Digital Technologies, Advanced Robotics and increased Cyber-security for Agile Production in Future European Manufacturing Ecosystems

Reporting

Project Information

TRINITY

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Periodic Reporting for period 2 - TRINITY (Digital Technologies, Advanced Robotics and increased Cyber-security for Agile Production in Future European Manufacturing Ecosystems)

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Summary of the context and overall objectives of the project
The main objective of TRINITY is to create a network of digital innovation hubs (DIHs) composed of Research Centers and University Groups specialized in Advanced Robotics and Internet of Things (IoT), supported by a DIH with experts in Robotics Cyber security to contribute to novel robotics solutions that will increase agility in production. The second objective is to continue this network after the ramp-up phase, by building a sustainable business model throughout the project lifetime. The third objective is to deliver a critical mass of use case demonstrations in collaboration with industry to support the industrial modernization leading to more agile production and increase the competitiveness of European companies. The modular and reconfigurable use case demonstrations will show how to combine robotics, IoT and Cybersecurity together. Furthermore, TRINITY will contribute to answer the European Industry demand for advanced, highly flexible and collaborative robotic solutions to keep companies competitive. TRINITY aims to bring together top researchers and industry from all over Europe with the objective of developing new, digital and human oriented robotic technology for improving agility of European manufacturing and innovation capabilities. Its mission is to make robotics available, cyber-secure, attractive and affordable for all sized companies.

Between 2010 and 2014 the average increase in sales of robots stood at 17% per year and in 2014 sales rose by 29%, the highest year-on-year increase ever, with automotive parts suppliers and the electrical/electronics industry being the main drivers of the growth. Annual patent filings for robotics technology have tripled over the last decade (EC, 2014). TRINITY’s vision is that the full adoption by EU SMEs of robotics systems and their related service platforms and innovation business models will allow Europe to achieve the ambitious target by have 20% of the GDP coming from manufacturing and related services. The project is based on the identified needs from the industry. The European industry has to evolve and modernize to be able to compete at global level. TRINITY’s focus is on the robotization and utilization of digital tools. The impact of the proposal is realized via the state of the art demonstrations that demonstrate the combination of the novel technologies in industrially relevant environments thus providing concrete and well formulated feasibility studies that can, later on, be industrialized. By promoting robotics for agile production, TRINITY will improve the technological competitiveness of Europe and help it to regain its attractiveness as a production site also for industries that have left Europe. This will enable companies to manufacture in vicinity of their target markets and react decisively quicker to market changes, adapt products to changing requirements, increase the speed of ramping up capacity, and decrease the overall time and cost to market.

In future, the manufacturing related jobs in Europe are increasingly knowledge based, and there is less need for manual labour due to increasing the level of automation in factories. Currently, around 10% of total employment in the automotive sector is regarded as “highly skilled” (ACEA, 2016). The share is increasing, in automotive as well as other sectors, through digitalization. Highly skilled employees possess a combination of theoretical knowledge, analytical mind-set and practical competence. The challenge is that jobs marked for un-educated and un-skilled workers disappear. In the TRINITY we will contribute to the development of teaching, training and learning factories. Within this network the teaching, training and learning will be targeted to 1) life-long learning that will happen in the factory-like environments for the staff already possessing
skills from other fields of technology,
2) newcomer education and training for students (BSc and MSc) e.g. via summer schools and courses, and
3) teaching the basics for the new generations e.g. kindergarten and primary school students by offering safe and interactive demonstrations.

Work performed from the beginning of the project to the end of the period covered by the report and main results achieved so far

As TRINITY aims at becoming the central institution for cooperation and technology transfer between academia and industry in flexible automation and robotic systems, one strategic mission will be the dissemination of the results to the scientific community, to end users and to the producers of the technology.

During the first year TRINITY has started to built the community via social media presence, organisation of thematic workshops, seminars and DeepDive events for the industry and academia. The main focus has been on the development of the core content of the TRINITY that are the use case demonstrations and the modules the use case demonstrations are using. We have currently published in our website 18 use case demonstrations and 32 module descriptions. These modules will include the set-up and training material as well.

During the first period of the project, the main focus of the TRINITY consortium, in terms of dissemination activities, will be to create awareness among the target audience for the project overall concept and main objectives. Moreover, the establishment of the TRINITY DIHs network has been communicated widely from this early phase of the project through the national as well as integration network of companies and institutes. Introduction to R&D and industrial clusters were seen as a strategic step for the dissemination of TRINITY by the academic countries through EU and regional related activities. Additionally, synergies and potential knowledge exchange with other relevant EU projects and the CSA RODIN on robotics have been initiated. From the early beginnings of the project, the Digital Access Point (DAP) has been set up. Through this portal, all the news, events, press releases will be published and widely available to the public.

During the 2nd period the focus has been on extending the TRINITY network via open calls, match-making events, seminars and other dissemination events. Special focus has been paid to the 3rd objective which is the delivery of the critical mass of use case demonstrations. The demonstrations were modularised to be more user friendly and re-usable for the industrial partners. Each of the use case and technical modules have associated set-up and training material published as video tutorials. The Digital Access Point was opened and the use case demonstrations and modules from the partners, 3rd parties in the demonstration program 1 and TRINITY community members can now publish their work in the DAP. The TRINITY publications, 14 are open access publications (with max 6 months embargo) and these have been also published in universities own open access collections and e.g. research gate. The collaboration with the sister projects is going on steadily.

Progress beyond the state of the art and expected potential impact (including the socio-economic impact and the wider societal...
The progress beyond the state of the art has been on realisation of very advanced technical modules, and by combining these to carefully designed use case demonstrations. The results have been submitted to several publication forums such as Journal of Robotics and Computer Integrated Manufacturing (RCIM), IEEE and CIRP publications. 14 publications have been published as open access to highlight the progress beyond the state of the art.