Alliance for AI, IoT and Edge Continuum Innovation

Edge IoT Industrial Immersive and Spatial Computing Applications

Ethics and Standardization aspects

Valerio Frascolla, Intel Deutschland GmbH

MULTIX 6GARROW

Ethics – Challenges

- As Immersive and Spatial Computing Applications and the underpinning IoT-Edge-Cloud Continuum become more and more integrated in the society, they also raise ethical challenges, as technology can influence perception and interactions, change behaviours, form opinions, and steer masses

- **CH#1:** Privacy: The Internet of Senses (IoS) will harvest personal data, e.g., neural activities, biometric info and emotions
- **CH#2:** manipulation and deception: real and virtual boundaries will disappear, making users weaker against unwanted messages. Avatar can better exploit emotionally people leveraging on psychological vulnerabilities
- **CH#3:** accessibility and equity: digital divide will become even more evident, with direct consequences on education, careers, and social participation

Ethics – Obstacles

- **OB#1:** Pace of technology development
- **OB#2:** Decentralization and scattered solutions are difficult to tame
- **OB#3:** Commercial interests vs. Ethical considerations – Data monetization
- **OB#4:** Complexity of the technology stack, from sensors to Apps
- **OB#4:** Translate ethical guidelines into engineering approaches

Ethics – Moving forward

- Ethics framework and guidelines to be adopted in all future products, specifically tailored for the virtual worlds.
  - Strengthen transparency, fairness, un-bias, human-in-the-loop,
- Advanced privacy-preserving techniques, federated learning, gossip learning, use of decentralized systems based on blockchain technologies
- Integrate by design those aspects in all future products, helped by powerful AI-based methods
- Effective governance models, new community-based approaches
- Advance XAI towards the needed requirements of IoT-Edge-Cloud Continuum and virtual worlds

Standards

- For the IoT-Edge-cloud Continuum to function properly, an aligned and comprehensive standardization suite of protocols is needed
  - Interfaces, protocols, messages, data formats, etc
- Interoperability can be guaranteed only through the availability of applicable standards
- Extensions to existing standards and even new standards are needed for that to happen

Standards – Some key ongoing actions

- OpenXR providing a common API for VR and AR HW
- Universal Scene Description: providing a 3D asset representation
- GL Transmission Format (glTF): the JPEG of 3D providing interoperable formats for 3D assets
- 3GPP / ETSI / IEEE: protocols for real-time communications
- Virtual Worlds Partnership
- Metaverse Standard Forum has been established

Standards – Challenges

- **CH#1:** Market fragmentation
- **CH#2:** How to achieve interoperability out of a plethora of formats and protocols
- **CH#3:** Rapid pace of innovation makes standards quickly potentially obsolete

AIOTI

Standards – Moving forward

- Semantic interoperability: ensuring that the meaning of data is understood consistently across different systems.
  - Common ontologies and data models,
  - Interplay among the different data spaces
- Frameworks for cross-platform identity and data management
- Integration of AI with standards considering also EU regulation (AI Act, Data Act, etc.)
- Collaborative efforts among the main stakeholders are needed to make all the above happen

---> **AIOTI** plays a crucial role as it acts at the intersection of many of the mentioned technologies and can address the highlighted challenges