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IoT-NGIN

EU H2020

Next Generation IoT as part of Next Generation Internet

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About IoT-NGIN

The main goal of IoT-NGIN H2020 project is to bring together innovations creating synergies between **5G, Artificial Intelligence, Augmented Reality and IoT Cybersecurity & Data Privacy systems** and provide foundations for integrating it with the Next Generation IoT ecosystem as an essential dimension for the Next Generation Internet.

As the project is reaching its end, it's time to present the main results:

The IoT-NGIN 5G Innovations

With increasing demand for 5G infrastructure, IoT-NGIN has been focusing on different topics on 5G technology, such as **cellular coverage extension, time-sensitive networking and generic resource management.** These extensions optimize the usage of 5G technologies providing improved user experience. They are addressing the evolution of the demand in order to cover new applications such as the ones found in private 5G, namely Smart Industry, Healthcare Industry as well as Smart City.

The IoT-NGIN Machine Learning Operations (MLOps) innovations

Introducing our comprehensive MLOps platform that covers the entire ML development lifecycle. This innovative platform integrates advanced ML frameworks, including **online learning, reinforcement-learning-based optimization, privacy-preserving federated learning and polyglot model sharing and serving. It also offers model zero-knowledge verification services.**

MLOps accelerates IoT-based device and application intelligence development. It harnesses dispersed peer knowledge while safeguarding data privacy. The platform results in reduced development costs and faster time-to-market.

Ambient Intelligence Support

Discover IoT-NGIN's transformative tech for humans and machines in IoT environments:

1. **Enhanced Discovery:** Detect, position, and track objects using images, light, and radio signals.
2. **Pervasive security & Access Control:** Interact security with IoT devices based on custom chained criteria.
3. **Augmented Reality Tools:** Establish tactile IoT interaction using AR tools.

These innovations elevate Ambient Intelligence, providing proactive support in digitalized environments. Sensors recognize people, objects, and context, enabling personalized responses. Current applications span smart homes, health, transport, and more. They also enhance Tactile IoT, fostering human-machine interactions through AR interfaces.

These technologies witness a future where technology seamlessly integrates into daily life, offering unprecedented convenience and efficiency. IoT-NGIN brings incredible empowerment to individuals and machines, working together to create a smarter and more connected world.

IoT-NGIN Cybersecurity and Privacy Innovations

In the IoT industry, cybersecurity and privacy hold immense significance. IoT-NGIN introduces an array of tools and services to address these concerns, encompassing:

- **Cyber-defense tools** guarding against attacks.
- **A novel Semantic Twin solution** for machine-understandable IoT device and Digital Twin descriptions.
- **Privacy solutions** for safeguarding users of diverse IoT devices.
- **An advanced distributed interledger system**.

These solutions elevate IoT security and privacy. They are actively leveraged in Federated Learning trainings while preserving data sovereignty. This approach ensures IoT data access remains trustworthy, auditable, and controlled.

Such improvements translate to better lives and greater confidence in utilizing IoT technologies.

Validation of IoT-NGIN results

IoT-NGIN's results undergo validation within the expansive scope of **IoT OneLab and five Living Labs across Europe, spanning Smart City, Smart Agriculture, Smart Industry, and Smart Energy** domains across Europe.

To amplify the impact, IoT-NGIN **orchestrated 2 Open Calls**, enhancing the potential for sustainability and expansion of its outcomes. Open Call 1 engages 5 European IoT device manufacturers, while Open Call 2 involves 6 SMEs across Europe, rigorously confirming IoT-NGIN's components and developments.

Moreover, the project actively explores diverse possibilities for exploitation through an **open innovation approach** and **open-source code**, driving the project's reach and influence.