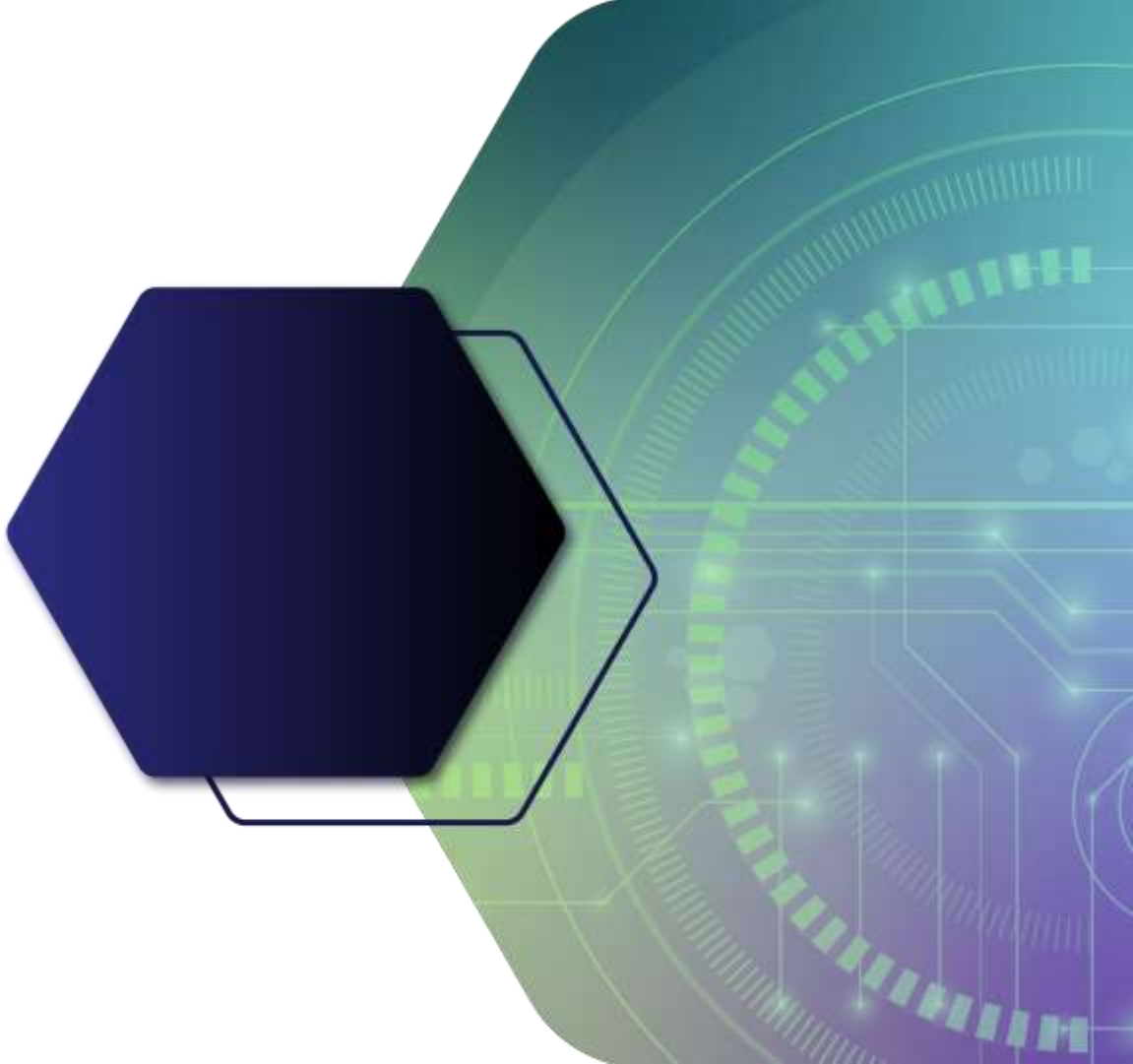
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INTECRO

AI-Driven Real-Time Adaptive Robotic Welding Platform




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ORGANISATION PROFILE

Intecro Robotics

Intecro provides industrial robotic automation and system integration solutions, with strong expertise in **robotic welding technologies, metal processing and flexible manufacturing systems**.

400+ projects delivered · **15 years** of experience · Ankara, Türkiye

Core capabilities

- Robotic welding systems, including pipe welding applications
- Industrial robot and welding cell integration
- Robot, sensor and process communication
- Welding process monitoring and seam tracking
- Software-based intelligent robotic process tools
- AI/software development and adaptive process control
- Digital manufacturing and traceability

PROPOSAL INTRODUCTION (I)

Vision: Develop an AI-driven adaptive welding platform that learns from real production data and adjusts robot motion and welding parameters in real time.

Innovation: Today's robotic welding runs on fixed parameters or stand-alone seam tracking. The project closes the loop: synchronized robot, process, image and quality data feed AI models that learn welding recipes and adapt robot path and welding parameters during the weld.

Motivation: Weld quality still depends on fixed parameters and operator experience, and no industrial dataset links process signals, joint geometry and final weld quality. Building this dataset in a real production environment is the first step towards adaptive welding.

Content:
- Synchronized welding, robot, image and quality data collection
- Real-time weld and geometry monitoring
- Adaptive robot path and welding parameter control

SMART domains: Intelligent & Adaptive Manufacturing Systems · Advanced Manufacturing Processes

PROPOSAL INTRODUCTION (II)

Expected outcomes:
- Digital Welding Record
- AI-assisted welding recipe
- Real-time process monitoring
- Adaptive robotic welding demonstrator

Impacts:
- Improved weld quality and repeatability
- Reduced trial-and-error
- Increased traceability
- Reduced operator dependency
- Data-driven adaptive welding

Development stage: TRL 4 → TRL 6–7 (adaptive welding demonstrator validated in the end-user's production environment)

Target markets: Pipe and cylindrical component welding in energy, oil & gas, pressure vessels and heavy machinery; transferable to other MIG/MAG applications

Schedule: 24–36 months
Data collection → AI decision support → Adaptive welding

PARTNERS (I)

Current consortium

Intecro Robotics (Türkiye) – Technology Provider / System Integrator
Robotic welding, sensor integration, software, AI-based process monitoring and adaptive control.
Website: intecro.com.tr/

METU DTX (Türkiye) – Research Centre / University
Provides expertise in advanced manufacturing solutions, digital transformation, AI application development, big data analytics, and VR/AR technology integration.
Website: dtx.metu.edu.tr

PARTNERS (II)

Partner search

1. Priority Partner - Industrial end-user:
Company running a robotic, mechanized or conventional MIG/MAG welding process suitable for industrial data collection

- Use case definition, quality and inspection methodology
- Repeatable welding use case
- Setup suitable for torch-mounted or near-torch
- camera/sensor monitoring
- Process, quality and inspection data
- Pilot validation support

Preferred: pipe/cylindrical welding; other suitable geometries are welcome.

2. Metallurgy / Testing Partner:
Mechanical testing, NDT, metallurgical characterisation and weld-quality validation.

3. Welding Machine / Process-Control Technology Provider:
Welding equipment integration, access to process parameters and real-time parameter control.

4. Sensor / Vision Technology Partner:
Welding cameras, seam tracking, laser/profile sensing and process monitoring technologies.

The consortium should include at least one partner from a SMART participating country outside Türkiye.

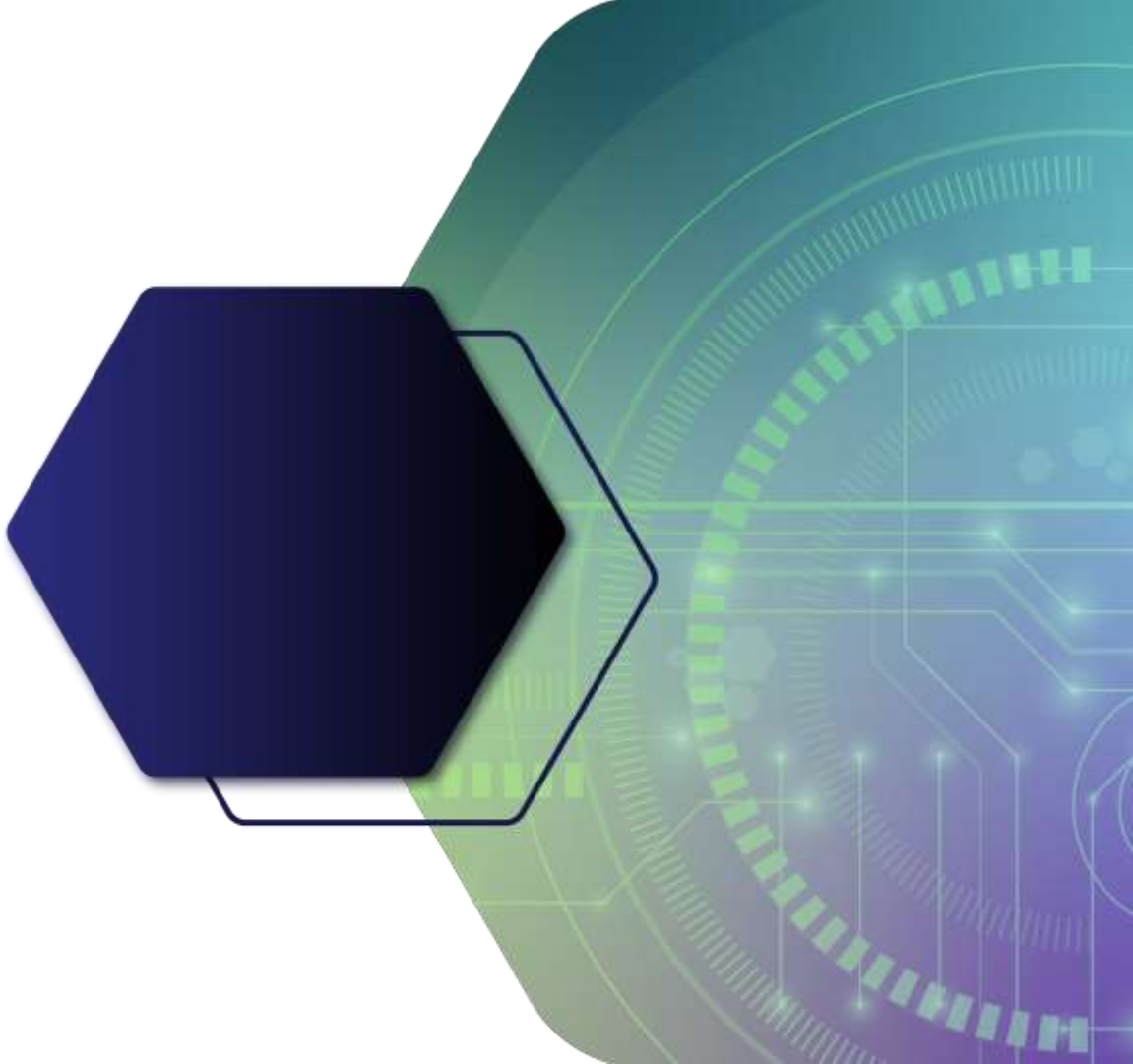
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