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Data sheet

10020 CREATE
Creating Evolution Capable Co-operating Applications in Industrial Automation

Project details

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Main Innovation

The CREATE project defined a novel architecture for industrial automation systems, implemented it in demonstrators and showed the benefits of its application in three use cases in the industrial automation domain. The CREATE approach enables:

- ✓ integration of decentralized, autonomous and cooperating components (legacy and new) in a plug & play approach
- ✓ use of decision support systems based on artificial intelligence algorithms and knowledge bases
- ✓ increased control and monitoring of production lines and their components in a highly portable way and easy to understand with intuitive visualizations
- ✓ enhanced interoperability between heterogeneous components in industrial automation systems
- ✓ integration of manual work to industrial automation systems
- ✓ automatically collecting and reusing human experience in decision support systems for MQD

Functionality and new usage

Flexible Material Flow: The application of the CREATE approach showed increase in control and monitoring of production lines as well as the decrease in time, costs and reprogramming efforts.

Industrial Metrology: The application of the CREATE approach showed the benefits of using high precision 3D models of mechanical parts for knowledge based manufacturing.

Monitoring and Quality Control: The application of the CREATE approach showed how the data fusion from production components and the use of artificial intelligence applications for decision support can lead to costs reduction and improved production quality.

Cross-Domain Demonstrator: Hybrid case-based reasoning, integration Sensor readings, operator corrective actions.

Technical breakthrough

The CREATE project achieved the implementation of Service Oriented Architecture (SOA) in industrial automation systems as well as the introduction and utilization of (production) data generation and fusion devices, artificial intelligence applications and knowledge bases. These technical innovations applied in industrial automation showed high potential for costs savings, improved quality and increased flexibility. By solving integration problems we managed to use different technologies and standards, free or from different vendors, to deliver the Cross-Domain demonstrator.

Impact

Performance enhancements:
The performance enhancements of the CREATE approach were evaluated and showed in three national and one cross domain demonstrator. In the various use cases different aspects of CREATE's added value were highlighted. In total it is showed that the CREATE approach enhances industrial automation via:

- ✓ Optimizing manufacturing quality with decision support systems
- ✓ Increasing control and monitoring of manufacturing in a portable and flexible way
- ✓ Supporting knowledge based manufacturing and automated experience collection
- ✓ Seamlessly integrating human work to automation systems
- ✓ Decreasing costs, time and reprogramming efforts

Contributions to industrial automation body of knowledge:
A number of publications have been produced and published both in conferences, workshops and journals and some further publications are planned to further spread the CREATE approach and its potential for manufacturing industry.

Productification of achievements within CREATE:
1. TIE SmatBridge 3.0 which includes additional features developed through research in CREATE (product released by TIE Kinetix).
2. TIE Smart Integrator, TSI extended within CREATE to support ontology schemas in OWL and RDF. TSI is planned to launch as a product in 2015.
3. INTERCEPTOR 16PRO, developed as a Smart Neighbourhood Module integrated in future flexible, intelligent and dynamic manufacturing solutions. To be released 2015 as a product.

In house applications (further funding from internal and/or external sources)**:**
1. Generic Substrate Carrier (GSC) based Production Lines (CCM) provided with a highly portable interface for control and monitoring as well as a PoC for reconfiguration of the production line support
2. Improved MQD in manufacturing of gores (Volvo Car, new project where the CREATE results are input, a two year FFI Vinnova project lead by Volvo Car)
3. Improved MQD in manufacturing of transmissions for Wheel loaders and aftermarket (Volvo Construction Equipment are partly funding a PhD and supervision at Mälardalen University).

Potential impact:
1. All involved partners have provided estimates on the expected impact when the results from CREATE are deployed.
2. Patenting of learning and self-improving algorithms ongoing by research at Mälardalen University.
3. Framework for case-based diagnostic systems – planned to be developed by MDH as an open source platform enabling further development of the algorithms for applications in industry, health care sector and business applications is planned. This would further strengthen our position in this research area.
4. A spin of company delivering beyond state of the art solutions to manufacturing industry. All partners in the consortium will be invited to be co-owner of such a company.
5. A number of popular science publication are planned to spread the results of CREATE to industry.