INTELOS – System Self-Awareness

Cognitive reflection technology to make systems know about themselves and their missions for improved autonomy.

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Technological Offers type

Technological solutions

Research and innovation areas

- Digital Technologies, Artificial Intelligence, Cybersecurity, 5G, Robotics
- Industry, Materials and Circular Economy
- Science For Engineering and Architecture

ODS

Available from: 2020

Where?

Autonomous Systems Laboratory Centre for Automation and Robotics (CAR). Joint UPM-CSIC Centre

Keywords: | Robótica | sistemas autónomos

Brief description of the technology solution and the added value it provides

Cognitive reflection technology to make systems know about themselves and their missions for improved autonomy.

Description of the technological base

Intelos technology provides the “know thyself” for machines. It enables the deployment and operationallization of self-knowledge to drive autonomous adaptation

Intelos is based on state-of-the-art software technologies and platforms for embedded smart systems and can be leveraged in modern software intensive systems engineering product life-cycles.

Machines shall take care of themselves to autonomously adapt to changing conditions.

Autonomous system reconfiguration in the presence of internal faults

Proper response by adaptation to disruption from uncertain dynamic environment condition

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Market demands

- Autonomous system are very complex technological systems (e.g. self-driving, cars, autonomous robots, space probes).
- Achieving reliable autonomy in unknown, dynamic and harsh environments is engineering-hard due to environment variability, internal faults or task contingencies.
- There are challenging requirements for a for deploying autonomous systems:
    - *Scalability* – up to real-world systems.
    - *Reusability* – in cross domain system-of-systems.
    - *Extensibility* – to bespoke developments.
    - *Dependability* – reliable, safe and ethical.
- Integrators’ and final users’ needs require augmentation of product adaptive resilience.
- Value and trust are key product values.
- Reduction of system engineering effort to shorten the the TTM of autonomous products and reduce engineering costs.

- Improvement of autonomous systems product line maintainability.

> *System and environmental complexity is an unsurmountable barrier for human control capability. Systems shall self-manage*

Competitive advantages

- Reflective cognition for autonomous machines is a technology that has been explored in the past and has produced promising results in laboratory prototypes.
- Intelos will offer a reusable toolbox of engineering-grade software assets of wide applicability.
- Up-to-date there is no technological offer of comparable capability.

Previous references

The research that has led to this technology has been funded by the European Union's research and innovation programmes in several projects:

- HUMANOBS – No. 231453
- UNEXMIN – No. 690008
- ROSIN – No. 732287
- RobMoSys – No. 732410
- ROBOMINERS – No. 820971

Intellectual property

- **Patente**
- Registro sw
- Secreto industrial

Development stage