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Intelligent manufacturing systems

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Abstract

University Science Park presents support of active development within applied research, innovative culture and competitiveness for interested and customer production organisation and services from public and business environment. Intelligent manufacturing system is the most quickly developing form of manufacturing systems of future – Factory of the Future. If company uses them, it can reach the best productivity. For this purpose research of intelligent solutions for transport and industry is carried out at the University of Žilina in Žilina.

Keywords: intelligent manufacturing systems, Factory of the Future, digital company

Introduction

Slovakia is a small country with great potential in the field of science, research and innovation. Together with emerging economy, a field of education is currently developing through the idea of science parks. Scientific research and higher education may progress and contribute to the technical development of country through the project of university science parks. In support of these activities partnerships and projects among public research organizations and industry dealing with development and sales are being formed.

University of Žilina decided to create a science park which would improve conditions for cutting-edge research and more effective cooperation with the private sector.

University Science Park

Project of University Science Park at the University of Žilina is connected with building of an excellent university science park with comparable results in the field of research and development of intelligent transport and manufacturing systems at the international level with emphasis on economic growth and regional development.

Project is oriented on scientific approach to solution of problems applied in practice while it will use and integrate knowledge and experience of researchers and experts. University Science Park will provide partnership among premises of the university, research and development organisations and business sector. At the same time it will motivate and manage knowledge and technologies among universities, research institutes, enterprises and market. Science park will help with creating and development of companies established by means of incubation and creating of spin-off companies.

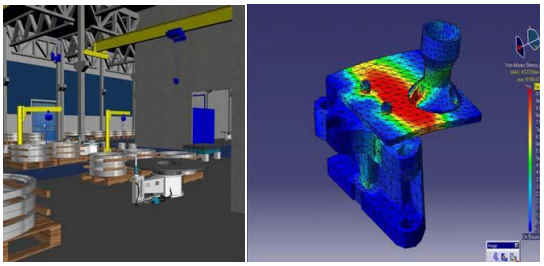
Project of University Science Park with its focus continues with research activities realised at the University of Žilina with emphasis on intelligent transport and manufacturing systems.

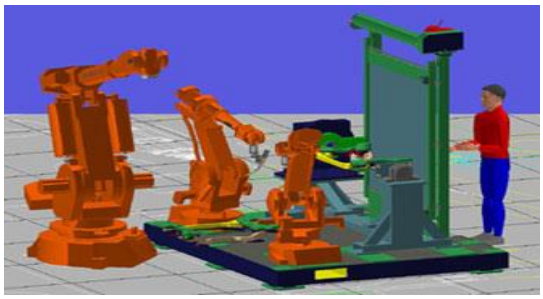
Intelligent manufacturing systems (concept of Digital Company)

Research in the field of intelligent manufacturing systems (IMS) is focused on creating and applying new methods, services and applications in manufacturing systems with a view to optimisation and increase of efficiency of complex systems in production. Manufacturing system is a system that can be adapted to external and internal changes, it is capable of rapid reconfiguration and it can promptly and properly respond to changes. Currently an important role plays man who is offered possibilities for performance of correspondent operations after interpretation of changes by intelligent system. The system itself does not make decisions. In practice it is especially connected with optimization of manufacturing processes. Its main task is research,

development and experiments within new trends of intelligent manufacturing systems. It deals with questions connected with future construction of the Factory of the Future, what procedures of installation progress may bring, to what extent human will intervene into device configurations, and to what extent artificial intelligence will be applied. An important element of the intelligent manufacturing system is software that serves for visualization, monitoring and holonic management of the production. The software is also used to design products what is closely connected with the digitization of objects. Efforts to accelerate and streamline cycle of designing manufacturing and logistic systems lead to the current trend of digitization and virtual design systems.

Within an area called Factory of the Future a significant role plays concept of digital company by using tools and technologies for virtual and augmented reality. Digital company is purely about design. Production facilities have their so called agent, virtual representation. Using the agent it is possible to easily reconfigure the system, to change its functionality, to create redundancy applicable in case of failure, so the whole real factory may have been represented in the virtual space where everything can be monitored, data can be collected and analysed and simultaneously to link data with the optimisation algorithms by means of artificial intelligence.





Conclusion

Existence of a science park will build a new scientific world-class infrastructures aimed at research areas such as intelligent transport systems, intelligent manufacturing systems, new advanced materials and technology, information and communication technologies, environment and energetics and will bring positive solutions in the field of science, research, development and innovations for the whole Slovakia and at the same time it will create an important basis for international cooperation.

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