

Paper	Outlook	Human	Technology	Organization
A Cyber-Physical Production System Framework of Smart CNC Machining Monitoring System	extending the heterogeneous data scope such as process textual data and the 3D CAD models for deep learning and machining process optimization		x	
A fog computing-based framework for process monitoring and prognosis in cyber-manufacturing	build predictive models using machine learning algorithms and integrate these models into the online process monitoring system for diagnosis and prognosis		x	
A framework to guide the selection and configuration of machine-learning-based data analytics solutions in manufacturing	further extend and evaluate the generality of our framework by applying it to other kinds of use cases		x	x
A Generic Data Analytics System for Manufacturing Production	replace the R part in GMDA with RHadoop or SparkR to make it available for use with big data.		x	
A Hybrid Machine Learning Approach for Predictive Maintenance in Smart Factories of the Future	Implemented and validated on not only the milling machine case but also other predictive maintenance pilots withintasks of BOOST 4.0, demonstrating its capacity and potential to support maintenance engineers and machine operators	x		x
A methodology for the semi-automatic generation of analytical models in manufacturing	extend the manufacturing meta-model to enable the representation of problems in greater detail develop new model transformations to offer more capabilities to the model interpreters and improve the accuracy of the generated models include a scoring engine to TADAM develop a BN builder to enable probabilistic prediction		x	
A Predictive Maintenance System Design and Implementation for Intelligent Manufacturing	Different use-cases and operational scenarios can be integrated to demonstrate the power advantage of the PdM system as a generic platform. Lastly, integration of the designed system across a factory floor for fleets of equipment monitoring is also planned.		x	x
A systematic development method for cyber-physical machine tools	implementation of artificial intelligence in CPMT. Various data visualization and analytics algorithms will be embedded mobile applications for the developed CPMT pro-prototype will be developed on different HMI's such as smart phonesand wearable devices OPC UA-based CPMTprototype is under development in our lab		x	

<p>An intelligent decision support system for production planning based on machine learning</p>	<p>focused on the integration of this tactical-level decision tool with the low-level flow shop problem. The combination of both tools can be regarded as a first step for the development of a digital twin capable of simulating all the process involved in the manufacturing sector.</p>	<p>x</p>	
<p>An Intelligent Maintenance Planning Framework Prototype for Production Systems</p>	<p>either the API needs to support stacked database layouts, or some of the machine learning preprocessing modules need to be moved to the local machine running the SCADA system</p>	<p>x</p>	
<p>Architecture Model for a Holistic and Interoperable Digital Energy Management Platform</p>	<p>focus on validating the proposed conceptual architecture model through an established multi-case research design, as well as on developing solutions based on such architecture to be implemented in manufacturing companies providing interoperability capabilities among enabling technologies and legacy systems that easily integrate with this reference architecture model</p>	<p>x</p>	<p>x</p>
<p>CAAI—a cognitive architecture to introduce artificial intelligence in cyber-physical production systems</p>	<p>automatic feature extraction or explainable AI solve a different use case by the model further efforts are required to build a truly intelligent system that can solve harder use cases through learning over time and re-calibration in an online manner</p>	<p>x</p>	<p>x</p>
<p>Cloud-based big data analytics platform using algorithm templates for the manufacturing industry</p>	<p>None</p>		
<p>Cognitive analytics platform with AI solutions for anomaly detection</p>	<p>comprise the addition of semantic technologies for the description of ML models and the application of reasoning functionalities over them An ontology will be built on top of it in order to enable rules appliance and reasoning related to various models metrics and parameters prescriptive analytics, as an effort to take advantage of the predictive future and to make decisions on any time horizon (immediate or long term), will be added a human-knowledge injection module will be added in order to enable human to add their observations and domain knowledge for further improvement of platform's analytic and predictive capabilities</p>	<p>x</p>	<p>x</p>

Computer Vision Toolkit for Non-invasive Monitoring of Factory Floor Artifacts	<p>future work also includes improving the current image processing routines for low light conditions integration of additional sensor technology such as acoustic, vibration, and high-speed controller data developed through the community</p> <p>Further additions of artificially intelligent modules using deep learning methods</p>		x	
Data analysis and visualization framework in the manufacturing decision support system of COMPOSITION project	<p>improvement of the algorithms used in prediction toolkits</p> <p>incorporation of new prediction models and rules</p> <p>These steps are going to be made with the continuous collaboration of the end users</p>	x		x
Developing a big data analytics platform for manufacturing systems: architecture, method, and implementation	<p>implementation of optimization and disturbance handling, which directly relate to increasing productivity and sustainability performance on shop floors. The present work also excluded UQ integration, which should be accompanied with</p>			x
Expert System for the Machine Learning Pipeline in Manufacturing	<p>automation of the whole ML-pipeline and introduction of ES for the other ML-pipeline phases</p>			x
Integrating human cognition in cyber-physical systems: A multidimensional fuzzy pattern model with application to thermal spraying	<p>Drei Themen: Human Subsystem, Physical Subsystem, Cyber subsystem</p>	x		x
KOI: An Architecture and Framework for Industrial and Academic Machine Learning Applications	<p>evaluate the system's performance and acceptance in different inspection and testing domains. New use-cases will emerge, and new requirements will drive the development of the system further. Additional features will broaden the scope of the system towards a more general usage and a wider audience</p>			x
ML Pro: digital assistance system for interactiv	<p>Extension to other data formats, use cases; support users during use case selection</p>	x		x
MOMIS Dashboard: A Powerful Data Analytics Tool for Industry 4.0	<p>None</p>			
Patented intelligence: Cloning human decision models for Industry 4.0	<p>integration, intellectualization, interaction, infrastructure, and implementation</p>	x		x
Scalable Data Analytics from Predevelopment	<p>focus will lie on organizational decision making structures, team compositions as well as work models in order to ensure the capabilities of data analytics within large scale manufacturing.</p>	x		x
Supporting Data Analytics in Manufacturing with a Digital Assistant	<p>Industrial validation</p>			x

Towards a cognitive assistant supporting human operators in the Artificial Intelligence of Things	it will be relevant to define performance metrics that are quick and easy to measure, compared to changes in requirements, and that allow for quick and effective redesign adjustments in each of the components of the Human-AI system	x
Towards a connected factory: Shop-floor data	future work within this research aims at increasing the technology readiness level of the implemented architecture, and also its scalability to reduce latency and achieve faster response times from the analytics models.	x
Towards big industrial data mining through explainable automated machine learning	expand AMLBID to support algorithms of regression, deep learning and distributed ML libraries	x
Validation of PERFoRM reference architecture demonstrating an application of data mining for predicting machine failure	The PERFoRM framework (including the Data Analytics tool) will be migrated to the actual factory	x