Bournemouth University
Service oriented computing group

Undergraduate Project 2016-2017

Supervisor: Dr. P de Vrieze

EUROPEAN UNION
Horizon 2020 - FIRST (734599)

Project title: Simulation of virtual factories

Background

This project is proposed in the context of the FIRST research project

Uber, Amazon, AirBnB, Netflix… The Internet has had many impacts on the economy. Not only on the consumer market, but widely across the service sector. There is a large amount of integration and automation to enable things like instant order confirmations. Work in these aspects of business processes is quite well established in the service sector.

Manufacturing is a key part of the economy. To remain competitive or become even more so, automation that supports innovation is also essential for the manufacturing sector. Advanced ICT supported manufacturing is currently gaining a lot of traction with initiatives such as Industrie 4.0 in Germany, Factory of the Future in Italy and the High Value Manufacturing Catapult the UK. Part of this development is advanced coordination of manufacturing allowing for increased flexibility and reduced costs. A virtual factory ensures exchange of data between smart machines, systems, software and design within the manufacturing chain. Manufacturing processes become more simple through plug-and-play techniques.

Project description

Many EU initiative programmes and projects, such as FI-PPP, FI-WARE, FInES3, FITMAN, and MSEE, industrial advisory groups and research associations are investigating a more flexible IT infrastructure that is able to react to business changes more quickly than the classic monolithic IT manufacturing systems.

The purpose of this project is to create an overview of these developments. Some existing platforms of virtual factories may be well-understood, others may only be in the visionary stage, or lack concrete implementations.

Project aims

- Identify existing platforms for virtual factories
- Identify the requirements for a platform
- Create a simulation of a virtual factory

Research question

What is a good approach to simulate a virtual factory?

Artefact

- Virtual factory simulation system
- Simulation results

Evaluation

- Does the simulation work.
- What are the strengths and weaknesses of the platform

References

[1] Xu, L., De Vrieze, P. and Wei, L., 2014. Supporting Interoperability of Virtual Factories. In: Camarinha-Matos, L.M. and Afsarmanesh, H., eds. PRO-VE'14: 15th IFIP Working Conference on Virtual Enterprises 6-8 October 2014 Amsterdam, The Netherlands. 510-517.

[2] Ding, Jian Hao, Yi Gang Wang, and Kui Chen. "An Interactive Layout and Simulation system of Virtual Factory." Applied Mechanics and Materials 20 (2010): 421-426. (2010)

[3] Yang, Sun-Mo, Beumjun Ahn, and Kwang-Kyu Seo. "Development of a prototype customer-oriented virtual factory system." The International Journal of Advanced Manufacturing Technology 28.9-10 (2006): 1031-1037. (2006).

[4] FITMAN: http://www.fitman-fi.eu/

[5] MSEE: http://www.msee-ip.eu/