CEUP2030

© https://claudeai.wiki/

Interreg CENTRAL EUROPE
European Union
European Regional Development Fund

CEUP 2030

AUTOMATION AND ROBOTICS

Project co-funded by European Regional Development Fund.

CONTENT

INTRODUCTION

Over the last several decades we have seen robots go from incredibly expensive machines with limited functionality to today's modern industrial robots that can do amazing things and offer a quick return on investment. It is always hard to look into the future and see exactly what it might bring, but if one thing is certain it is that robots will be an integral part of that future, entering parts of the economy that a few years ago we could only imagine. Here are six emerging trends in the world of industrial robots that will likely have a big impact on a wide variety of industrial sectors, and provide benefits well beyond what was once imaginable.

1. Increasing ease of use, deployment and maintenance

The automotive industry has had a long history of using robots, but for industries that are relatively new to automation, programming robots can be a challenge. We need to find ways to make robots easier to use so that they do not require such a highly skilled workforce to deploy, operate and maintain. In fact, this question is one of the largest technical challenges the industry is currently grappling with. As more and more companies find that robots are within their affordability range, it is clear that one of the final barriers to adoption is the perceived complexity of programming and designing robotic systems.

2. Human-Robot Collaboration

Close collaboration between humans and robots, working as colleagues on assembly lines and in other applications, will be a large part of the future of industrial robotics. In fact, there may come a time when the line between what is made by a human and what is made by a robot is blurred to the point of becoming indistinct. This will be especially pronounced during a transition phase in which robots are still incapable of perfectly reproducing human dexterity, but have enough dexterity and ability to work with delicate objects that they can take over some but not all of the jobs that currently require a human touch. The growing need for small parts assembly is a perfect example, with the electronics market leading the charge in this regard. The industry, working in conjunction with lawmakers, regulators and the insurance industry around the planet, will need to agree on ways to mitigate the inherent risks of human interaction with robots. Specifically, strengthened and new global standards governing this interaction, as well as creative ways of mitigating risk, will be needed.

3. New ways of working with robots

We envision a future in which companies that depend on robots will be able to manage them and the teams that rely on them from any device, anywhere with an Internet connection to simplify all stages of robot interaction (design, sales, installation, commissioning, operation, oversight, and service). I believe the future of robotics is closely tied to two aspects of connectivity that the entire industry is focusing on. The first relates to the application of connectivity to remotely monitor robots.

4. Improved ROI

Over the last several decades we have seen robots go from incredibly expensive machines with limited functionality to today's modern industrial robots that can do amazing things and offer a quick return on investment. Robots have also reduced injuries in the workplace, increased the competitiveness of companies in a fierce global market, elevated the quality of affordable products, increased profits for countless businesses, and created a whole new ecosystem of high-paying and rewarding jobs. Based on a huge body of evidence, experience and common sense, it is clear that the companies that adopt robots realize huge financial benefits. More than any other action businesses can take, integrating robots can increase productivity, reduce overhead, provide flexibility, reduce waste, and increase quality—in some cases improving these metrics by orders of magnitude.

5. Training the robot employees of the future

Industrial robots have created a whole new ecosystem of highpaying and rewarding jobs. Designing, building, marketing, selling, installing, operating and maintaining robots creates jobs that didn't exist before robots. The jobs this "robot ecosystem" creates are typically high paying, rewarding and come with good levels of benefits. Robots allow companies to remain cost competitive even while maintaining production in a high cost country as opposed to moving operations to a low cost country. This preserves jobs in the high cost countries that would otherwise be entirely shifted to the low cost countries.

As companies seek to not just survive but to thrive in these disruptive times, many are looking to automated systems for their labor-strapped warehouses and distribution centers. To that end, I would like to share some related thoughts on the current state of robotics in automation, expected trends for the future, and what this all means for companies looking to robotics automation to meet consumer demand.

Robotics have always been something of a showpiece for automation systems — watching a robot arm delicately picking items from a bin, pivoting swiftly, and placing them in a shipping container over and over can be fascinating. But there is certainly more to their capabilities than that.

For many companies automation has long been a key part of their business strategies. The pandemic accelerated the business case for full-enterprise automation solutions and, consequently, robotics-based solutions are being thought of less in terms of future and more in terms of now.

Robotics are a subset of automation (though not all automation is robotics). Robotics are not a requirement for integrated automation solutions, but they can provide real value for many applications. For example, robotic arm technology has matured from decades of manufacturing automation into a viable tool for order fulfillment.

Robotic piece picking systems now operate 24/7 with extremely high accuracy. These systems feature advanced image processing software to rapidly scan and verify contents of incoming containers and gripper technologies that allow robotic arms to select and transfer materials. That said, the success for each picking robot depends on the collaborative effort between the customer and the integrator. Mastering the set of SKUs used in the application is critical to the practical use of robotics.

Automation systems featuring robotic palletizing present a more practical application for current technology. Dematic recently worked with ODW Logistics, a third-party logistics company, to implement a robotic palletizing system that automatically fulfills online orders for beverage cartons. When an order is received, software sequences the cartons to release in carton sizes largest to smallest, allowing the robot to optimally build pallets with up to three cartons at a time.

When discussing robotics, one question is often raised, "Will a completely automatic, no human intervention, lights-out facility ever be possible?" The short answer is no, not 100%. People will always be needed to manage and maintain the facility.

However, as far as daily operations go, it's a possibility. As technologies continue to develop and improve, we can expect more complex operations that accommodate larger variations in SKU size, shape, weight, and number.

What's clear is that robotics isn't about replacing workers, it's about creating opportunities. Many developed countries are facing near and long-term labor shortage. In many cases, robotics can help fill that need allowing companies to continue to meet customer demand.

And rather than taking away jobs, robotic automation creates roles for workers in operation support and maintenance — higher paying, more rewarding jobs that can help companies attract and retain valued employees.

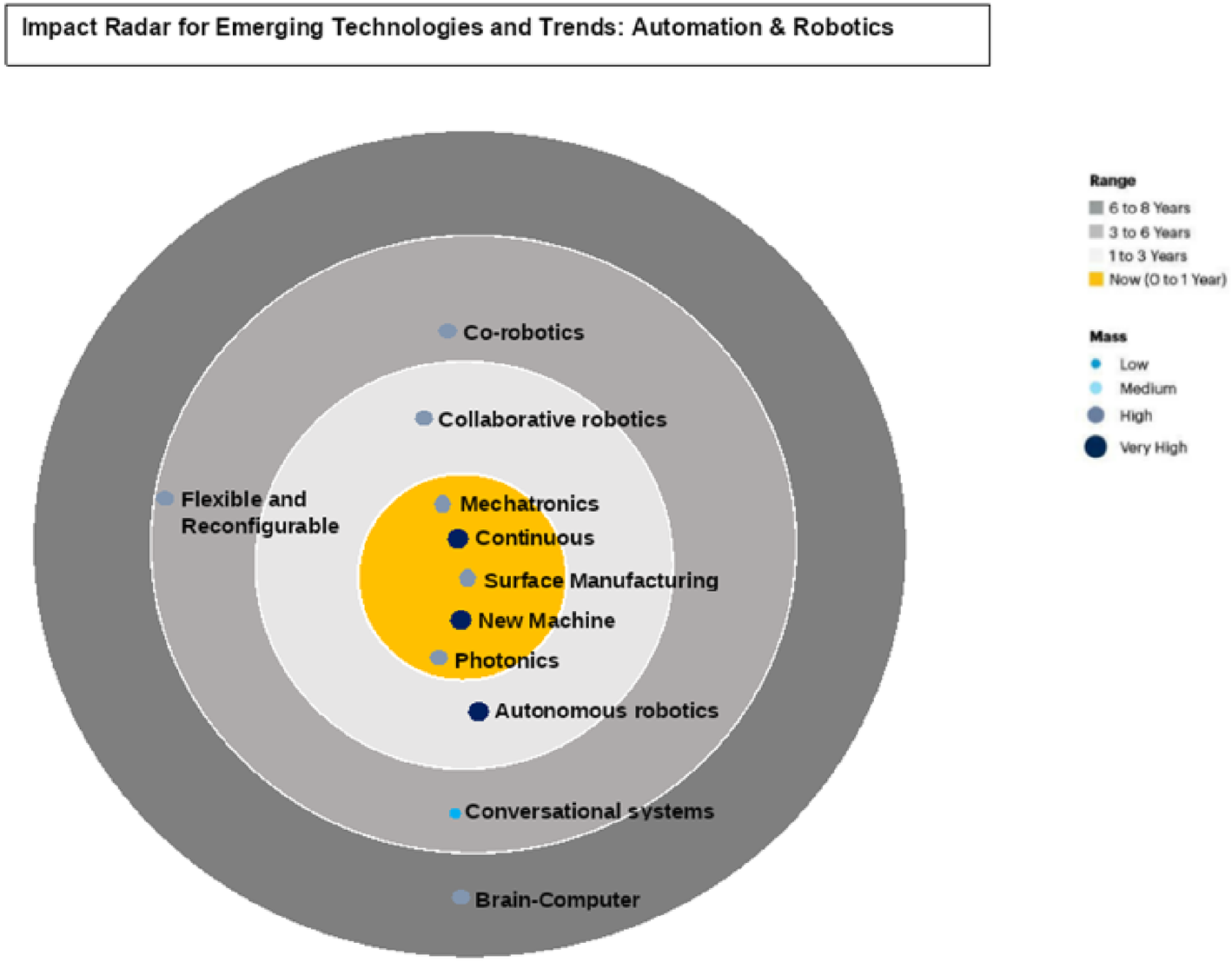
The future for robotics isn't binary (as in, either people or robotics), but a shared "cohabitation" ecosystem, where humans and robots interact in a shared space. Autonomous Mobile Robots (AMRs) provide an excellent example of this. AMRs have many applications, but one of the most obvious is transporting materials within a facility instead of conveyor or monorail. This provides greater flexibility and opens up valuable space. AMRs can safely coexist with dynamic features to navigate around people, equipment, and inventory. In this case, robotics become an extension of a successful work environment.

But as we move into the future with robotic applications, advancement in both productivity and safety will depend on software, specifically developments in Machine Learning (ML) and Artificial Intelligence (AI). ML will allow robotic systems to learn and adapt without following explicit instructions, but instead by using algorithms and statistical models to analyze and draw inferences from patterns in data. AI will empower robotics systems to improve by continuously fine-tuning operational processes.

One place where the human touch will always remain is with the relationship between the automation supplier and the customer depending on it. The real value of any automation solution (including those with robotics) comes from how well it is implemented and maintained as part of the customer's entire ecosystem. I'm proud to say that Dematic has been and will continue to be that trusted partner for some of the world's most well-known brands.

Software is the key to the future flexibility, so it's vital for companies to have a partner who will be with them every step of the way — from design and implementation to operation and eventual upgrades.

IMPACT RADAR



POLICY INTELLIGENT DASHBOARD

The CEUP 2030 Partnership would like to invite all interested stakeholders to explore Policy Intelligence Dashboard - policy tool to streamline, process and manage the knowledge for improved policy decision making, in a practicable and sustainable manner.
Policy Intelligent Dashboard is the most complete one-stop-shop for policy makers and policy influencing stakeholders as research technology organizations and enterprises operating around Advanced Manufacturing and Industry 4.0 topics.
PID gathers in one place practical and streamlined knowledge and insight on technology trends and potential industry impact for the entire innovation eco-system. Each CAMI4.0 area: Intelligent Production Systems, Automation and Robotics, Smart Materials and Artificial Intelligence represents a Tech Radar, where policy-relevant data sources as use cases, financial instruments, flagships and organizations are presented with a goal to support, transfer and enrich policy decision making processes in the area of key technologies.

PID is located on the http://ceup2030pid.eu/ -website and integrate knowledge and insight developed from dialogue occurring within the Partnership's workshop series includes the following elements for each CAMI4.0 topics :

INTERESTING USE-CASES

Each project partner provided contributions of thematic use cases/developments from regional companies/DIHs in connection with every thematic topic identified in the CEUP project.

SUMMARY OF THE FLAGSHIPS

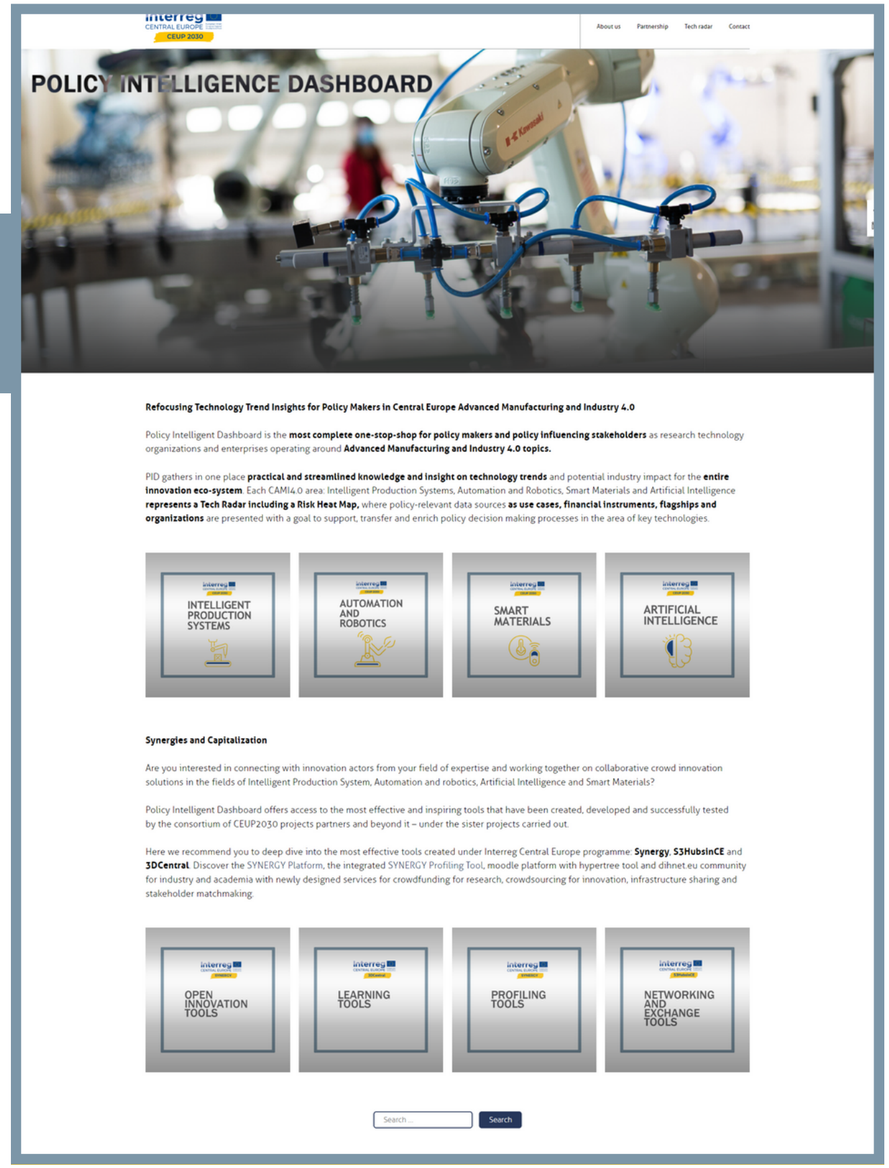
Flagships are significant initiatives which clearly add value or deliver enhanced competitive advantage to the innovation eco-system surrounding advanced manufacturing and industry 4.0

POLICY INSTRUMENTS

One of CEUP 2030's main goals is to exchange information and good practice examples regarding policy instruments that are being used and deployed in Central Europe.

ANALYSIS OF THE TECH RADAR

The Tech Radar and Risk Heat Map offer open access to policy-relevant data sources as use cases, policy instruments, organisations and networks, technology trends in the most convenient, practicable and efficient way.



Policy Intelligent Dashboard offers access to the most effective and inspiring tools that have been created, developed and successfully tested by the consortium of CEUP2030 projects partners and beyond it – under the sister projects carried out.

We recommend you to deep dive into the most effective tools created under Interreg Central Europe programme: Synergy, S3HubsinCE and 3DCentral. Discover the SYNERGY Platform, the integrated SYNERGY Profiling Tool, moodle platform with hypertree tool and dihnet.eu community for industry and academia with newly designed services for crowdfunding for research, crowdsourcing for innovation, infrastructure sharing and stakeholder matchmaking.

Check the Policy Intelligent Dashboard now!

http://ceup2030pid.eu/

FLAGSHIPS

An integral part of the CEUP 2030 project is the development of so-called Flagships. Flagships are projects that the CEUP 2030 project partners have designed throughout the project. Ideally, the Flagships will soon be implemented – provided the necessary funding for most of the projects materializes. On the topic of Automation & Robotics, 4 Flagships have been provided by the project partners. Therefore, 20% of all CEUP 2030 Flagships are in Automation & Robotics. In the following paragraphs the 4 Flagships are further described. The projects are highly diverse. However, all of them plan to use robots for solving societal challenges and for improving the project partner's regional economies within a bigger European ecosystem.

UNDERWATER ROBOTS CLEANING THE CROATIAN OCEAN

The key goal is to develop and implement a marine robotic system consisting of a modular autonomous catamaran coupled with an ROV (remotely operated underwater vehicle) on the three Adriatic nodes.

POLISH EUROPEAN DIGITAL INNOVATION HUB FOCUSING ON ROBOTICS

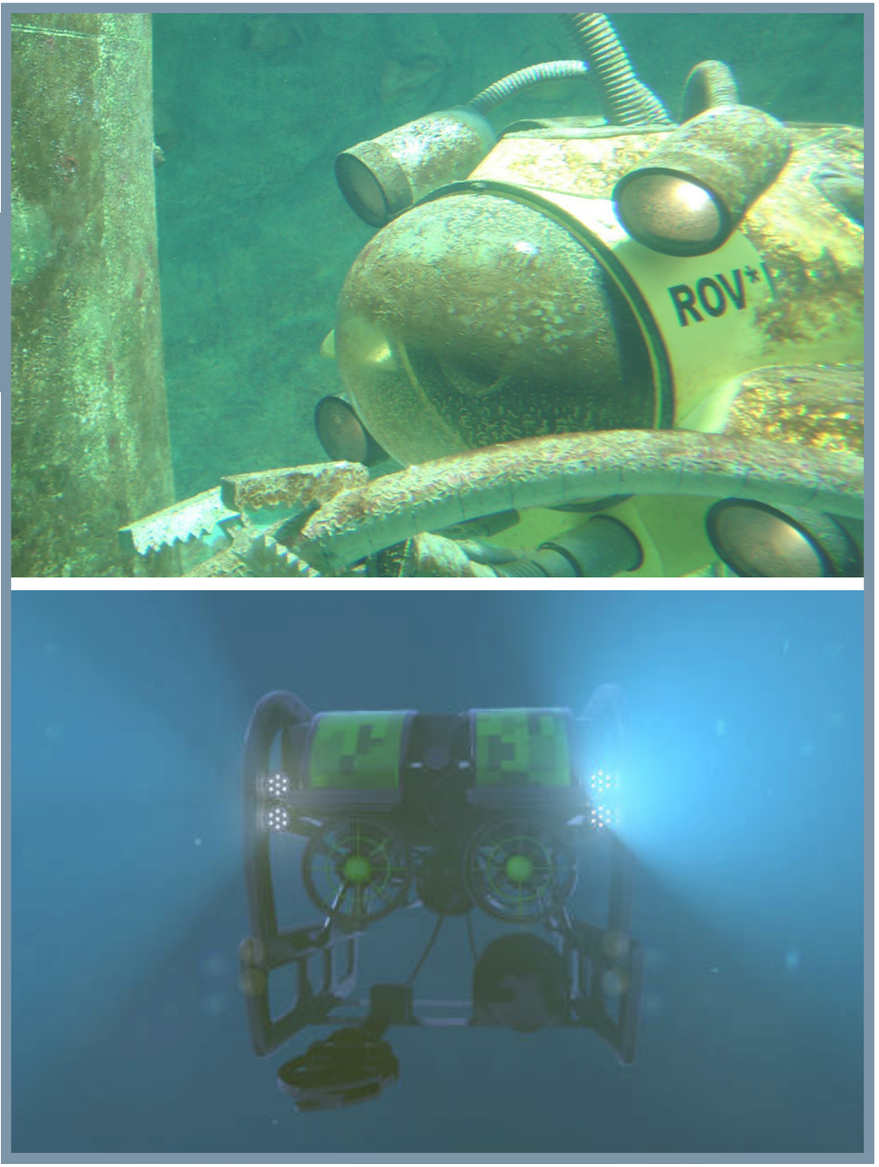
The proposed Digital Innovation Hub focuses on various technologies connected to the term "4.0". A special focus of the proposed project lies in robotics and communication (including 5G).

CONNECTING INDUSTRIAL TESTBEDS IN AUSTRIA AND THE CZECH REPUBLIC

One goal of the proposed Flagship project is to create and implement a strategic plan to identify key areas of interest and plan concrete collaborations among the cooperating pilot factories.

HUMAN-CENTERED ROBOTICS ON AUSTRIAN FACTORY FLOORS

The proposed Flagship project aims at implementing a reconfigurable framework to deploy and configure multiple collaborative teams of workers, robots, and machines in manufacturing processes.



Underwater robots cleaning the Croatian ocean

HAMAG is the Croatian Agency for SMEs and Investments. HAMAG's Flagship within the CEUP project combines technology with the need to support the environment:
The North Adriatic coast, especially the Istria region, is frequently polluted by jelly fish. Further south, on the island of Krk there is pipe gas plant and the port of Rijeka, the biggest port in the Adriatic. In the central Adriatic, in Šibenik area, there used to be heavy industry which polluted the soil with heavy metals, which are still present in the soil and affecting the local ecosystem. Industrial pollution affects the whole eco chain in the Adriatic region and undermines the prospects of eco agriculture, tourism, and fishery
One of the ways to tackle that issue is through the deployment of underwater robots which clean the seafloor and monitor the level of pollution. The robots can also measure relevant parameters important for marine research which is conducted in the research stations on both sides of the Adriatic. The underwater robots could be deployed in tourism-heavy areas, providing continuous remote access to water quality, sea state, beach, harbour, and waterway data.
The key goal is to develop and implement a marine robotic system consisting of a modular autonomous catamaran coupled with an ROV (remotely operated underwater vehicle) on the three Adriatic nodes: north mid and south in both sides of the Adriatic – Croatian and Italian.

A Polish European Digital Innovation Hub focusing on robotics

The Krakow Technology Park (KPT) is a physical hotspot for technology in Poland. KPT’s Flagship within the CEUP 2030 project builds on this strength.
The hub4industry (h4i) project is focusing on manufacturing SMEs from southern Poland. It's built around the KPT ecosystem. The network of KPT encompasses more than 230 manufacturing clients, about 120 IT tenants, and 80+ graduates of Industry 4.0 acceleration programs.
The proposed Digital Innovation Hub focuses on various technologies connected to the term "4.0". A special focus of the proposed project lies in robotics and communication (including 5G). Furthermore, thanks to a broad network of partners, h4i offers also support in implementing AR/VR, AI, IoT, cybersecurity solutions, and various software solutions to manufacturing. The hub should provide companies in the region with skills and trainings as well as “Demonstration and Test Before Invest” services.
For the digital maturity assessment of companies, the ADMA methodology is applied to rely on a proven track record in Poland: In the last four years, KPT has supported 80+ pilot projects of innovative solutions to be tested in real-life facilities of 15+ corporate industrial partners.
The key goals of the Flagship are:
·Provide companies with skills, capacities, and resources to implement innovative robotization technologies in their factories

- Increase the level of expertise and competencies of the companies
- Increase the level of innovativeness of the Polish manufacturing sector
- Increase the amounts allocated for innovativeness in the manufacturing sector

Interreg

EUROPÄISCHE UNION

Österreich-Tschechische Republik

Europäischer Fonds für regionale Entwicklung

Connecting industrial testbeds in Austria and the Czech Republic

The Platform Industry 4.0 Austria (PIA) has built an extensive network of companies and academic institutions on manufacturing. Different organizations often lack certain machinery to test innovative applications, and with their Flagship, PIA wants to change that.

In PIA's experience, even today the concepts of Industry 4.0 are still only vaguely understood, and each company may understand something different from it. PIA, therefore, believes it is necessary to create a solid framework that standardizes the view of Industrie 4.0 and thus leads to a more concrete understanding of Industrie 4.0 among the general public.

The leading players in Industrie 4.0 are currently in many cases universities and specialized departments of top companies. At academic institutions, so-called testbeds (in Austria called pilot factories) have emerged in recent years, which have both in-depth expertise and modern infrastructures.

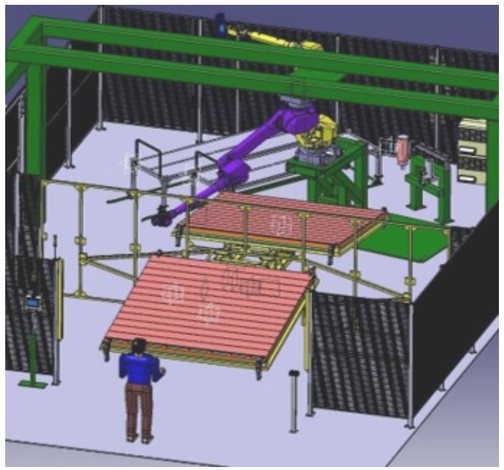
The aim of the Testbed Exchange project is to survey these testbeds and to create a sustainable network in which intensive communication, mutual learning, and exchange of experience take place.

One goal of the proposed Flagship project is to create and implement a strategic plan to identify key areas of interest and plan concrete collaborations among the cooperating pilot factories. The second goal concerns the transfer and publication of expertise. This will be done through seminars. The seminars are designed for cooperating testbeds, SMEs, students and partner universities, as well as the general public.

Human-centered robotics on Austrian factory floors

PROFACTOR (PRO) is a highly specialized Austrian research institution focusing on robotics. Therefore, PRO's proposed Flagship project has a strong focus in this area as well.
The era of mass customization demands small lot size production from the manufacturing sector. Also, Europe is experiencing a demographic change with growing concern over the retiring workforce and a subsequent skill drain.
To keep up the high quality of produced goods and the need of optimized assistance for the workers in the factory, flexible assistance systems are being developed. The goal of those systems is to assist users at the factory floor both physically (e.g., using robots) and cognitively (e.g., through an intelligent guidance system).
However, dealing with the factory floors involves multiple working stations and users. Therefore, such solutions could tackle multiple users and varying production workflows (needed for mass customization) which could involve multiple robots. Such assistance systems could also be re-configurable (to accommodate production changes) according to the situation in the factory floor and cater to users accordingly.
The proposed Flagship project called "CoRTeam" aims at implementing a reconfigurable framework to deploy and configure multiple collaborative teams of workers, robots and machines in manufacturing processes. This should be achieved by a human-centered approach, studying behaviors and practices at work, informing a digital simulation environment that can optimally and dynamically allocate roles of agents (humans, robots) and initiate the required collaboration to improve the overall productivity at the factory floor level. The project should promote a humanistic perspective to robotization (introduction of robots to carry out industrial tasks).
In order to reach its goals, the project should focus on safety holistically.

USE CASES




DIH²
ACCELERATING PRODUCTION
ROBO4TOYS TTE Proposal
DIH² 2nd Open Call


AIRSKIN


PROFACTOR

1.Augmented Reality (AR) in advanced manufacturing in Lombardy

As a leader for industrial imaging, Canon has developed a system to capture 3D content with the goal of simplifying the entire stereoscopic acquisition process by enabling users to develop immersive content for virtual reality solutions. This, integrated with AR, could allow to work hands-free, without having supporting paper documents and communications, strongly increasing task efficiency and effectiveness. TeamViewer is working in this direction as well, using smart glasses to control, manage and repair machines and components.
This solution has been implemented in different applications: in the automotive sector for manual assembly, in logistics activities for sorting envelopes and packages and for the training of workers for the assembly of luxury watches.



2.Industrial robots for the production of toys in Hungary

Two Hungarian companies, one in the field of robotics (Robo-Tech Service), the other one in the field of toy production (Artrade Ltd.), are participating in a common research project.
Artrade Ltd. is an internationally leading designer, developer, and producer of toys dominantly made of injection molded plastic components. Robo-Tech Service Ltd. offers maintenance services as main activates and can deliver turn key solutions on automation system design and simulation, programming, preventive maintenance, status monitoring, life cycle assessment, testing and diagnostics, refurbishment and reconditioning services.
Together, the partners are planning a research project.

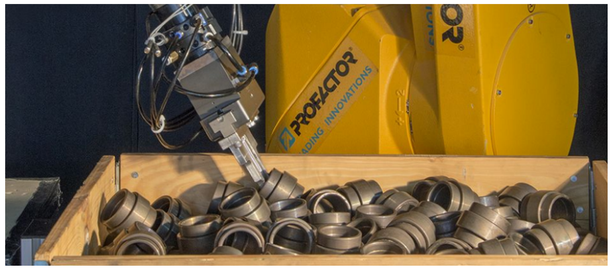
3.Increasing the potential of industrial robotics through safe and fenceless robots

Today, most industrial robots are operating within a cage or behind a fence to avoid human injury and to keep the shop floor safe. However, operating robots this way leads to limitations in their application. The Austrian company Blue Danube Robotics aims to change that with AIRSKIN.
AIRSKIN is a soft pressure-sensitive safety skin for industrial robots and tools. It consists of individual pads whose deformation (e.g., when humans are in the way of the robot) causes the rise of internal air pressure issuing a safe stop of the robot. The product turns an industrial robot into a fenceless robot, combining the advantages of an industrial robot with the advantages of fenceless collaborative applications.

AIRSKIN is a certified product (CE mark) fulfilling modern security standards, has won several awards, and works with different manufacturers of robots.

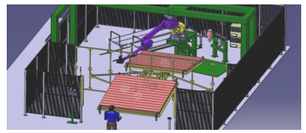
4.Bin picking in the Automotive Industry

"Bin picking", the handling of misshapen and unsorted presented parts, is a challenge for automation. The iRob Feeder®, jointly developed by PROFACTOR and IH Tech, can detect different workpieces in different positions, grab them and position them for further processing. The partners have implemented several robotic handling systems in the automotive industry.
The 3D algorithms used to play out their strengths very well, especially in the case of crankshafts. Robotic handling has also been integrated into the XRob software platform - the corresponding technology module is called XRobFeeder.



5.Industrial robots for the production of saunas

In Slovenia, a research project called “Agile Robotic assembly for Smart Sauna Factory“ has been proposed.
The goal of the project is to automate a robotic handling and assembly process and upgrade robotic systems for the FIWARE platform to achieve agile robotic manufacturing. The proposed solution consists of two robots with a tool changer, a single-axis robot positioner with two working stations, multiple containers for input material, material tracking systems and a machine vision system for intermediate and final quality control of the products (sandwich walls / panels).



6.Operating robots and autonomous navigation

Romb technologies is a is Croatian high-tech SME focusing on robotics and autonomous navigation. The company is specialized in designing autonomous navigation modules to power the next generation of load transportation vehicles.
The modules are written in ISO-standard C++11 and are available as precompiled libraries on a variety of platforms. The Romb technologies provide Robot Operating System (ROS) wrappers for seamless integration into existing ROS-based systems.
Their products include: forklift conversions, navigation software development, autonomous mobility for intelligent greenhouses, Soft4AVG.

POLICY INSTRUMENTS

WHICH MIGHT INFLUENCE THE DEVELOPMENT OF THE FLAGSHIPS

One of CEUP 2030's main goals is to exchange information and good practice examples regarding policy instruments that are being used and deployed in Central Europe. The CEUP 2030 project partners have provided examples for policy instruments that have the potential to influence the development of the CEUP 2030 Flagship projects.

1.ITALIAN POLICY INSTRUMENTS FOR THE DEVELOPMENT OF ROBOTICS & AUTOMATION

The regional policy instrument in Lombardy called "Manifestazione di interesse Regione Lombardia e Uniocamere" supports projects aimed at:

- enhancing and consolidating the productive chains, services and industrial, productive, and economic ecosystems existing in Lombardy
- identify new supply chains and new ecosystems emerging in the region
- stimulating business combinations and synergies by encouraging the exchange of skills and the achievement of common objectives for consolidation and development of industrial ecosystems and supply chains
- innovating and improving the quality of the production process of the supply chain and increase the competitiveness and attractiveness of industrial, productive, and economic sectors and ecosystems on national and international markets

2.A CROATIAN POLICY INSTRUMENT IN THE REALM OF ROBOTICS & AUTOMATION

The Croatian policy instrument "Commercialization of Innovation" will be launched in April 2022 by the Ministry of Economy and Sustainable Development through the National Recovery and Resilience Program 2021-2026.
The Call will encourage the investments necessary for the commercialization of innovation and research and development results. Innovative projects with the highest probability of commercial success will be encouraged, which will start business activities and production based on the applied solutions. The results of the project are market-ready innovations.
Available amount of funds: 380,000,000.00 HRK i.e. 50 million Euros.

3.GERMAN FUNDING OPPORTUNITIES REGARDING ROBOTICS & AUTOMATION

Funding opportunities by the German Ministry of Education and Research (BMBF) include among others:

- the “Microelectronics Framework Programme Germany”
- the establishment of the “Federal Agency for Disruptive Innovation (SPRIND)” which creates spaces for innovators, where they can take risks and think radically different
- the possibility for strategic international collaboration which is fostered by specific bilateral calls (2+2 Projects) and via dedicated ERA-Net programs

4.SHAPING THE DIGITAL TRANSFORMATION IN A JUST AND EMPLOYEE FRIENDLY WA

With its “Digitisation Fund Work 4.0”, the Austrian chamber of labour (AK) puts people at the centre of digitisation. The fund supports projects that illuminate digitalisation from the perspective of employees and shape it in their interests. The Digitisation Fund is part of the AK’s “Future Programme 2019 – 2023”, 150 million euros are spent to make Austria's working world fit for the future. For the year 2022, AK Vienna provides 4 million euros in two funding rounds as part of the funding scheme. The funding is used to support projects to shape digitalisation from the perspective of employees.
Projects that want to receive funding need to focus on one of five leverage points:

- Knowledge and awareness
- Technology development
- Regulation
- Experimenting
- Science

The next Digifonds funding round will take place in autumn 2022.

© https://claudeai.wiki/

Interreg CENTRAL EUROPE
European Union
European Regional Development Fund

CEUP 2030

https://www.interreg-central.eu/Content.Node/CEUP-2030.html

https://www.facebook.com/CEUP2030

https://www.linkedin.com/in/ceup-interreg-ce-1a561b1a8/

Pomurje TECHNOLOGY PARK
PROFACTOR
AFIL Lombardia
HAMAG BICRO
Siit
PBN advanced management
Fraunhofer IWU
INDUSTRIE 4.0 AUSTRIA
KIT Karlsruhe Institute of Technology
KRAKOWSKI PARK TECHNOLOGICZNY

Project co-funded by European Regional Development Fund.