HPI Symposium at SAP Next-Gen 2017

SAP Next-Gen | Hasso Plattner Institute
New York, Hudson Yards | October 9 – 10, 2017

Design IT. Create Knowledge.

HPI Hasso
Plattner
Institut

Digital Engineering · Universität Potsdam

Agenda

Monday, Oct 9, 2017

9:30 – 10:00	**Opening**
	Prof. Dr. Andreas Polze, Hasso Plattner Institute, Speaker of the Research School Introduction to HPI Research School on Service-Oriented Computing
10:00 – 12:00	**Ph.D. Student Talks Session I – Data Analysis**
	Julian Risch, Ph.D. Student, Hasso Plattner Institute, Potsdam, Germany What Should I Cite? Cross-Collection Reference Recommendation of Patents and Papers
	Sankalita Mandal, Ph.D. Student, Hasso Plattner Institute, Potsdam, Germany A Framework for Integrating Real-World Events and Business Processes in an IoT Environment
	Davide Mottin, Postdoctoral researcher, Hasso Plattner Institute, Potsdam, Germany Graph Exploration via Multifidelity Active Search
	Hazar Harmouch, Ph.D. Student, Hasso Plattner Institute, Potsdam, Germany Cardinality Estimation: An Experimental Survey
12:00 – 13:00	**Lunch**
13:00 – 13:45	**Invited Presentation**
	Prof. Juliana Freire, Professor at the Department of Computer Science and Engineering at New York University Democratizing Urban Data Exploration
14:00 – 16:00	**Ph.D. Student Talks Session II – Systems**
	Christoph Matthies, Ph.D. Student, Hasso Plattner Institute, Potsdam, Germany Data-Driven Software Development Processes
	Sven Köhler, Ph.D. Student, Hasso Plattner Institute, Potsdam, Germany Tools for Adaptive Work-Package Choice in Middleware
	Sona Ghahremani, Ph.D. Student, Hasso Plattner Institute, Potsdam, Germany Model-Driven Self-adaptation in Large Dynamic Architectures
	Tatiana Gayvoronskaya, Ph.D. Student, Hasso Plattner Institute, Potsdam, Germany Blockchain Technology and Applications
16:00 – 17:00	**Invited Presentation**
	Prof. Craig Gotsman, Dean of the Ying Wu College of Computing at the New Jersey Institute of Technology (NJIT) A Survey of Data Science and Related Research at NJIT
17:00 – 17:30	**Keynote**
	Prof. Dr. Christoph Meinel, Dean of the Digital Engineering Faculty of the University of Potsdam HPI: A Bright Future Perspective
17:30	**Social Event**

Tuesday, Oct 10, 2017

10:00 – 11:00	**Keynote**
	Ann Rosenberg, Global Head of SAP Next-Gen
	The Vision of SAP Next-Gen
11:00 – 12:00	**Poster Session**
12:00 – 13:00	**Lunch**
13:00 – 14:00	**Keynote**
	Prof. Dr. Mathias Weske, Chair of the HPI Business Process Technology Research Group
	Rethinking Business Process Management
14:00 – 16:30	**Ph.D. Student Talks Session III – Analysis & Interfaces**
	Christian Bartz, Ph.D. Student, Hasso Plattner Institute, Potsdam, Germany
	Towards Semi-Supervised End-to-End Scene Text Recognition
	Oliver Schneider, Postdoctoral Scholar, Hasso Plattner Institute, Potsdam, Germany
	Spatial Haptic Interaction for Blind Users
	Erik Scharwächter, Ph.D. Student, Hasso Plattner Institute, Potsdam, Germany
	Anomaly Detection in Massive Collections of Time Series
	Thomas Staubitz, Ph.D. Student, Hasso Plattner Institute, Potsdam, Germany
	Peer Assessment and Teamwork in Scalable Learning Environments
	Vladeta Stojanovic, Ph.D. Student, Hasso Plattner Institute, Potsdam, Germany
	Interactive Visualization for Facility Management
16:30 – 17:00	**Closing Remarks**
	Prof. Andreas Polze
17:00	**Social Event**

Hasso Plattner Institute for Digital Engineering

The Hasso Plattner Institute for Digital Engineering in Potsdam is Germany's university excellence center for IT-Systems Engineering. HPI is the only university institution in Germany to offer the Bachelor's and Master's degree in "IT-Systems Engineering" — a practical and engineering-oriented alternative to a conventional computer science study program. Current enrollment is at approximately 500 students. It carries out research noted for its high standard of excellence in its twelve topic areas. Research work is also conducted at the HPI Research School for Ph.D. candidates as well as at its branches in Cape Town, Haifa and Nanjing.

The HPI School of Design Thinking is Europe's first innovation school for university students. It is based on the Stanford d.school model and offers 240 places annually for a supplementary study program. Since 2012 the Hasso Plattner Institute has offered Massive Open Online Courses (MOOCs) at its own interactive platform, openHPI. The courses on IT topics have so far reached more than 140,000 users from over 180 countries. Free via the Internet, learners can access didactically prepared multi-media course materials and learn in close exchange with other course participants through social media.

HPI Symposium at SAP Next-Gen

The HPI Research School for "Service-Oriented Systems Engineering" is the HPI graduate school, founded in 2005, with branches in Cape Town, Haifa and Nanjing. The HPI Research School has dedicated itself to the field of "Service-Oriented Systems Engineering." The focus is on the design and implementation of service-based architectures.

These architectures target various research problems from software engineering, system modeling and analysis, as well as the adaptability and integration of applications. "Service-Oriented Systems Engineering" represents a synthesis of best practices in object orientation, component-based development, distributed computing, and business process management. It also targets the integration of business needs and IT. The topics of the HPI Research School thus have a unique potential not only in terms of academic research but also in industrial application.

At the Symposium, we would like to present the HPI "Research School on Service-Oriented Systems Engineering" to the academic community in the NYC area, thus providing a forum for exchange and discussion of ideas among industry and academia. The theme of this year's symposium at SAP will be "Trends in Service-Oriented Computing: big data, machine learning, and beyond".

The HPI Research School

In October 2005, the HPI started its Research School on "Service-Oriented Systems Engineering", a graduate school based on the model of the DFG (German Research Foundation) "Graduiertenkolleg".

The Vision of the Research School

Design and implementation of service-oriented architectures impose numerous research questions from the fields of software engineering, system analysis and modeling, adaptability, and application integration. Service-Oriented Systems Engineering represents a symbiosis of best practices in object orientation, component-based development, distributed computing, and business process management. It provides integration of business and IT concerns. Service-Oriented Systems Engineering denotes a current research topic in the field of IT-Systems Engineering with high potential in academic research as well as in industrial application. Supported by an internationally renowned grant, Ph.D. students at our college participate in joint activities such as lectures, seminars, winter schools and workshops.

The Members of the Research School

The professors of the HPI with their research groups are supporting pillars for our Ph.D. school. With its interdisciplinary structure, the research college on Service-Oriented Systems Engineering interconnects the HPI research groups and fosters close and fruitful collaborations.

In context of the Research School, the different groups at HPI work on the following topics:

Human Computer Interaction and Computer Vision as Service (Prof. Dr. Patrick Baudisch), Service-Oriented Geovisualization Systems (Prof. Dr. Jürgen Döllner), Algorithm Engineering for Service-Oriented Systems (Prof. Dr. Tobias Friedrich), Modeling and Verification of Self-Adaptive Service-Oriented Systems (Prof. Dr. Holger Giese), Tools and Methods for Software Engineering in Service-Oriented Systems (Prof. Dr. Robert Hirschfeld), Security Engineering of Service-Based IT-Systems (Prof. Dr. Christoph Meinel), Service-Oriented Knowledge Discovery and Data Mining (Prof. Dr. Emmanuel Müller), Service-Oriented Information Systems (Prof. Dr. Felix Naumann), Evolutionary Transition of Enterprise Applications to Service-Orientation (Prof. Dr. h.c. Hasso Plattner), Operating System Abstractions for Service-Oriented Computing (Prof. Dr. Andreas Polze); and Services Specification, Composition, and Enactment (Prof. Dr. Mathias Weske).

On the website of the Research School, please find latest information about the Ph.D. students, their research interests, joint projects, and events:

https://hpi.de/en/research/research-school

Speakers

Prof. Dr. Andreas Polze is the Operating Systems and Middleware Professor at the Hasso Plattner Institute at University Potsdam, Germany. He is also the speaker of the HPI Research School and member of the steering committee of HPI's Future SOC Lab. Andreas received a doctoral degree from Freie University Berlin, Germany, in 1994 and a habilitation degree from Humboldt University Berlin in 2001, both in Computer Science. At HPI, his research focuses on architectures of operating systems, on component- based middleware, as well as on predictable distributed and cloud computing. Andreas Polze was visiting scientist with the Dynamic Systems Unit at Software Engineering Institute, at Carnegie Mellon University, Pittsburgh, USA, where he worked on real-time computing on standard middleware (CORBA) and with the Real-Time Systems Laboratory at University of Illinois, Urbana-Champaign. Current research interests include Predictable Service Computing, Adaptive System Configuration, and End-to-End Service Availability for standard middleware platforms. Together with Charité, GETEMED, and Deutsche Telekom, he has run the Fontane telemedicine project. Joint research with SAP has investigated porting HANA to new processor architectures.

Prof. Dr.
Andreas Polze

Speaker of the
HPI Research School

Christoph Meinel (Univ. Prof., Dr. sc. nat., Dr. rer. nat., *1954) is CEO and Scientific Director of the Hasso Plattner Institute for Digital Engineering gGmbH (HPI) and Dean of the Digital Engineering Faculty at the University of Potsdam. Christoph Meinel is full professor (C4) for computer science at HPI and the University of Potsdam, and he holds the chair of Internet Technologies and Systems. He teaches courses on IT Systems Engineering in the HPI Bachelor and Master Degree programs and in the MOOC platform developed by his team: openHPI. He supervises numerous Ph.D. projects and is a teacher at the HPI School of Design Thinking. His research currently focuses on security engineering, knowledge engineering, and Web 3.0-Semantic, Social, Service Web. He is also scientifically active in research on the innovation method Design Thinking. Earlier scientific work concentrated on efficient algorithms and complexity theory. Christoph Meinel is author or co-author of more than 25 books, anthologies, as well as numerous conference proceedings. He has had more than 550 (peer-reviewed) papers published in scientific journals and at international conferences and holds a number of international patents. He is a member of the National Academy of Science and Engineering (acatech), director of the HPI-Stanford Design Thinking Research Program, honorary professor at the TU Beijing, visiting professor at Shanghai University, concurrent professor at the University of Nanjing, and member of numerous scientific committees and supervisory boards.
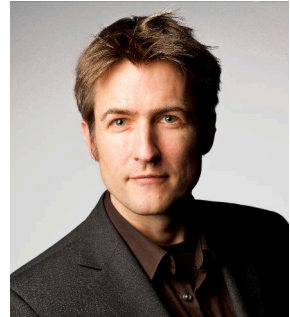
Prof. Dr.
Christoph Meinel

Dean of the
Digital Engineering Faculty
at the University of Potsdam

Professor Dr. Mathias Weske is chair of the business process technology research group at Hasso Plattner Institute, Digital Engineering Faculty, University of Potsdam. The research group aims at addressing real-world problems in business process management with formal approaches and engineering useful prototypes. The BPT research group has a track record in engineered prototypes with a significant impact on research and practice, including projects like Oryx and jBPT. He co-founded Signavio, and he is an advisor to Synfioo. Dr. Weske is author of the first textbook on business process management and he held the first massive open online course on the topic in 2013. He on the Editorial Board of Springer's Distributed and Parallel Databases journal, Springer's Distributed Computing journal, and he is a founding member of the steering committee of the BPM conference series and, since September 2017, chairperson of the steering committee.

Prof. Dr.
Mathias Weske

Chair of the Business Process
Technology group

Patrick Baudisch is a professor in Computer Science at Hasso Plattner Institute at Potsdam University and chair of the Human Computer Interaction Lab. His research focuses on natural user interfaces and interactive devices and in particular on haptics and personal fabrication. Previously, Patrick Baudisch worked as a research scientist in the Adaptive Systems and Interaction Research Group at Microsoft Research and at Xerox PARC. He holds a Ph.D. in Computer Science from Darmstadt University of Technology, Germany. He was inducted into the CHI Academy in 2013 and has been an ACM distinguished scientist since 2014.

Prof. Dr.
Patrick Baudisch

Chair of the Human Computer Interaction group

Dr. Matthias Uflacker is chair representative at the chair of Prof. Dr. Hasso Plattner at the Hasso Plattner Institute for Digital Engineering, University of Potsdam. His responsibilities include the general coordination and conduction of teaching, research and project activities of the research group. After graduating in Computer Science at Monash University and University of Oldenburg, Matthias received his doctoral degree at HPI under supervision of Prof. Dr. Hasso Plattner in 2011. After completion of his doctorate, he joined the newly founded SAP Innovation Center in Potsdam where he was exploring new concepts for enterprise applications based on in-memory database technology. In September 2013, he returned to the Hasso Plattner Institute to direct the department of Professor Plattner. His research interests focus on enterprise data management on latest hardware and the design of modern enterprise applications.
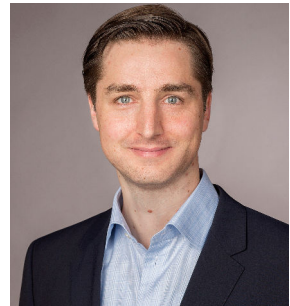
Dr.
Matthias Uflacker

Chair representative of the Enterprise Platform and Integration Concepts group

Ph.D. Student Talks

Julian Risch

Ph.D. Student, Hasso Plattner Institute, Potsdam, Germany

What Should I Cite? Cross-Collection Reference Recommendation of Patents and Papers

Research results manifest in large corpora of patents and scientific papers. However, both corpora lack a consistent taxonomy and references across different document types are sparse. Therefore, and because of contrastive, domain-specific language, recommending similar papers for a given patent (or vice versa) is challenging. We propose a hybrid recommender system that leverages topic distributions and key terms to recommend related work despite these challenges. As a case study, we evaluate our approach on patents and papers of two fields: medical and computer science. We find that topic-based recommenders complement term-based recommenders for documents with collection-specific language and increase mean average precision by up to 23%. As a result of our work, publications from both corpora form a joint digital library, which connects academia and industry.

Julian is a Ph.D. student at the Information Systems group of Prof. Dr. Felix Naumann at the Hasso Plattner Institute (Potsdam, Germany). His research focuses on text mining, machine learning, and deep learning. He is especially passionate about topic modeling.

A Framework for Integrating Real-World Events and Business Processes in an IoT Environment

Business process management is the key for companies to document, execute, monitor, and optimize their business processes. Considering the recent rapid development of Internet of Things (IoT) scenarios, these processes are often influenced by external events occurring in the process context. Complex event processing techniques, on the other hand, provide with large number of operations that can be performed on event streams to come up with the business events necessary for the processes. Modeling constructs for different types of events are part of the de-facto standard Business Process Model and Notation (BPMN). However, the semantics of BPMN sometimes are ambiguous or insufficient to capture the event handling requirements of the real-life scenarios. Also, when the integration of external events needs to be supported by process-oriented information systems, the gap between conceptual process model and its implementation needs to be bridged. The talk presents the challenges for integrating real-world events into business processes and proposes a framework that guides through the integration.

Sankalita Mandal

Ph.D. Student, Hasso Plattner Institute, Potsdam, Germany

Sankalita is a Ph.D. student in the Business Process Technology Group at Hasso Plattner Institute, Potsdam since March 2015. After completing her Bachelor studies from Kolkata, India, she did Masters in Computer Science from TU Kaiserslautern. Right now, she is focused on using events for implementing and improving business processes.

Graph Exploration via Multifidelity Active Search

The increasing interest in social networks, knowledge graphs, protein-interaction, and many other types of networks has raised the question how users can explore such large and complex graph structures easily. In this regard, graph exploration has emerged as a complementary toolbox for graph management, graph mining, or graph visualization in which the user is a first class citizen. The talk first identifies the main research in graph exploration by providing a taxonomy of algorithms, and then shows a novel application that supports multifidelity active search in graphs. Active search involves the user in a series of interactions by asking the evaluation of some nodes with the purpose of learning the user's tacit interests. As opposed to traditional active search which tiresomely request the user feedback, we propose a multifidelity framework. Our multifidelity framework relies on an additional source of information (low-fidelity) which approximate the user interests, substantially reducing the number of interactions with the user.

Davide Mottin

Postdoctoral researcher,
Hasso Plattner Institute,
Potsdam, Germany

Cardinality Estimation: An Experimental Survey

Data preparation and data profiling comprise many both basic and complex tasks to analyze a dataset at hand and extract metadata, such as data distributions, key candidates, and functional dependencies. Among the most important types of metadata is the number of distinct values in a column, also known as the zeroth-frequency moment. Cardinality estimation itself has been an active research topic in the past decades due to its many applications. The aim of this talk is to present a detailed experimental study of twelve cardinality estimation algorithms, scaling far beyond the original experiments. We evaluate the algorithms' accuracy, run-time, and memory consumption using synthetic and real-world datasets. Our results show that different algorithms excel in different in categories, and we highlight their trade-offs.

Hazar Harmouch

Ph.D. Student, Hasso Plattner Institute, Potsdam, Germany

Hazar is a Ph.D. student at the Information Systems group of Prof. Dr. Felix Naumann at the Hasso Plattner Institute (Potsdam, Germany).

Data-Driven Software Development Processes

Christoph Matthies

Ph.D. Student, Hasso Plattner Institute, Potsdam, Germany

The steps that are taken to detect and solve problems and hindrances in software development processes are oftentimes based on intuition and experience. Often team members are asked to identify problems during that occured in the latest development iteration. However, it is a challenge to connect these observations to data created during the iteration, leading to a heavy reliance on memory and gut feeling. Little research focuses on how identified problems can be tackled and, even more importantly, how progress towards removing these problems can be measured.

This talk presents experiences from a classroom project where 38 students developed a single system using a scaled version of Scrum. In addition to surveys and tutoring, we performed a post-hoc, tool-supported analysis of collaboration artifacts to detect concrete indicators for anti-patterns in Scrum adoption. Through the combination of these techniques we were able to understand how software developers implemented Scrum and which elements required further attention in the future. Automated analysis of collaboration artifacts proved to be a promising addition to the development process that allowed for more concrete, targeted and objective feedback to developers about their employed development process.

Christoph is a Ph.D. student at the Enterprise Platform and Integration Concepts group of Prof. Dr. h.c. Hasso Plattner at the Hasso Plattner Institute (Potsdam, Germany). His research interests lie in software development processes and software repository mining.

Tools for Adaptive Work-Package Choice in Middleware

Hardware performance counters are a popular means to evaluate software behavior in regards of, for instance, consumed time, issued instructions, and failed branch prediction.

I investigate how measurement jitters—usually avoided in experiments—can provide detailed information on the overall system load and properties of currently running processes on the same hardware as my probe program. At the example of memory access times on an IBM POWER8 processor, I present a set of probing tools. These tools enable not only a better understanding of how black-box processes' resource usage changes over time, but allow further the construction of middlewares that can dynamically start or defer annotated work packages based on the current cache utilization.

As a third application, I show how cache timing delays can be employed for the construction of cross-process covert channels. They allow for breaking the isolation of kernel process groups and potentially logical partitions (LPARs).

Sven Köhler

Ph.D. Student, Hasso Plattner Institute, Potsdam, Germany

Sven is a Ph.D. student at the Operating Systems and Middleware group of Prof. Dr. Andreas Polze at the Hasso Plattner Institute (Potsdam, Germany). His work focuses on accelerators for parallel data processing and cryptography on heterogenous platforms. In his spare time he mentors a CoderDojo and introduces school kids to the marvels of computing.

Sona Ghahremani

Ph.D. Student, Hasso Plattner
Institute, Potsdam, Germany

Model-Driven Self-adaptation in Large Dynamic Architectures

Self-adaptation can be realized in various ways. Rule-based approaches prescribe the adaptation to be executed if the system or environment satisfy certain conditions and result in scalable solutions, however, with often only satisfying adaptation decisions. In contrast, utility-driven approaches determine optimal adaptation decisions by using an often costly optimization step, which typically does not scale well for larger problems. We propose a rule-based and utility-driven approach that achieves the beneficial properties of each of these directions such that the adaptation decisions are optimal while the computation remains scalable since an expensive optimization step can be avoided. The approach can be used for the architecture-based self-healing of large software systems. We define the utility for large dynamic architectures of such systems based on patterns capturing issues the self-healing must address and we use pattern-based adaptation rules to resolve the issues. Defining the utility as well as the adaptation rules pattern-based allows us to compute the impact of each rule application on the overall utility and to realize an incremental and efficient utility-driven self-healing. We demonstrate the efficiency and optimality of our scheme in comparative experiments with a static rule-based scheme as a baseline and a utility-driven approach using a constraint solver.

Sona is a Ph.D. student at the System Analysis and Modeling group of Prof. Dr. Holger Giese at the Hasso Plattner Institute (Potsdam, Germany).

Blockchain Technology and Applications

Finding a consensus is the major challenge of a decentralized, nonhierarchical network that consists of unknown and therefore untrusted nodes. The blockchain technology provides an automatic consensus algorithm that confirm the consensus between all participants of the blockchain system in every stage of the blockchain process. Blockchain technology offers a secure, distributed and autonomous system, where non-trusting parties can directly interact with each other and verify the information obtained by comparing it with a system's global truth. Through the traceable logging and the transparency enabled by technology, blockchain creates important intelligence revealing whether information in a system was modified. Blockchain was firstly used as the basis of the bitcoin payment system. Bitcoin provides a decentralized payment system and an associated cryptocurrency. The talk first describe the main benefits and drawbacks in blockchain technology and shows characteristics crucial for the implementation of this technology in a new application area. Based on this characteristics some applications will be presented.

Tatiana Gayvoronskaya

Ph.D. Student, Hasso Plattner Institute, Potsdam, Germany

Tatiana is a Ph.D. student at the Internet Technologies and Systems group of Prof. Dr. Christoph Meinel at the Hasso Plattner Institute (Potsdam, Germany).

Towards Semi-Supervised End-to-End Scene Text Recognition

Christian Bartz

Ph.D. Student, Hasso Plattner Institute, Potsdam, Germany

Detecting and recognizing text in natural scene images is a challenging, yet not completely solved task. In recent years several new systems that try to solve at least one of the two sub-tasks (text detection and text recognition) have been proposed. Most existing works consist of multiple deep neural networks and several pre-processing steps. In this talk, I will present a novel single deep neural network, that learns to detect and recognize text from natural images, in a semi-supervised way. The proposed network integrates and jointly learns a spatial transformer network and a text recognition network. I will introduce the idea behind the novel network architecture and show its feasibility, by performing a range of experiments on standard benchmark datasets, where competitive results are achieved.

Christian is a Ph.D. student at the Internet Technologies and Systems group of Prof. Dr. Christoph Meinel at the Hasso Plattner Institute (Potsdam, Germany).

Spatial Haptic Interaction for Blind Users

Current interactive displays for blind users, such as screen readers and Braille displays, effectively communicate text but struggle when displaying spatial information. We are developing new interfaces that enable blind users to work interactively with spatial data. We accomplish this by using haptic technology, which engages the users' sense of touch. Through a series of evaluations with blind participants, we show how our new devices support diverse applications such as interactive maps, calendars, and games.

Oliver Schneider

Postdoctoral Scholar, Hasso Plattner Institute, Potsdam, Germany

Oliver researches, designs, and develops tools that empower users to work with new technologies. As technology becomes more physical, interactive, and intelligent, we need better capabilities to create for and with it. He is driven to understand how to creatively work with interactive physical-digital systems, especially those that engage users through multiple senses. Oliver is currently a Postdoctoral Scholar at the Hasso Plattner Institute working with Patrick Baudisch. His Ph.D. is from UBC, where he worked with Karon MacLean to establish the field of Haptic Experience Design, improving how designers can create touch-based experiences from rumble feedback in a smartphone to immersive augmented-reality experiences.

Anomaly Detection in Massive Collections of Time Series

Erik Scharwächter

Ph.D. Student, Hasso Plattner Institute, Potsdam, Germany

The dramatic increase in the availability of time series data, in particular from environmental sensors, calls for new approaches to scalable time series analysis. Anomalies, extreme values, and significant changes in these time series can indicate the occurrence of important events like natural disasters or tipping points within a system. In our work, we focus on a recent method for time series anomaly detection that is based on pairwise correlations. Correlation-based anomaly detection is particularly challenging because of its quadratic complexity. For this reason, we aim at estimates of the full pairwise correlation matrix without computing and storing all pairwise correlations. We propose a new estimation algorithm that can capture the correlation structure of a large time series collection in a compressed representation and show how to exploit the representation for anomaly detection.

Peer Assessment and Teamwork in Scalable Learning Environments

openHPI is the Hasso Plattner Institute's online learning platform. Courses similar to those that are provided on-campus, are offered here in a condensed format to a world wide audience. Further instances of the platform, such as openSAP (SAP SE) and openWHO (World Health Organization), are operated for our partners to enable them to offer such courses in their own context. The courses' main components are video lectures, self-tests, exams, and a discussion forum that allows the participants to communicate with each other and the teaching team. Hands-on exercises and practical tasks are getting increasingly important. As the courses often attract a large amount of participants, scalability is key. For the programming courses, a language agnostic tool has been developed that allows the participants to execute their code in the browser and get it automatically graded. For more general purposes, a peer assessment tool has been developed, which also allows teams to hand in their solutions and get their work graded. To keep the additional effort for the instructors to a minimum, a range of mechanisms has been developed in this context: teams need to be created, lurkers need to be detected, different contribution levels within the teams need to be determined. The talk will present the openHPI platform in general and then focus on the mentioned hands-on training and team work tools.

Thomas Staubitz
Ph.D. Student, Hasso Plattner Institute, Potsdam, Germany

Thomas is a Ph.D. student at the Internet Technologies and Systems group of Prof. Dr. Christoph Meinel at the Hasso Plattner Institute (Potsdam, Germany).

Interactive Visualization for Facility Management

Vladeta Stojanovic

Ph.D. Student, Hasso Plattner Institute, Potsdam, Germany

The ability to capture and visualize Building Information Modelling (BIM) data is becoming increasingly important in the field of Facility Management (FM). This is especially the case when new or additional BIM documentation is required for existing buildings. Facility managers can make use of as-is BIM data in order to create and enhance planning and operational documentation for a building throughout its lifetime. Generation of as-is BIM data from point cloud data poses a particular challenge. Machine learning-based methods for classification can be used to enhance generation of as-is BIM data. Point cloud data can also be compared with as-designed BIM data for further inspection. Visualization of sensor data can be used to enhance the analysis of the associated BIM data in order to show not just the physical features of the building, but also the status of the internal operation of the building. The visualization-based analytical output of combined as-designed and as-is BIM, point cloud and sensor data based on a Generalized Building Information Model (GBIM), allows for representation of lifecycle management topics for stakeholder engagement within the emerging "Real Estate 4.0" realm. The use of service-based interactive visualization extends the outputs of the visualization scenario to thin clients. This could be potentially beneficial for increasing stakeholder engagement by allowing complex visualization results to be transmitted to clients in real-time on mobile and portable computer devices and accessed through a simple web-based portal. This research investigates the development of new methods and techniques for interactive visualization of as-is BIM and sensor data related to FM and Real Estate 4.0 operations within the scope of the post-construction lifecycle stages. This outcome research will show that GBIM data related to FM and Real-Estate 4.0 activity can be visualized in real-time using a service based approach and aid in decision making.

Vladeta is a Ph.D. student at the Computer Graphics Systems group of Prof. Dr. Jürgen Döllner at the Hasso Plattner Institute (Potsdam, Germany).

Notes
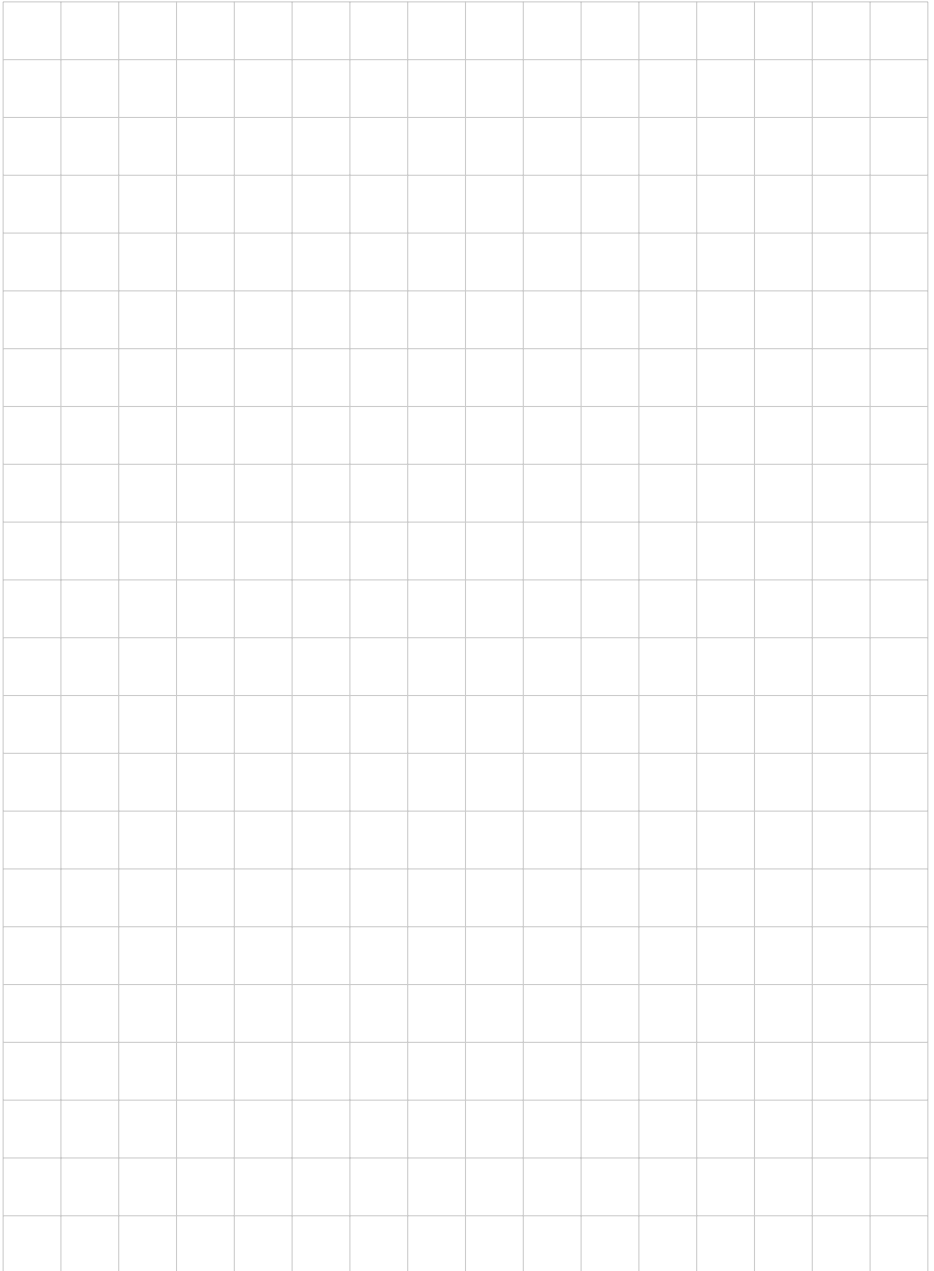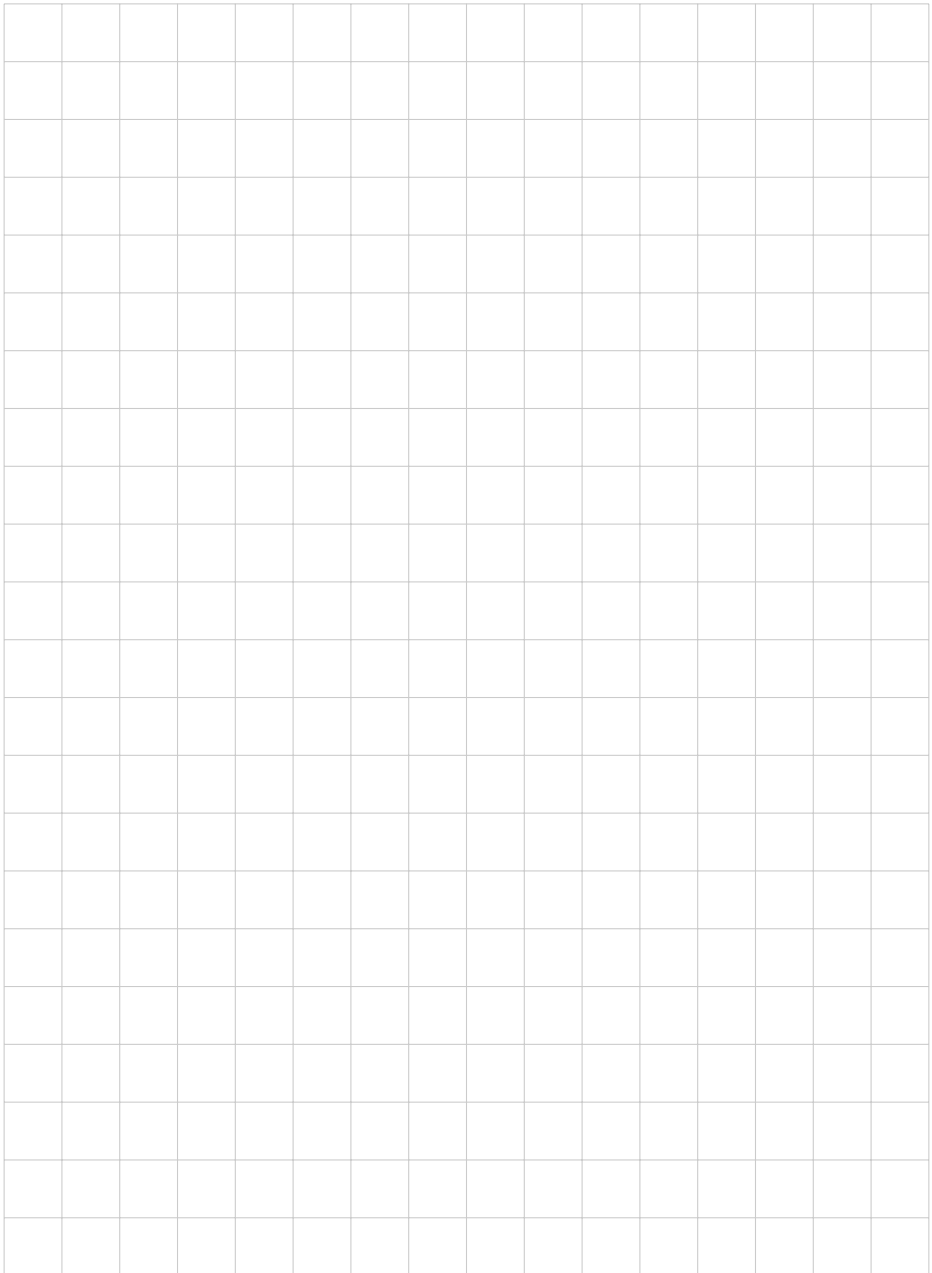
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