-16:00			SS01	TT10	SS02	SS04	SS08	TU 2
16:30-18:00			SS01	TT10		SS04	SS08	
Tuesday								
09:00-09:45	KN 2							
10:30-12:30		IF 2	TT02	SS11	TT08	TT07	TT11	TU 3
13:30-15:30			TT04	TT03	SS02	SS10	TT11	TU 4
16:00-18:00			TT04	TT03	SS02	SS10	TT11	
Wednesday								
09:00-09:45	KN 3							
10:30-12:30		IF 3	SS05	TT09	SS06	SS12	SS03	
13:30-15:30		IF 4	TT02	TT09	TT07	TT06/SS07	SS03	
16:00-16:30	Closing							

Other Events

Coffee Breaks are in the University's Canteen.

- Monday: 10:30-11:00, 16:00-16:30
- Tuesday: 10:00-10:30, 15:30-16:00
- Wednesday: 10:00-10:30

You can also find coffee stations at the corridor on the 2nd floor of the S Building, where the parallel sessions will be held.

Lunch Breaks are in the University's Canteen.

- Monday: 12:00-14:00
- Tuesday: 12:00-14:00
- Wednesday: 12:00-14:00

Monday

- Opening Ceremony -- 09:00-09:30, in Forum T151
- Keynote: "A Pathway to Industrial Digitalisation" (Robert Harrison, Warwick Manufacturing Group) -- 09:30-10:15 in Forum T149
- Welcome Reception -- 19:00 in front of the University's Canteen

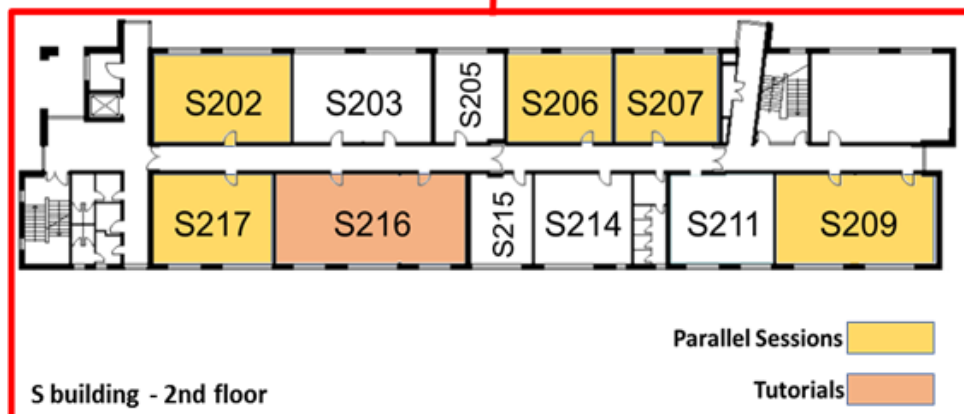
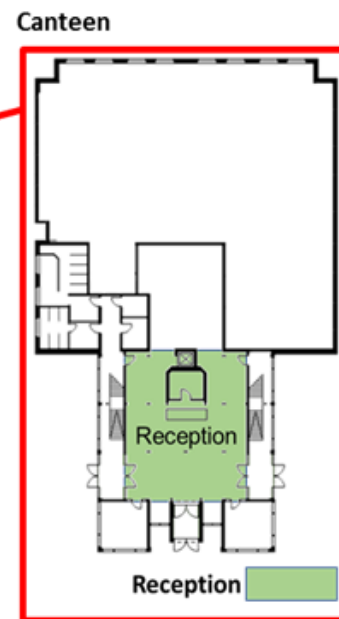
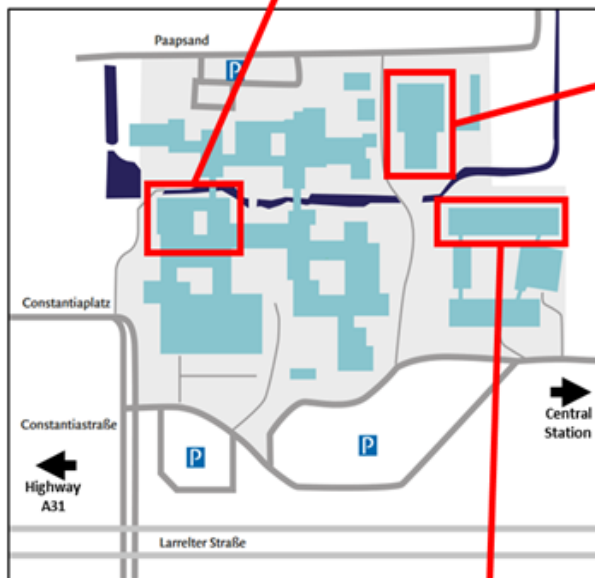
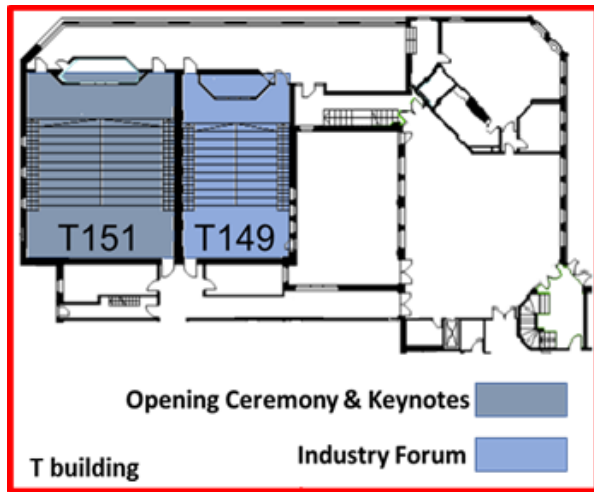
Tuesday

- Keynote: "Digital Transformation at Honeywell" (Roland Essmann, Honeywell) -- 09:00-09:45 in Forum T149
- Gala Dinner -- Reception and Welcome by the Mayor of Emden at the Johannes-a-Lasco-Bibliothek at 18:00; Begin of the Dinner at 19:00 at "Klub zum Guten Endzweck"

Wednesday

- Keynote: "Self-Organizing Systems - (R)Evolution in Logistics" (Sören Kerner, Fraunhofer-Institut für Materialfluss und Logistik) -- 09:00-09:45 in Forum T149
- Closing Ceremony -- 16:00-16:30 in Forum T149

Floor Plan



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Monday 24th of July

CE - Opening Ceremony

T151, Monday 24th of July, 09:00

CE - Keynote Speech - A Pathway to Industrial Digitalisation (Robert Harrison)

T151, Monday 24th of July, 09:30

Keynote Speaker: Robert Harrison

Abstract- This presentation provides a perspective on the provision of a pipeline to impact for industrial digitalisation at WMG, one of the UK's seven Manufacturing Catapult Centres, which serve as catalysts for the growth and success of UK advanced manufacturing. Industrial digitalisation is part of the UK Government's new Industrial Strategy. In this context the Automation Systems Group at WMG is researching cyber-physical systems methods, tools, and technologies and addressing their application to production systems, typically via user-driven applications engineering projects in the automotive and other sectors. An initiative of key importance has been the creation of digital manufacturing demonstrators at WMG in the form of a full-scale automation workbench and pilot facilities (e.g., for battery modules and electric machines) created and used collaboratively with industrial partners. The group is developing solutions and engineering strategies to support the entire lifecycle of production systems, from engineering to operation, maintenance, reconfiguration and reuse.

IF - Digital Energy Ecosystems

T149, Monday 24th of July, 11:00

Chair/s: Johannes Rolink

Industry Forum 1: Digital Energy Ecosystems

Title: Smart Data and Service Platform - Smart Data for the Energiewende

Dipl.-Phys. Jens Walter, EWE, Germany

Summary:

Being one major demonstrator project in the SINTEG program funded by the German Federal Ministry for Economic Affairs and Energy (BMWi), enera (www.energie-vernetzen.de) represents the realization of the next big step towards a sustainable world in a value-creation network consisting of new and "classic" players from the energy sector. New - even disruptive - business models and innovations will quickly roll out in this business environment. The result will be technical and digital interaction between smart grid, smart market, and smart data to produce an incubator for the German Energiewende.

This talk focuses on the Smart Data and Service Platform as a digital backbone and ecosystem for the new energy system.

Title: Data-driven business opportunities in digitalized energy eco-systems - An enera case study

Dr. Matthias Postina, EWE, Germany

Summary:

Being one major demonstrator project in the SINTEG program funded by the German Federal Ministry for Economic Affairs and Energy (BMWi), enera (www.energie-vernetzen.de) represents the realization of the next big step towards a sustainable world in a value-creation network consisting of new and “classic” players from the energy sector. New – even disruptive – business models and innovations will quickly roll out in this business environment. The result will be technical and digital interaction between smart grid, smart market, and smart data to produce an incubator for the German Energiewende.

This presentation dives into work-package 9 of the enera project where data-driven business opportunities in digitalized energy eco-systems are going to be elaborated.

Title: Efficient integration of renewables into electric distribution power grids using automatic grid controllers

Dr. -Ing. Matthias Rohr, BTC Business Technology Consulting, Germany

Summary:

The advent of renewable energy resources and the energy transition increasingly causes challenges to the operation of distribution power grids. However, so far most of these challenges were mainly addressed by physical grid construction (transformers, power lines) all over the world and distribution grids are less automated than most other technical systems.

However, this changes now, and automation, control technology, as well as communication infrastructures become available and are established to achieve a much higher utilization of power grid infrastructure. This reduces the amount of required physical conventional grid construction, which is not only very expensive but also time-consuming and unpopular for local residents.

The presentation summarizes recent results and high-level solution architectures for operating distribution grids using our approach for automatic and autonomous control from several field projects and the rollout in two large-scale projects.

It is also addressed how to embed the automatic grid control into the operation of the overall electric power system (e.g., electric power control center integration, grid-market-integration).

Title: Power Grid Optimization with the help of Machine Learning Algorithms

Gerald Ristow and Marc Dorchain, Software AG, Germany

Summary:

In the energy grid, traditionally the consumption and production values are collected every 15 minutes for adjusting the production which is sufficient for a centralized distribution and planning. With the promotion of the production of energy from renewable resources like wind and solar power, many smaller players, down to the individual households, start to participate and contribute to the grid which leads to new challenges regarding the grid stabilization and energy distribution. Currently, many utility companies are exploring the use of shorter measuring intervals, down to seconds or less, which leads to a vast amount of data which needs to be analyzed in real time or near real time in order to be of added value.

We will present and discuss an energy data platform which can handle such use cases. Especially, when data was collected for a while, one can use machine learning techniques to analyze and understand different scenarios and peculiarities. When these algorithms are exported in the standardized PMML format, they can be deployed in different platform architectures, including the one presented and discussed in this presentation.

TT01 - TT01: Internet of Things and Emerging Paradigms

S202, Monday 24th of July, 11:00

Chair/s: Jerker Delsing, Gerd von Colln

Empirical Propagation Performance Evaluation of LoRa for Indoor Environment

Mr. Salaheddin Hosseinzadeh, Prof. Hadi Larijani, Dr. Krystyna Curtis, Mr. Andrew Wixted, Mr. Amin Amini

Next-Generation Enterprise Architectures -- Common Vernacular and Evolution Towards Service-Orientation

Dr. Mohsen Moghaddam, Prof. C. Robert Kenley, Mrs. Julia Colby, Ms. Marissa Cadavid Berns, Mr. Randal Rausch, Mr. Joel Markham, Mr. Wesley Skeffington, Mr. John Garrity, Prof. Alok Chaturvedi, Prof. Abhi Deshmukh

Early Model-Driven Timing Validation of IoT-Compliant Use Cases

Dr. Padma Iyengar, Mr. Arne Noyer, Prof. Elke Pulvermueller

Protocol interoperability of OPC UA in Service Oriented Architectures

Mr. Hasan Derhamy, Mr. Jesper Rönholm, Prof. Jerker Delsing, Prof. Jens Eliasson, Prof. Jan van Deventer

Ontology-driven IoT code generation for FIWARE

Mr. Charles Steinmetz, Mrs. Greyce Schroeder, Prof. Carlos Eduardo Pereira, Mr. Alexandre dos Santos Roque, Mrs. Carolin Wagner, Mr. Philipp Saalman, Prof. Bernd Hellingrath

TT07 - TT07: Factory Automation and Communication, Mechatronics and Robotics

S217, Monday 24th of July, 11:00

Chair/s: N. N.

Simulative Evaluation of Applying Optimized Support Vector Machines to Identify the Simplified Ship Dynamic Model

Ms. Man Zhu, Prof. Axel Hahn, Prof. Yuan Q. Wen

Solar Powered High Performance Switched Reluctance Motor for EV applications

Mr. Jose Thankachan, Prof. S. P. Singh

Performance evaluation of the message queue protocols to transfer binary JSON in a distributed CNC system

Dr. Maxim Ya. Afanasev, Dr. Yuri V. Fedosov, Ms. Anastasiia A. Krylova, Mr. Sergey A. Shorokhov

Fast View-based Pose Estimation of Industrial Objects in Point Clouds using a Particle Filter with an ICP-based Motion Model

Mr. Bjarne Grossmann, Prof. Volker Krueger

Continuous hand-eye calibration using 3D points

Mr. Bjarne Grossmann, Prof. Volker Krueger

Ontology-Based Web Service Integration for Flexible Manufacturing Systems

Dr. Haibo Cheng, Dr. Lingling Xue, Dr. Peng Wang, Prof. Peng Zeng, Prof. Haibin Yu

SS09 - SS09: Lifecycle Engineering of Cyber Physical Manufacturing Systems

S206, Monday 24th of July, 11:00

Chair/s: Robert Harrison, Bilal Ahmad, Daniel Vera

Ensuring the consistency between assembly process planning and machine control software

Mr. Mussawar Ahmad, Mr. Borja Ramis Ferrer, Dr. Bilal Ahmad, Prof. José L. Martinez Lastra, Prof. Robert Harrison

Providing an Access Control layer to Web-Based Applications for the industrial domain

Mr. Samuel Olaiya Afolaranmi, Mr. Borja Ramis Ferrer, Mr. Wael M. Mohammed, Prof. Jose Luis Martinez Lastra, Mr. Mussawar Ahmad, Prof. Robert Harrison

Recovery Planning Method as End-of-Life Support for Production Systems

Ms. Nicole Schmidt, Prof. Arndt Lüder

Multifunctional Use of Functional Mock-up Units for Application in Production Engineering

Mr. Dominik Hauf, Mr. Sebastian Süß, Dr. Anton Strahilov, Prof. Jörg Franke

Experiences in Integrating Internet of Things and Cloud Services with the Robot Operating System

Mr. Stamatios Karnouskos, Ms. Nadine Gaertner, Dr. Nemrude Verzano, Mr. Frank Beck, Mr. Andre Becker, Mr. Santo Bianchino, Dr. Daniel Kuntze, Mr. Miguel Perez, Mr. Rupam Roy, Mr. Serge Saelens

TT05 - TT05: Industrial Digitalization, Big Data and Analytics

S207, Monday 24th of July, 11:00

Chair/s: Elmar Wings

Building Scalable Models for Anomaly Detection in Self-Organizing Industrial Systems

Mrs. Marie Kiermeier, Dr. Martin Werner, Mr. Horst Sauer, Dr. Jan Wieghardt

Towards Industrie 4.0 Compliant Configuration of Condition Monitoring Services

Mr. Florian Pethig, Prof. Oliver Niggemann, Dr. Armin Walter

Big Data as a Promoter of Industry 4.0: Lessons of the Semiconductor Industry

Mr. David Cemernek, Mr. Heimo Gursch, Dr. Roman Kern

Towards a Big Data Platform for Managing Machine Generated Data in the Cloud

Dr. Nicolas Ferry, Dr. German Terrazas, Mr. Per Kalweit, Dr. Arnor Solberg, Prof. Svetan Ratchev, Mr. Dirk Weinelt

Ontology-Based Integration of Performance Related Data and Models: An Application to Industrial Turbine Analytics

Mrs. Gulnar Mehdi, Prof. Thomas Runkler, Dr. Mikhail Roshchin, Dr. Sindhu Suresh, Mr. Nguyen Quang

Semi-supervised Soft Sensor and Feature Ranking Based on Co-Regularised Least Squares Regression Applied to a Polymerization Batch Process

Mr. Vasco Ferreira, Dr. Francisco Souza, Prof. Rui Araújo

SS08 - SS08: Big Data Analysis and Diagnosis For Industrial Applications

S209, Monday 24th of July, 11:00

Chair/s: Tommy W. C. Chow

AutoEncoder based High-dimensional Data Fault Detection System

Mr. Jicong Fan, Dr. Wei Wang, Dr. Haijun Zhang

An Exponential Triangle Model for the Facebook Network Based on Big Data

Mr. Dong Yang, Prof. Tommy W. S. Chow, Prof. Yichao Zhang, Prof. Guanrong Chen

Multi-Label Classification for images with Missing Labels

Ms. Jianghong Ma, Mr. Jicong Fan, Prof. Wei Wang

Hierarchical Context-Aware Anomaly Diagnosis in Large-Scale PV Systems Using SCADA Data

Mrs. Qi Liu, Ms. Yingying Zhao, Ms. Yawen Zhang, Mr. Dahai Kang, Prof. Qin Lv, Prof. Li Shang

Complexity Based Test Cases for Log File Analyzers

Mr. Esa Heikkinen, Prof. Timo D. Hämäläinen

Semi-supervised Classification for Rolling Fault Diagnosis via Robust Sparse and Low-rank Model

Prof. Mingbo Zhao

TU 1 - Balancing Small Samples and Big Data - An Introduction to Time Series Feature Extraction for Industrial Applications

S211, Monday 24th of July, 11:00

Lecturer/s: Andreas W. Kempa-Liehr

Promising fields of application for machine learning are the Internet of Things (IoT) and Industrie 4.0 environments. In these fields, machine learning models anticipate future device states by combining knowledge about device attributes with historic sensor time series. They permit the classification of devices into risk classes with respect to a specific defect.

This tutorial introduces a distributed and parallel time series feature extraction algorithm on basis of the recently published Python library tsfresh, which allows to balance small samples (e.g. predictive maintenance) with big data volumes from sensor time series and enterprise data on basis of scalable hypothesis tests.

The tutorial will explain the use cases both from the application and machine learning point of view as well as implications for the enterprise architecture, and will demonstrate the integration of the automated time series feature extraction into machine learning pipelines. Since its publication in October 2016, the respective Github project (<https://github.com/blue-yonder/tsfresh>) has been starred nearly 1,900 times and benefits from a growing international user group.

SS01 - SS01: Monitoring, Diagnosis, Prognosis and Tolerant Control Methods and Applications

S202, Monday 24th of July, 14:00

Chair/s: Zhiwei Gao

Monitoring Self-Organizing Industrial Systems Using Sub-Trajectory Dictionaries

Mrs. Marie Kiermeier, Mr. Horst Sauer, Dr. Jan Wieghardt

Robust Fault Tolerant Control for Drive Train in Wind Turbine Systems with Stochastic Perturbations

Ms. Xiaoxu Liu, Dr. Zhiwei Gao, Prof. Aihua Zhang, Prof. Yanling Li

An Automatic Fuzzy Clustering Segmentation Algorithm with Aid of Set Partitioning

Prof. Yanling Li, Dr. Zhiwei Gao, Ms. Xiaoxu Liu

Class-based Query-Optimization for Minimizing Worst-Case Execution Times of Diagnostic Queries in Embedded Real-Time Systems

Ms. Nadra Tabassam, Mr. Roman Obermaisser

Leakage Detection in a Gas Pipeline Using Artificial Neural Networks Based on Wireless Sensor Network and Internet of Things

Mr. Mohsen Rahmati, Mrs. Honeyeh Yazdizadeh, Dr. Alireza Yazdizadeh

Reinforcement-Learning Based Fault-Tolerant Control

Dr. Dapeng Zhang, Dr. Zhiling Lin, Dr. Zhiwei Gao

TT10 - TT10: Education in engineering and industrial informatics

S217, Monday 24th of July, 14:00

Chair/s: Elena Mäkiö-Marusik

Concept for Introducing the Vision of Industry 4.0 in a Simulation Game for Non-IT Students

Mr. Maximilian Zarte, Mrs. Agnes Pechmann

Summer School on Intelligent Agents in Automation: Experience and Reflections from the Second Edition

Prof. Luis Ribeiro, Prof. Paulo Leitao, Prof. Birgit Vogel-Heuser, Prof. Jose Barata

Methodology and Case Study for Investigating Curricula of Study Programs in Regard to Teaching Industry 4.0

Mr. Moritz Götting, Mr. Frederik Gosewehr, Mr. Marcel Müller, Mr. Jeffrey Wermann, Mr. Maximilian Zarte, Prof. Armando W. Colombo, Prof. Agnes Pechmann, Prof. Elmar Wings

Current Trends in Teaching Cyber Physical Systems Engineering

Mrs. Elena Mäkiö-Marusik

Discussion: No S Without Q

Mrs. Anita Messinger, Prof. Eva Kühn

Reconfigurable devices based experimentation supporting teaching introductory digital systems

Prof. Luis Gomes, Prof. Aniko Costa, Prof. Filipe Moutinho, Prof. Pedro Maló

SS02 - SS02: Intelligent Engineering of Intelligent Automation Systems

S206, Monday 24th of July, 14:00

Chair/s: Valeriy Vyatkin

A Framework for Designing Dynamic and Interoperable Automation and Robotics Systems

Prof. Zoran Salcic, Dr. Udayanto Dwi Atmojo, Dr. Hee Jong Park, Mr. Andrew Tzer-Yeu Chen, Dr. Kevin I-Kai Wang

A framework for runtime verification of industrial process control systems

Mr. Roope Savolainen, Dr. Seppo Sierla, Prof. Tommi Karhela, Mr. Tuomas Miettinen, Prof. Valeriy Vyatkin

Towards a Task Allocation Algorithm for Frequency Containment Reserves

Mr. Christian Giovanelli, Mr. Olli Kilkki, Dr. Seppo Sierla, Dr. Ilkka Seilonen, Prof. Valeriy Vyatkin

Modeling faults in communication protocols based on an aspect-oriented method

Prof. Alexandre dos Santos Roque, Ms. Charles Steinmetz, Dr. Edison Pignaton Freitas, Dr. Carlos Eduardo Pereira

Legacy Systems Interactions with the Supply Chain Through the C2NET Cloud-based Platform

Mr. Khurshid Ali Qureshi, Mr. Wael M. Mohammed, Mr. Borja Ramis Ferrer, Dr. Carlos Agostinho, Prof. Jose Luis Martinez Lastra

Development of a Mobile Application for the C2NET Supply Chain Cloud-based Platform

Mr. Enbo Chen, Mr. Wael M. Mohammed, Mr. Borja Ramis Ferrer, Prof. Jose Luis Martinez Lastra

SS04 - SS04: Evolution of Cyber Physical Production Systems and their Services

S207, Monday 24th of July, 14:00

Chair/s: Birgit Vogel-Heuser, Armando W. Colombo

Generalized Test Tables: A Powerful and Intuitive Specification Language for Reactive Systems

Mr. Alexander Weigl, Mrs. Franziska Wiebe, Mr. Mattias Ulbrich, Mr. Sebastian Ulewicz, Ms. Suhyun Cha, Mr. Michael Kirsten, Mr. Bernhard Beckert, Mrs. Birgit Vogel-Heuser

Deploying Microservices for a Cloud-based Design of System-of-Systems in Intralogistics

Mr. Andreas Habl, Mr. Orthodoxos Kipouridis, Prof. Johannes Fottner

Evolution of Cyber-Physical Production Systems supported by community-enabled experiences

Mr. Christopher Haubeck, Mr. Abhishek Chakraborty, Mr. Jan Ladiges, Dr. Alexander Pokahr, Prof. Winfried Lamersdorf, Prof. Alexander Fay

An AutomationML Model for Plug-and-Produce Assembly Systems

Mr. Paul Danny, Dr. Pedro Ferreira, Dr. Niels Lohse, Mr. Magno Guedes

Towards Trustworthy End-to-End Communication in Industry 4.0

Mr. Ani Bicaku, Ms. Silia Maksuti, Ms. Silke Palkovits-Rauter, Prof. Markus Tauber, Dr. Rainer Maticsek, Mr. Christoph Schmittner, Dr. Georgios Mantas, Mr. Mario Thron, Prof. Jerker Delsing

CPPS on Low Cost Devices for Batch Process under IEC-61499 and ISA-88

Mr. Marcelo V. Garcia, Mr. Carlos A. Garcia, Mr. Esteban X. Castellanos, Mr. Cesar Rosero, Mr. Carlos Sanchez, Dr. Federico Perez, Dr. Marga Marcos

SS08 - SS08: Big Data Analysis and Diagnosis For Industrial Applications

S209, Monday 24th of July, 14:00

Chair/s: Tommy W. C. Chow

Graph based Semi-supervised Classification via Capped $l_{2,1}$ -Norm Regularized Dictionary Learning

Prof. Mingbo Zhao

Holiday Effect on User Growth Profile and Analysis of Sales Rate in Short Time Scale

Dr. Choujun Zhan, Prof. Chi K. Tse

Detrended Fluctuation Analysis of Daily Rainfall Records of the Entire China

Dr. Choujun Zhan

Incorporating Word Embeddings in the Hierarchical Dirichlet Process for Query-Oriented Text Summarization

Mr. Hadrien Van Lierde, Prof. Tommy Chow

Sentiment Analysis of Foreign Tourists to Bangkok using Data Mining through Online Social Network

Mr. Taweesak Kuhamanee, Mr. Nattaphon Talmongkol, Mr. Krit Chaisuriyakul, Dr. Wimol San-Um, Dr. Noppadon Pongpisuttinun, Dr. Surapong Pongyupinpanich

A Reliable Weighted Feature Selection for Auto Medical Diagnosis

Mrs. Golnaz Sahebi, Mr. Amin Majd, Dr. Masoumeh Ebrahimi, Prof. Juha Plosila, Prof. Hannu Tenhunen

TU 2 - Automation ML and its usage in the Industrie 4.0 context

S211, Monday 24th of July, 14:00

Lecturer/s: Nicole Schmidt, Roland Rosendahl

AutomationML was initially developed as a data exchange format to enable a consistent and lossless data exchange in a heterogeneous software tool landscape within the engineering process of production systems. In the last years, the syntax, basic semantics, and advanced semantics were developed.

But recent developments go beyond the single use within the engineering phase. Essential for those was the cooperation of the AutomationML association with the OPC Foundation. The result was a standard that describes how AutomationML can get transferred via the OPC UA technology. This enables a usage of AutomationML even in the operation phase of production system. By this, the requirements - postulated in the Industrie 4.0 context - on digitalization and data consistency can be met.

SS01 - SS01: Monitoring, Diagnosis, Prognosis and Tolerant Control Methods and Applications

S202, Monday 24th of July, 16:30

Chair/s: Zhiwei Gao

Adaptive Quadratic Interpolation for Loss Minimization of Direct Torque Controlled Induction Motor Driven Electric Vehicle

Dr. Sukanta Das, Mr. Abhisek Pal, Mr. Murli Manohar

TT10 - TT10: Education in engineering and industrial informatics

S217, Monday 24th of July, 16:30

Chair/s: Elena Mäkiö-Marusik

An Approach to Renewable Energies Course for Energy Engineering Students in the Framework of the European Higher Education Area (EHEA)

Prof. Herminio Martinez-Garcia, Prof. Encarna Garcia-Vilchez

SS04 - SS04: Evolution of Cyber Physical Production Systems and their Services

S207, Monday 24th of July, 16:30

Chair/s: Birgit Vogel-Heuser, Armando W. Colombo

Towards Flexible and Secure End-to-End Communication in Industry 4.0

Ms. Silia Maksuti, Mr. Ani Bicaku, Prof. Markus Tauber, Ms. Silke Palkovits-Rauter, Ms. Sarah Haas, Prof. Jerker Delsing

SS08 - SS08: Big Data Analysis and Diagnosis For Industrial Applications

S209, Monday 24th of July, 16:30
Chair/s: Tommy W. C. Chow

Recommending e-Books by Multi-layer Clustering and Locality Reconstruction

Dr. Haijun Zhang, Ms. Shuang Wang, Dr. Eric Ke Wang, Dr. Yan Li, Dr. Yongjun Zhang, Prof. Dianhui Chu

Analysis and Machine-Learning based Detection of Outlier Measurements of Ultra-WideBand in an Obstructed Environment

Dr. Yiming Quan, Dr. Lawrence Lau, Dr. Alan Wen, Mr. Faming Jing, Dr. Qian Nie, Dr. Siu-Yeung Cho

Multi-class Novelty Detection in Diagnostic Trouble Codes from Repair Shops

Dr. Andreas Theissler

CE - Reception

Dining Hall, Monday 24th of July, 18:00

Tuesday 25th of July

CE - Keynote Speech - Digital Transformation at Honeywell (Roland Essmann)

T151, Tuesday 25th of July, 09:00
Keynote Speaker: Roland Essmann

Abstract- Products become more complex and are built in more variants in a shorter time-to-market schedule than ever before. Efficient production in this environment needs seamless vertical and horizontal integration leveraging latest IIoT technology. Learning from architectures beyond manufacturing industry is key to fulfil the next Industrial (R)-Evolution.

IF - Standards for Industry 4.0

T149, Tuesday 25th of July, 10:30
Chair/s: Armando Walter Colombo

Industry Forum 2: Standards for Industry 4.0

Title: Industrie 4.0 – From RAMI4.0 Model to Administration Shell: The Role of Standards for the Development of Industrie 4.0 Components
Dr. Martin Wollschläger, Technische Universität Dresden, Germany

Summary:

The current developments in Industry 4.0 are focusing on adopting existing specifications for use in Industry 4.0 Components.

Using an example from Manufacturing Execution Systems, the presentation shows the transition of available standards to information models and services for Industry 4.0. A method for the definition of partial models of administration shells of Industry 4.0 components is presented. Finally, the role of standardization in industry is discussed.

Title: Capabilities of AutomationML – status quo
Nicole Schmidt, Otto-von-Guericke-Universität Magdeburg, Germany

Summary:

AutomationML is a data exchange format that targets to enable a consistent and lossless data exchange in a heterogeneous software tool landscape within the engineering process of production systems.

To give the audience an overview of AutomationML and its capabilities, use cases will be presented and to what extent they are already implemented and used in industry. Additionally, an overview of future use cases is presented.

Title: OPC UA unleashed – the Open Integrated Factory Generation 2017
Rüdiger Fritz, SAP, Germany

Title: Importance of IT Standards in project execution business

Dr. Michael Gepp, Siemens, Germany

Summary:

The digitalization is rapidly transforming industrial businesses. While new business models are created, old ones are changed or even destroyed. In large industrial plant business as energy transmission or manufacturing. Project execution in these businesses is driven by hard market competition and the need to adapt to these, e.g. by utilizing benefits of digitalization and automation, while at the same time customers and system operators tend to stay conservative. This limits the implementation of digital concepts. One reason behind this conservative mindset can be found in the lack of proven standards and their acceptance. Currently we are at a turning point where two worlds collide: the traditional operator business where each technology has to be proven and preferably used for years already to be adapted (e.g. IEC 61131), and the digitalized businesses where standards need to be defined and adapted very quickly (e.g. 2g, 3g, 4g, 5g communication standards, OPC UA, ...) Currently this is tackled by open standards which in their openness are perceived by the "traditional business" as not yet mature enough.

The presentation will highlight these and other areas of conflict and will discuss the importance of suitable migration approaches to successfully manage this transformation.

TT02 - TT02: Cyber-Physical Systems and Industrial Agents

S202, Tuesday 25th of July, 10:30

Chair/s: Marga Marcos

A New Approach to Model-Based Test Case Generation for Industrial Automation Systems

Mr. Kevin Pinkal, Prof. Oliver Niggemann

Developing Open Source Cyber-Physical Systems for Service-Oriented Architectures Using OPC UA

Mr. Marcel Müller, Prof. Elmar Wings, Mr. Lars Bergmann

Optimally Scheduled Interventions in the Presence of Vulnerabilities for Modern Cyber-Physical Systems

Mr. Hunor Sandor, Dr. Piroska Haller, Dr. Bela Gnege, Dr. Zoltan Katai

A Railway Safety and Security Concept for low-power mixed-criticality systems

Dr. Ainara Bilbao, Mrs. Irune Yarza, Mr. Jose Luis Montero, Dr. Mikel Azkarate-askasua, Mrs. Nera Gonzalez

Design, Verification and Implementation of a Lightweight Remote Attestation Protocol for Process Control Systems

Prof. Bela Genge, Prof. Adrian-Vasile Duka, Prof. Piroska Haller, Prof. Bogdan Crainicu, Mr. Hunor Sandor, Mr. Flavius Graur

System reconfiguration of modular production units using a SOA-based control structure

Prof. Andreas Schwung, Mr. Alexander Elbel, Mrs. Dorothea Schwung

SS11 - SS11: Integrating Cloud Technologies, Context Sensitive Tools and Data Mining for Design of Product-Service

S217, Tuesday 25th of July, 10:30

Chair/s: Sebastian Scholze, José Barata

Multi-Layered Data Mining Architecture in the Context of Internet of Things

Prof. Oliviu Matei, Mrs. Carmen Anton, Mr. Sebastian Scholze, Mr. Claudio Cenedese

ProSEco as a Data Processing Platform A Service-Oriented Architecture for Data Analysis

Mr. Pedro Lima-Monteiro, Mr. Guilherme Brito, Mr. André Dionisio Rocha, Mr. Paulo Ilheu, Mr. Joao Freire, Prof. Jose Barata, Mr. Claudio Cenedese

Context Sensitive Collaborative Product Service System Development Environment

Mrs. Ana Correia, Dr. Dragan Stokic, Mr. Sebastian Scholze

An Approach for Context Sensitive Product Extensions Services

Mr. Sebastian Scholze, Mr. Kevin Nagorny, Dr. Karsten Stöbener, Mr. David Brückner

Orchestrating Loosely Coupled and Distributed Components for Product/Process Servitization

Mr. Guilherme Brito, Mr. Giovanni di Orio, Dr. José Barata

A real-world application scenario for a novel collaborative ICT engineering platform

Mr. Kevin Nagorny, Mr. Sebastian Scholze, Prof. Armando Walter Colombo

TT08 - TT08: Distributed and Networked Control Systems

S206, Tuesday 25th of July, 10:30

Chair/s: Gavin Kane

New Predictive PID Controllers for packet dropouts in Wireless Networked Control Systems

Ms. Mercedes Chacón Vásquez, Dr. Reza Katebi

A tiered security analysis of Industrial Control System Devices

Ms. Cyntia Vargas Martinez, Mr. Michael Langfinger, Prof. Birgit Vogel-Heuser

OPC UA Integration for Field Devices

Mr. Armin Veichtlbauer, Mr. Martin Ortmayer, Dr. Thomas Heistracher

Scheduler for Reliable Distributed Systems with Time-Triggered Networks

Mr. Ayman Murshed, Prof. Roman Obermaisser

Integration of Safety Aspects in Modelling of Networked Control Systems

Mr. Michael Sollfrank, Mrs. Mina Fahimi Pirehgalin, Prof. Birgit Vogel-Heuser

TT07 - TT07: Factory Automation and Communication, Mechatronics and Robotics

S207, Tuesday 25th of July, 10:30
Chair/s: N. N., N. N.

Development of the design and description of the control system of the hand rehabilitation device

Mr. Sergei V. Krivosheev, Mr. Roman V. Oleynik, Mr. Ivan I. Borisov, Mr. Stanislav S. Reznikov

Addressing security challenges in industrial augmented reality systems

Mr. Michael Langfinger, Mr. Michael Schneider, Prof. Didier Stricker, Prof. Hans D. Schotten

Real-Time Wireless Extensions of Industrial Ethernet Networks

Mr. Michele Luvisotto, Mrs. Alessia Tagliapietra, Mr. Stefano Romagnolo, Dr. Federico Tramarin, Prof. Stefano Vitturi

Robotic Conveyor Tracking with Dynamic Object Fetching for Industrial Automation

Prof. Ren C. Luo, Mr. Chun-Hao Liao

Generation of Monitoring Functions in Production Automation Using Test Specifications

Mrs. Suhyun Cha, Mr. Sebastian Ulewicz, Mr. Alexander Weigl, Mr. Mattias Ulbrich, Mr. Bernhard Beckert, Mrs. Birgit Vogel-Heuser

Modeling and verifying behavioral constraints for automation systems

Mr. Benjamin Brandenbourger, Mr. Milan Vathoopan, Dr. Alois Zoitl

TT11 - TT11: Tools for Industrial Informatics Application

S209, Tuesday 25th of July, 10:30
Chair/s: Bilal Ahmad, Valeriy Vyatkin

A MDE-based framework to improve the process management: The EMPOWER project

Dr. Julian Garcia

ArChes - Automatic Generation of Component Fault Trees from Continuous Function Charts

Dr. Marc Zeller, Dr. Kai Hoefig, Mr. Jean-Pascal Schwinn

Model-based Control Design for a District Heating Plant

Mr. Vitali Vansovits, Dr. Boris I. Godoy, Dr. Aleksei Tepljakov, Dr. Kristina Vassiljeva, Dr. Eduard Petlenkov

Benchmarking of existing OPC UA implementations for Industrie 4.0-compliant digitalization solutions

Mr. Hermann Haskamp, Mr. Michael Meyer, Ms. Romina Möllmann, Mr. Florian Orth, Prof. Armando Colombo

Current Status of Software Development in Industrial Practice: Key Results of a Large-Scale Questionnaire

Prof. Birgit Vogel-Heuser, Mr. Alexis Sardá-Espinosa

Scalable Cloud Based Semantic Code Analysis To Support Continuous Integration of Industrial PLC Code

Ms. Safa Bougouffa, Mr. Sebastian Diehm, Mr. Michael Schwarz, Mrs. Birgit Vogel-Heuser

TU 3 - Event-driven controllers for IoT Green Applications

S211, Tuesday 25th of July, 10:30
Lecturer/s: Ciufudean Calin Horatiu

Our tutorial proposes sustainable development of urban communities seen through the new technologies involved in office and home automation, urban traffic and services automation as application areas to exchange new research results and ideas to explore synergies and foster scientific advancement of the event-based paradigm.

This tutorial provides event-formalisms for modeling and diagnosing both urban and industrial environment threats for the assurance of sustainable development of human modern habitats. We will also provide an event-diagnosis method of these challenges. A valuable insight to evaluation of methods and applications necessary for implementing urban regeneration are also shown.

The urban regeneration, in particular of building, public utilities and energy infrastructures, e.g. ecological footprint, is one of the basic steps for the development of a Smart City, where architectural and energetic innovative models and best practices can be tested.

Our tutorial examines the critical topics and the strategies for monitoring, risk assessment, innovative materials, in the urban areas, also analyzing aspects of seismic protections and building diseases. We mention that all these topics are also relevant one of the most prominent ICT technologies that underpin our society, e.g. the Internet of Things (IoT) and its new branches for a sustainable development, as a whole we call it Green IoT, for example:

- The "Things-Oriented" as a branch of IoT is focused on Things connectivity technologies e.g., RFID (Radio-Frequency Identification), NFC (Near Field Communications), WSN (Wireless Sensor Networks), etc.
 - The "Internet-Oriented" is focused on the web-of-things layer for simplifying application development, IPv6 for internet connectivity and identification etc.
 - The "Semantics-Oriented" is focused on technologies for accessing and leveraging the semantics of IoT, other reasoning technologies etc.
- Modelling tools discussed and exemplified in our tutorial will deal with the following (and not only) frameworks:

1. Artificial Social Systems (ASoS)
2. Grid Petri Nets (GPNs)
3. Basic Equivalent Transfer Functions for GPNs
4. Perturbation Parameters Modelled with GPNs
5. Application to a Queuing Grid Network: practical example
6. Application to a IoT controlled Flexible Manufacturing System
7. Modelling Control and Hazards in Industrial Applications driven by IoT.

RF - Technical Tour - Volkswagen Emden

Technical Tours, Tuesday 25th of July, 12:20

TT04 - TT04: Cognitive and Computational Intelligence

S202, Tuesday 25th of July, 13:30

Chair/s: Sebastian Scholze , Doriana D'Addona

Segmentation of the Left Ventricle by Slope Difference Distribution Based on Threshold Selection

Ms. Jingjing Xiong, Mr. Yongming Yang, Prof. Zhenzhou Wang

Self-optimization of energy consumption in complex bulk good processes using reinforcement learning

Mrs. Dorothea Schwung, Mr. Tim Kempe, Prof. Andreas Schwung, Prof. Steven Ding

An Application of Reinforcement Learning Algorithms to Industrial Multi-Robot Stations for cooperative handling operation

Mrs. Dorothea Schwung, Mr. Fabian Csaplar, Prof. Andreas Schwung, Prof. Steven Ding

Evaluation of State of the Art Segmentation Methods for Muscle Cells

Ms. Haixing Li, Mr. Yongming Yang, Mr. Zhenzhou Wang

Hybrid Spiking Neural Model for Clustering Smart Environment Activities

Dr. Hesham Amin, Dr. Wael Deabes, Dr. Kheireddine Bouazza

Online Evolving Fuzzy Control Design: An Application to a CSTR Plant

Dr. Jerome Mendes, Dr. Francisco Souza, Dr. Rui Araujo

TT03 - TT03: Cloud and Wireless Systems for Industrial Applications

S217, Tuesday 25th of July, 13:30

Chair/s: Sean Pritchard

Wireless Interference Identification with Convolutional Neural Networks

Mr. Malte Schmidt, Mr. Dimitri Block, Prof. Uwe Meier

Solutions for Inter-connectivity and Security in a Smart Hospital Building

Mr. Andreas Plageras, Mr. Christos Stergiou, Prof. Kostas Psannis, Prof. Byung-Gyu Kim, Dr. Brij Gupta, Prof. Yutaka Ishibashi

Security in Software-Defined Wireless Sensor Networks: Threats, Challenges and Potential Solutions

Mr. Sean W. Pritchard, Prof. Gerhard P. Hancke, Dr. Adnan M. Abu-Mahfouz

Nash equilibrium for Proactive Anti-jamming in IEEE 802.15.4e (Emerging wireless sensor actuator technologies for I4.0)

Mr. Aydin Hoday, Prof. Mario de Sousa, Prof. Luis Almeida

FamilyPal: An Effective System for Detecting Family Activities Based on Smartphones

Dr. Fei Gu, Prof. Jianwei Niu, Dr. Zhenxue He, Mr. Xin Jin

A Decrease-and-Conquer Genetic Algorithm for Energy Efficient Virtual Machine Placement in Data Centers

Mrs. Chanipa Sonklin, Dr. Maolin Tang, Prof. Yu-Chu Tian

SS02 - SS02: Intelligent Engineering of Intelligent Automation Systems

S206, Tuesday 25th of July, 13:30

Chair/s: Valeriy Vyatkin, Matthias Schoof

On Requirements-driven Design of Distributed Smart Grid Automation Control

Mr. Chen-Wei Yang, Prof. Valeriy Vyatkin

A novel approach for Flexible Automation Production Systems

Dr. Elisabet Estévez, Dr. Federico Pérez, Dr. Dario Orive, Prof. Marga Marcos

Automatic Generation of Function Block Systems Implementing HMI for Energy Distribution Automation

Mr. Artem Voinov, Mr. Chen-Wei Yang, Prof. Valeriy Vyatkin

Service-Oriented Data Acquisition and Management for Industrial Cyber-Physical Systems

Prof. Wenbin Dai, Mr. Zhijie Zhang, Mr. Peng Wang, Prof. Valeriy Vyatkin, Dr. James Christensen

Towards Electric Vehicles Integration to Distributed Energy Resources of Prosumer

Mr. Evgeny Nefedov, Dr. Seppo Sierla, Prof. Valeriy Vyatkin

CSP-based inference of function block finite-state models from execution traces

Dr. Daniil Chivilikhin, Dr. Vladimir Ulyantsev, Prof. Anatoly Shalyto, Prof. Valeriy Vyatkin

SS10 - SS10: Innovative Approaches for Re-Configurability of Industrial Production Systems

S207, Tuesday 25th of July, 13:30

Chair/s: Jeffrey Wermann, Michael Gepp, Jose Barbosa

A standard approach to production systems modelling based on Finite State Automata

Mr. Giacomo Tavola, Prof. Marco Taisch, Mr. Filippo Boschi

Introducing agent-based simulation of manufacturing systems to industrial discrete-event simulation tools

Mr. Lennart Büth, Mr. Nik Broderius, Prof. Christoph Herrmann, Dr. Sebastian Thiede

Validation of PERFoRM reference architecture demonstrating an automatic robot reconfiguration application

Ms. Nandini Chakravorti, Ms. Evangelia Dimanidou, Mr. Giacomo Angione, Mr. Jeffrey Wermann, Mr. Frederik Gosewehr

A harmonized approach for constructing a robust and efficient technology backbone for agile manufacturing systems

Mrs. Olga Meyer, Ms. Ambra Calà, Mr. Greg Rauhoeft, Mr. Christian Henkel

Integrating Material Flow Simulation Tools in a Service-oriented Industrial Context

Dr. Jan Fischer, Mrs. Birgit Obst, Dr. Benjamin Lee

Model-based Engineering of CPPS in the process industries

Mr. Henry Bloch, Mr. Stephan Hensel, Mr. Mario Hoernicke, Mrs. Anna Hahn, Prof. Alexander Fay, Prof. Leon Urbas, Mr. Sachari Wassilew, Mr. Knohl Torsten, Dr. Jens Bernshausen, Mr. Axel Haller

TT11 - TT11: Tools for Industrial Informatics Application

S209, Tuesday 25th of July, 13:30
Chair/s: Bilal Ahmad, Valeriy Vyatkin

Universal Parser for Wireless Sensor Networks in Industrial Cyber Physical Production Systems

Mr. Ricardo Silva, Mr. João Reis, Mr. Luís Neto, Dr. Gil Gonçalves

Development of an ontology-based competence management system

Mr. Markus Brandmeier, Mr. Christian Neubert, Mr. Matthias Brossog, Prof. Jörg Franke

A roundtrip engineering approach for data consistency in process industry environments

Mr. Julian Rahm, Mr. Markus Graube, Prof. Leon Urbas

SOC Estimation for a Lithium-Ion Battery by Designing a Nonlinear Observer Based on an Equivalent Circuit Model

Mr. Mehdi Gholizadeh, Dr. Alireza Yazdizadeh, Mr. Mohsen Rahmati, Dr. Abbas Aliabadi

An Appraisal of Human Happiness Level based on Air Quality through Fuzzy Logic Inference System

Mr. Nattaphon Talmongkol, Dr. Noppadon Pongpisuttinun, Dr. Wimol San-Um, Dr. Surapong Pongyupinpanich

Algorithm and Tool for LD to SFC Conversion With State-space Method

Mr. Vitor Lopes, Prof. Mário Sousa

TU 4 - Connected Vehicles

S211, Tuesday 25th of July, 13:30
Lecturer/s: Juan Pimentel

Traditionally, the perception system of autonomous vehicles is composed of an array of sensors that include vision cameras, radar, lidar, and ultrasonic. Although not a sensor per se, wireless communications can significantly enhance the perception system of autonomous vehicles thus leading to the concept of "connected vehicles" as an enhancement of traditional autonomous vehicles perception system. In this tutorial, participants will be given a detailed overview and in depth discussions on the state of the art of wireless technologies and standards that support the

concept of connected vehicles together with a survey of research and development projects including a discussion of commercial offerings.

Learning Objectives

1. Requirements to support autonomous vehicles
2. Main technologies and standards
3. Survey of research and development projects
4. Survey of commercial offerings

TT04 - TT04: Cognitive and Computational Intelligence

S202, Tuesday 25th of July, 16:00

Chair/s: Sebastian Scholze, Doriana D'Addona

Adaboost-based algorithm for human action recognition

Mr. Nabil Zerrouki, Dr. Fouzi Harrou, Prof. Ying Sun, Prof. Amrane Houacine

Lego-like reconfigurable machining system

Dr. Doriana M. D'Addona, Prof. Alessandro A.G. Bruzzone

TT03 - TT03: Cloud and Wireless Systems for Industrial Applications

S217, Tuesday 25th of July, 16:00

Chair/s: Sean Pritchard

Energy Optimization of an Experimental Wireless Sensor Network for Remote Areas, Part I: Intra-Cluster Communications

Dr. Juan Pimentel, Mr. Oscar Baltuano, Mr. Renzo Chan, Mr. Jean-Pierre Tincopa

An ultrasonic-based localization system for underground mines

Mr. Johannes Jordaan, Mr. Carel Kruger, Mr. Bruno Silva, Dr. Gerhard Hancke

A Time-synchronized ZigBee Building Network for Smart Water Management

Mr. Chung Kit Wu, Mr. Hongxu Zhu, Prof. Loi Lei Lai, Ms. Anna S. F. Chang, Dr. Fengjun Li, Dr. Kim Fung Tsang, Prof. Roy Kalawsky

SS02 - SS02: Intelligent Engineering of Intelligent Automation Systems

S206, Tuesday 25th of July, 16:00

Chair/s: Valeriy Vyatkin, Matthias Schoof

Plant trace generation for formal plant model inference: methods and case study

Mr. Dmitry Avdyukhin, Dr. Daniil Chivilikhin, Dr. Georgiy Korneev, Dr. Vladimir Ulyantsev, Prof. Anatoly Shalyto

Automatic Generation of Function Block Applications Using Evolutionary Algorithms: Initial Explorations

Mr. Vladimir Mironovich, Dr. Maxim Buzdalov, Prof. Valeriy Vyatkin

Safe Dynamic Reconfiguration Through Supervisory Control in IEC 61499 Compliant Systems

Mr. Leando Israel Pinto, Prof. Andre B. Leal, Prof. Roberto Ubertino Rosso

SS10 - SS10: Innovative Approaches for Re-Configurability of Industrial Production Systems

S207, Tuesday 25th of July, 16:00

Chair/s: Jeffrey Wermann, Michael Gepp, José Barbosa

Specification and Design of an Industrial Manufacturing Middleware

Mr. Frederik Gosewehr, Mr. Jeffrey Wermann, Mr. Waldemar Borsych, Dr. Armando Walter Colombo

Agent-based Reconfiguration in a Micro-flow Production Cell

Mr. José Dias, Dr. Johan Vallhagen, Dr. José Barbosa, Prof. Paulo Leitão

Dynamic Monitoring of Key-Performance Indicators in Industrial Environments

Mr. Arnaldo Pereira, Mr. Pierluigi Petrali, Mr. Arnaldo Pagani, Dr. José Barbosa, Prof. Paulo Leitão

Migration from Traditional towards Cyber-Physical Production Systems

Ms. Ambra Calà, Prof. Arndt Lüder, Ms. Ana Cachada, Ms. Flávia Pires, Dr. José Barbosa, Prof. Paulo Leitão, Dr. Michael Gepp

TT11 - TT11: Tools for Industrial Informatics Application

S209, Tuesday 25th of July, 16:00

Chair/s: Bilal Ahmad, Valeriy Vyatkin

Automatic Person Information Extraction Using Overlay Text in Television News Interview Videos

Mr. Sanghee Lee, Prof. Kanghyun Jo

Energy Efficiency in Industry 4.0 using SDN

Ms. Theo Lins, Dr. Ricardo Augusto Rabelo Oliveira

Wednesday 26th of July

CE - Keynote Speech - Self-Organizing Systems - (R)Evolution in Logistics (Sören Kerner)

T151, Wednesday 26th of July, 09:00
Keynote Speaker: Sören Kerner

Abstract- Currently logistics automations undergoes a paradigm shift in many fields of application, which result a variety of novel application of industrial informatics in logistics automation. Market dynamics demand higher flexibility, which is answered by a rising autonomy of components and systems. New kinds of communication technologies lead to the real world application of the internet of things. Advantages in Data Science lead to a whole new area of optimization possibilities and advances in Cognition lead to a paradigm shift in Human Machine Interaction. The keynote resolves pieces of the puzzle and draws a vision of self-organizing systems for future application.

IF - Digital manufacturing in the automotive sector

T149, Wednesday 26th of July, 10:30
Chair/s: Stephan Kotzur, Dirk Schleuter

Industry Forum 3: Digital manufacturing in the automotive sector
Title: The increasing digitalisation and automation in the car industry, using the example of Volkswagen Emden
Andree Clüver, Volkswagen Emden, Germany

Title: Creation of a Pilot Production System for Battery Manufacture
Robert Harrison, Warwick Manufacturing Group, UK

Summary:

The AMPLiFiI (Automated Module-to-Pack Pilot Line for Industrial Innovation) project brings together OEMs, supply chain partners and technology providers. The project aims to create a UK supply chain for fully qualified battery packs to suit hybrid and electric vehicles across a range of automotive markets. A modular battery architecture has been designed, based on cylindrical cell formats, developed for both high-power and high-energy requirements. A battery pack manufacturing pilot line, which has been designed and developed to embody digital manufacturing good practice throughout its lifecycle, has been constructed at WMG as part of the project and allows manufacturing processes for high-quality pre-production prototypes, which blend appropriate levels of manual and automated assembly methods. The pilot line supports the manufacture of high-quality pre-production battery modules and packs, based on cylindrical cell formats. Key objectives are ensuring in-line quality verification and a no-faults-forward policy within a flexible, integrated, automation system. Key aspects of the pilot line include a blend of manual and automated stations, the incorporation of best practice into manufacturing processes, and an integrated approach to digital product and process development.

Title: The Smart Factory and Logistics in the Context of Build-To-Schedule Seat Manufacture
Andrew Williams, Lear Corporation

Summary:

In a Build-To-Schedule Automotive tier 1 supplier of seating, the component logistics can be more complex than the OEM, the assembly is mostly manual and the time to build and deliver is a few hours.

What would be the gain from implementing an Industry 4.0 Smart factory into such an environment and how would you do it?

Its more than buying I4.0 ready automation from your vendor and more than just buying a software package.

This presentation will discuss the complex environment, the barriers & silos and an approach to get the most out of your manufacturing data.

Title: Digital business models in rural areas: Challenges and opportunities for East Frisian logistics companies in the digitalization process

Torsten Slink, Industrie- und Handelskammer für Ostfriesland und Papenburg, Germany

SS05 - SS05: Cyber-Physical Systems: Innovative Use Cases and Business Models

S202, Wednesday 26th of July, 10:30

Chair/s: Juho Mäkiö, Jolanta Kowal, Elena Mäkiö-Marusik

Cyber physical systems by humanistic management. Introduction

Prof. Rafal Maciag

Testbed Architecture for Maritime Cyber Physical Systems

Mr. Marius Brinkmann, Prof. Axel Hahn

Business Competencies and Innovation Capability in Cross-border Small Regional Enterprises

Dr. Jolanta Kowal, Prof. Juho Mäkiö, Dr. Anna Jasińska-Biliczak

Automation, per se, is not Job Elimination: How Artificial Intelligence Forwards Cooperative Human-Machine Coexistence

Dr. Oussama H. Hamid, Dr. Norris Lee Smith, Dr. Amin Barzanji

Guidelines for Using MARTE Profile Packages Considering Concerns of Real-Time Embedded Systems

Mrs. Fabíola G. C. Ribeiro, Dr. Achim Rettberg, Dr. Carlos E. Pereira, Dr. Sílvia S. da C. Botelho, Dr. Michel Soares

TT09 - TT09: Technologies and Infrastructures for Smart Grids, Buildings, and Cities

S217, Wednesday 26th of July, 10:30

Chair/s: Herminio Martinez-Garcia, Mathias Uslar

Development of a Microgrid Controller for Black Start Procedure and Islanding Operation

Ms. Maria Nuschke

New Control Functions for IEC 61850

Mrs. Julia Masurkewitz-Möller, Dr. Thomas Kumm, Dr. Mathias Uslar, Mr. Wolfgang Friedrich

ECoS: Energy Control System for Smart Homes

Mrs. Latha Karthigaa Murugesan, Dr. Rashina Hoda, Prof. Zoran Salcic

Low Carbon Technologies Integration in Smart Low Voltage Network

Mr. Rilwan O. Oliyide, Mr. Charalampos Marmaras, Mr. Emmanuel T. Fasina, Dr. Liana M. Cipcigan

Localised Energy Systems in Nigeria Power Network

Mr. Emmanuel T. Fasina, Mr. Rilwan O. Oliyide, Dr. Liana M. Cipcigan

Semantic-aware Anomaly Detection in Real Time Parking Data

Mr. Arnamoy Bhattacharyya, Mr. Weihang Wang, Ms. Christine Tsang, Dr. Cristiana Amza

SS06 - SS06: Advanced Methodology and Applications of Industrial Software

S206, Wednesday 26th of July, 10:30

Chair/s: Takaaki Goto

Ontology Driven Query Language for NoSQL Databases

Ms. Shreya Banerjee, Dr. Takaaki Goto, Prof. Narayan C Debnath, Dr. Anirban Sarkar

Water Quality Prediction: Multi Objective Genetic Algorithm coupled Artificial Neural Network based approach

Mr. Sankhadeep Chatterjee, Mr. Sarbartha Sarkar, Dr. Nilanjan Dey, Dr. Soumya Sen, Prof. Takaaki Goto, Prof. Narayan C Debnath

Efficient Data Lookup in Non-DHT Based Low Diameter Structured P2P Network

Prof. Bidyut Gupta, Mr. Nick Rahimi, Prof. Shahram Rahimi, Mr. Ashraf Alyanbaawi

A Modified Version of DVR-Based Multicasting with Security

Prof. Bidyut Gupta, Dr. Sindooru Koneru, Mr. Ashraf Alyanbaawi, Mr. Nick Rahimi, Prof. Ziping Liu

Real Time System for Measuring the Pantograph Vertically Movement

Prof. Caius Panoiu, Prof. Raluca Rob, Prof. Stela Rusu-Anghel

An Efficient Approach for Load-Shared and Fault-Tolerant Multicore Shared Tree Multicasting

Mr. A. Alyanbaawi, Prof. B. Gupta, Prof. S. Rahimi, Mr. N. Rahimi, Dr. K. Sinha

SS12 - SS12: Information and Communication Technologies for Smart Water Management System

S207, Wednesday 26th of July, 10:30
Chair/s: Sean Pritchard, Jianwei Niu

Analysis of River Bed Variation Based on Hydrological and Hydraulic Models

Mr. Muhammad Azam, Dr. Seung Jin Maeng, Mr. Ju Ha Hwang

An Interface for Coupling Optimization Algorithms With EPANET in Discrete Event Simulation Platforms

Dr. Lawrence Letting, Prof. Yskandar Hamam, Dr. Adnan Abu-Mahfouz

A Spreadsheet Tool for the Analysis of Flows in Small-scale Water Piping Networks

Mr. Kazeem B. Adedeji, Prof. Yskandar Hamam, Dr. Bolanle T. Abe, Dr. Adnan M. Abu-Mahfouz

State estimation in water distribution network: A review

Mr. Kgaogelo Tshela, Prof. Yskandar Hamam, Dr. Adnan Abu-Mahfouz

Achieving Interoperability Using Low-Cost Middleware OPC UA Wrapping Structure. Case Study in the Water Industry

Dr. Adrian Korodi, Prof. Ioan Silea

An Autopilot System Based on ROS Distributed Architecture and Deep Learning

Mr. Meng Liu, Prof. Jianwei Niu, Ms. Xin Wang

SS03 - SS03: Smart Data and Data Analytics for Automation and Manufacturing Systems

S209, Wednesday 26th of July, 10:30
Chair/s: Benjamin Klöpper, Paulo Leitao, Birgit Vogel-Heuser

Energy Efficiency Enhanced Shop Floor Scheduling - Data Model and Flexible Optimization Heuristics

Prof. Heiko Thimm, Mr. Can Kaymakci, Mr. Reinhard Andre, Mr. Milan Tanik

Detection of Regime Switching Points in Non-Stationary Sequences using Stochastic Learning based Weak Estimation Method

Mr. Ezdin Aslancı, Mr. Kutalmış Coşkun, Dr. Peter Schüller, Dr. Borahan Tümer

Unsupervised Mode Detection in Cyber-Physical Systems using Variable Order Markov Models

Mr. Barış Gün Sürmeli, Mrs. Feyza Eksen, Mr. Bilal Dinç, Prof. Peter Schüller, Prof. Borahan Tümer

Framework for Mining Event Correlations and Time Lags in Large Event Sequences

Mr. Marc-Andre Zöller, Prof. Marcus Baum, Dr. Marco Huber

Online Data-Driven Battery Voltage Prediction

Dr. Milutin Pajovic, Dr. Zafer Sahinoglu, Dr. Yebin Wang, Dr. Philip Orlik, Dr. Toshihiro Wada

Defining and Validating Similarity Measures for Industrial Alarm Flood Analysis

Ms. Marta Fullen, Dr. Peter Schüller, Prof. Oliver Niggemann

RF - Technical Tour - Meyer shipyard, Papenburg

Technical Tours, Wednesday 26th of July, 12:00

IF - Digitalization of Logistics

T149, Wednesday 26th of July, 13:30
Chair/s: Stephan Kotzur, Dirk Schleuter

Industry Forum 3: Digitalization of Logistics

Title: "Be smart" - Logistics and Mobility on the way to a new era
Ernst Kreppenhofer, Sentiero Logistiq, Germany

Summary:

What is this so called "digital transformation" that takes the decisive influence on our society and thereby - changing the life, business and working world?

The answer to this question has two contents - a technical and a social content.

"Things" - whatever their nature - should be designed or used in such a way that they can carry out certain actions themselves or independently.

Information, communication and data transfer is to be carried out autonomously from "thing" to "thing". The "control ring" for these transactions - is the Internet of Things (IoT). And how Logistics, Mobility and the new Supply Chain are involved?

Is the “digital transformation” and - wants it to be - the driver for a new form of logistics and mobility? The presentation is giving in a short version an overview with possible perspectives and necessary changes or additions.

Title: Automated solutions for the last mile – perspectives and challenges
Uwe Meinberg, Brandenburgische Technische Universität, Germany

Summary:

At present several companies like Amazon, UPS, DHL, Hermes, Daimler Benz and others having pilot projects to cover the expensive last mile based on automated solutions. The presentation, giving an overview, focusses on propagated perspectives and points out, where the proof of conception is still missing.

Title: Smart glasses in industrial applications
Hannes Baumann, Ubimax, Germany

Summary:

Since Google announced their Glass project, we have seen increasing interest in the use of smart glasses in industrial applications. The advantages are obvious: workers keep their hands free for physical work while also having all relevant information visible at a short glimpse of their smart glass display. Smart glasses offer huge potential – Ubimax has shown, with companies like DHL, Samsung, and Intel, that efficiency increases of 25% or more are possible.

The presentation will give a short Wearable Computing introduction, show possible applications for the use of smart glasses and will present some outcomes from pilots that used smart glasses in productive industrial environments.

Title: A long road ahead, on the way to intralogistics 4.0
Ulf Gerdes, M & K ProCon, Germany

TT02 - TT02: Cyber-Physical Systems and Industrial Agents

S202, Wednesday 26th of July, 13:30
Chair/s: Marga Marcos

The Relational Model: in Search for Lean and Mean CPS technology

Dr. Andrea Bonci, Dr. Massimiliano Pirani, Prof. Aldo Franco Dragoni, Prof. Alessandro Cucchiarelli, Prof. Sauro Longhi

Cloud architecture for industrial image processing

Mr. Dirk Jacobsen, Prof. Peter Ott

Method of automated design of operating the workpieces in a CAD system environment.

Prof. Dmitry Kulikov, Prof. Eugeny Yablochnikov, Mr. Artem Vostropiyatov, Mr. Aleksandr Arnst

Modelling and Certification for Electric Mobility

Mr. Alexander Graf-Brill, Dr. Arnd Hartmanns, Prof. Holger Hermanns, Mr. Steffen Rose

Classification of Agent-based Approaches to Apply Cyber Physical Systems in Manufacturing

Mr. Luis Alberto Cruz Salazar, Prof. Birgit Vogel-Heuser

Interoperability rules for heterogenous Multi-Agent Systems Levels of conceptual interoperability model applied for multi-agent systems

Mr. Erik Wassermann, Prof. Alexander Fay

Metric based modelling of flexibility properties of demonstration plants

Prof. Arndt Lüder, Prof. Birgit Vogel-Heuser, Ms. Nicole Schmidt, Ms. Julia Prieler

TT09 - TT09: Technologies and Infrastructures for Smart Grids, Buildings, and Cities

S217, Wednesday 26th of July, 13:30

Chair/s: Herminio Martinez-Garcia, Mathias Uslar

Novel Infrastructure with Common API using Docker for Scaling the Degree of Platforms for Smart Community Services

Mr. Tatsuki Miura, Dr. Janaka Wijekoon, Dr. Shanaka Prageeth, Prof. Hiroaki Nishi

Simulation: A Case for Interoperability based on LCIM

Dr. Mathias Uslar, Ms. Judith Schulte, Dr. Davood Babazadeh, Mr. Florian Schlögl, Mr. Carsten Krüger, Ms. Maike Rosinger

Placing Reflectors for Reducing Payback Period of Solar PV for Smart Buildings

Mr. Dehan Vithana, Mr. Prathap Wijesuriya, Mr. Saman Wickramathilaka, Mr. Lovindu Wijesinghe, Prof. HY Ranjit Perera

The Use of Output-Capacitorless Class-AB CMOS Low-Dropout Regulator for Power Management

Prof. Herminio Martinez-Garcia

Efficient LDO-Assisted DC/DC Buck Converter for Power Management Integrated Systems

Prof. Herminio Martinez-Garcia

Computerized Control Strategy to Prevent Wastewater Plants Pollution

Dr. Yolanda Bolea, Prof. Antoni Grau, Dr. Herminio Martinez

TT07 - TT07: Factory Automation and Communication, Mechatronics and Robotics

S206, Wednesday 26th of July, 13:30
Chair/s: Gavin Kane

Automated Seam Tracking System based on Passive Monocular Vision for Automated Linear Robotic Welding Process

Mr. Átila A. Weis, Mr. Jusoan L. Mór, Mrs. Luciane B. Soares, Mr. Cristiano R. Steffens, Dr. Paulo L. J. Drews-Jr, Mr. Matheus F. de Faria, Mr. Paulo J. D. de O. Evald, Dr. Rodrigo Z. Azzolin, Dr. Nelson D. Filho, Dr. Sílvia S. da C. Botelho

Cooperative Localization of Unmanned Aerial Vehicles in ROS - The Atlas Node

Mr. Paul Kremer, Mr. Jan Dentler, Dr. Somasundar Kannan, Prof. Holger Voos

Simulative assessments of the IEEE 802.15.4 CSMA/CA with Priority Channel Access in Structural Health Monitoring scenarios

Mr. Luca Leonardi, Dr. Gaetano Patti, Dr. Filippo Battaglia, Prof. Lucia Lo Bello

TT06 - TT06: Human, Computer and Machine Interface

S207, Wednesday 26th of July, 13:30
Chair/s: Juho Mäkiö

A Virtual Training System for Aging Employees in Machine Operation

Mr. Frieder Loch, Prof. Birgit Vogel-Heuser

Improvement of Maintenance through Speech Interaction in Cyber-Physical Production Systems

Mr. Joachim Fischer, Dr. Dorothea Pantfoerder, Prof. Birgit Vogel-Heuser

An Improved Method for 3D Shape Estimation Using Cascade of Neural Networks

Mr. Van-Thanh Hoang, Dr. Van-Dung Hoang, Prof. Kang-Hyun Jo

SS03 - Smart Data and Data Analytics for Automation and Manufacturing Systems

S209, Wednesday 26th of July, 13:30
Chair/s: Benjamin Klöpper, Paulo Leitao, Birgit Vogel-Heuser

Towards a Methodology for Assisted Knowledge Discovery in Manufacturing

Mr. Steffen Huber, Mr. Gordon Lemme, Dr. Michael Schwarzenberger, Dr. Hajo Wiemer, Prof. Steffen Ihlenfeldt

Explanation-Aware Feature Selection using Symbolic Time Series Abstraction: Approaches and Experiences in a Petro-Chemical Production Context

Dr. Martin Atzmueller, Mr. Naveed Hayat, Mr. Andreas Schmidt, Dr. Kloepper Benjamin

Grid-Based Outlier Detection in Large Data Sets for Combine Harvesters

Ms. Ying Gu, Mr. Ram Kumar Ganesan, Mr. Benjamin Bischke, Dr. Ansgar Bernardi, Dr. Alexander Maier, Mr. Heinrich Warkentin, Mr. Thilo Steckel, Prof. Andreas Dengel

Data-driven Model Development for Quality Prediction in Forming Technology

Ms. Iris Kirchen, Prof. Birgit Vogel-Heuser, Mr. Philipp Hildenbrand, Mr. Robert Schulte, Mr. Manfred Vogel, Mr. Michael Lechner, Prof. Marion Merklein

Metrics for the Evaluation of Data Quality of Signal Data in Industrial Processes

Ms. Iris Kirchen, Mr. Daniel Schütz, Mr. Jens Folmer, Prof. Birgit Vogel-Heuser

SS07 - SS07: Industry 4.0: Keeping Humans in the Loop and in Control

S207, Wednesday 26th of July, 14:40

Chair/s: Juho Mäkiö

Design of the High-Payload Grasping Device for Assistive Manipulation

Mr. Ivan I. Borisov, Mr. Oleg I. Borisov, Mr. Sergey A. Kolyubin

Co-Simulation Techniques in Assistance Systems for Process Control

Mr. Florian Schloegl, Dr. Lars Fischer, Prof. Sebastian Lehnhoff, Mr. Roland Rosen, Mr. Jan C. Wehrstedt

CE - Closing Ceremony

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