“Smart Body Area Network – Standardization”

June 11-12, 2021

Agenda

- About European Project SESEI
- Artificial Intelligence (AI)
- Body Area Network (BAN) – Smart BAN

European Project SESEI

SESEI (**S**econded **E**uropean **S**tandardization **E**xpert in **I**ndia) ***is a local face for the European standardization community in India: Dinesh Chand Sharma***

Why SESEI: India is a major trade partners for Europe, Increasing role of standards to gain market access and Evolving & complex nature of regulatory and standardization landscapes, Sharing best practices, work together

Sector: 1. ICT: M2M/IoT, Security, 5G, NFV/SDN, e-Accesibility, eHealth, eCALL… **2. Electrical equipment including Consumer Electronics**: Smart Grid, Smart Meter, LVDC, Micro- Grid, Lift Escalator… 3**. Automotive**: Connected Cars, ITS, e-Mobility… 4**. Smart Cities**: Mobility, Waste, Energy, ICT..

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Enabling Europe-India Cooperation on Standards

Artificial Intelligence (AI)

Artificial Intelligence (AI)

- Artificial Intelligence (AI) is emerging very fast these days and is affecting widely the industry e.g. automation, data management, integration of smart technology.
- AI applies to a variety of sectors where standardization is of high relevance: smart manufacturing, robots, autonomous cars, virtual reality, healthcare, interactive speech interfaces, visual recognition, data analysis/manipulation, home appliances, cybersecurity or spatial programming.
- 57% of the companies expect AI to have a high impact or a very high impact on business areas that are "entirely unknown to the company today".
- Increasing investment, making more data available, fostering talent and ensuring trust. Stronger coordination is essential for Europe to become the world-leading region for developing and deploying cutting-edge, ethical and secure AI.
- For 2021-2027, EU has proposed to invest at least €7 billion from Horizon Europe and the Digital Europe Programme in AI.
- European Association for AI EurAI was established in July 1982 as a representative body for the EU AI community. Its aim is to promote the study, research and application of Artificial Intelligence in Europe.

EU strategy for AI

- EC released its Communication COM(2018) 237 'Artificial Intelligence for Europe' in April 2018, setting out a European initiative on AI, which is part of its "Delivering on the Digital Single Market – 3rd Data package".
- A STRATEGY for Europe to lead the way is based on **three distinct pillars**:
  - ✓ **Boost technological expertise and industrial capacity, as well as the "AI uptake"** by both the private and public sectors
  - ✓ **Prepare for social-economic changes** brought about by AI, by encouraging the modernisation of education and training systems, nurturing talent, anticipating changes in the labour market, supporting labour market transitions and adapting social protection systems.
  - ✓ **Ensuring an appropriate ethical and legal framework** based on the EU's values and in line with the Charter of Fundamental Rights.
- On 10th April 2018, Twenty-five EU countries agreed to work together in AI domain and signed declaration on AI cooperation.

The European AI Alliance

- EC launched the European AI Alliance—a community of stakeholders and experts in AI Field.
- It is an online platform aim to stimulate debate on AI.
- The Alliance is also a place to share practices, contribute to the AI ethics guidelines, Network and encourage activities related to the development of AI.
- Supported by high-level expert group on AI.

Goal: Making it the world-wide reference platform for thinking and reflecting on AI

- Anyone who would like to participate in debate on AI in Europe can join Alliance.
- For more information, check: **https://ec.europa.eu/digital-single-market/en/european-ai-alliance**

Ethics Guidelines for Trustworthy Artificial Intelligence

- High Level Expert Group on Artificial intelligence (HLEG AI) published "**Ethics Guidelines for Trustworthy AI**" on 8 April 2019.

- According to the Guidelines, trustworthy AI should be:
  - **Lawful -** complying with all applicable laws and Regulations
  - **Ethical -** ensuring adherence to ethical principles and values
  - **Robust -** both from a technical and social perspective

- **4 Ethical Principles based on fundamental rights:**
  - Respect for human autonomy
  - Prevention of harm
  - Fairness
  - Explicability

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- **7 key requirements of Trustworthy AI**
  - **Human agency and oversight**: Including fundamental rights, human agency and human oversight
  - **Technical robustness and safety** : Including resilience to attack and security, fall back plan and general safety, accuracy, reliability and reproducibility
  - **Privacy and data governance**: Including respect for privacy, quality and integrity of data, and access to data
  - **Transparency**: Including traceability, explainability and communication
  - **Diversity, non-discrimination and fairness**: Including the avoidance of unfair bias, accessibility and universal design, and stakeholder participation
  - **Societal and environmental wellbeing**: Including sustainability and environmental friendliness, social impact, society and democracy
  - **Accountability**: Including auditability, minimisation and reporting of negative impact, trade-offs and redress.
- Aiming to operationalise these requirements, the Guidelines present an assessment list that offers guidance on each requirement's practical implementation. This assessment list will undergo a **piloting process** to which all interested stakeholders can participate, in order to gather feedback for its improvement.
- In addition, a forum to exchange best practices for the implementation of Trustworthy AI was created.

Policy and investment recommendations for trustworthy Artificial Intelligence

- Following its Ethic Guidelines for Trustworthy AI, HLEG AI has also published its second deliverable "**Policy and investment recommendations for trustworthy AI**"

- In this document, the group has put forward 33 recommendations that can guide Trustworthy AI towards sustainability, growth and competitiveness, as well as inclusion – while empowering, benefiting and protecting human beings.

Recommendations

1. Empower humans by increasing knowledge and awareness of AI
2. Protect the integrity of humans, society and the environment
3. Promote a human-centric approach to AI at work
4. Leave no one behind
5. Measure and monitor the societal impact of AI
6. Boost the uptake of AI technology and services across sectors in Europe
7. Foster and scale AI solutions by enabling innovation and promoting technology transfer
8. Set up public-private partnerships to foster sectoral AI ecosystems
9. Provide human-centric AI-based services for individuals
10. Approach the government as a platform, catalysing AI development in Europe
11. Make strategic use of public procurement to fund innovation and ensure trustworthy AI
12. Safeguard fundamental rights in AI-based public services and protect societal infrastructures
13. Develop and maintain a European strategic research roadmap for AI
14. Increase and streamline funding for fundamental and purpose-driven research
15. Expand AI research capacity in Europe by developing, retaining and acquiring ai researchers
16. Build a world-class European research capacity
17. Support AI infrastructures across member states
18. Develop legally compliant and ethical data management and sharing initiatives in Europe
19. Support European leadership in the development of an AI infrastructure
20. Develop and support AI-specific cybersecurity infrastructures
21. Redesign education systems from pre-school to higher education
22. Develop and retain talent in European higher education systems
23. Increase the proportion of women in science and technology
24. Upskill and reskill the current workforce
25. Create stakeholder awareness and decision support for skilling policies
26. Ensure appropriate policy-making based on a risk-based and multi-stakeholder approach
27. Evaluate and potentially revise EU laws, starting with the most relevant legal domains
28. Consider the need for new regulation to ensure adequate protection from adverse impacts
29. Consider whether existing institutional structures, competences and capacities need revision to ensure proportionate and effective protection
30. Establish governance mechanisms for a single market for trustworthy AI in Europe
31. Ensure adequate funding for the recommendations put forward in this document
32. Address the investment challenges of the market
33. Enable an open and lucrative climate of investment that rewards trustworthy AI

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- Recommendations focus on four key areas in respect of which policy is required to achieve the Commission's vision for "trustworthy" AI:
  - **Humans and society**. Achieving human-centric AI
  - **Private sector**: Importance of private sector in addressing opportunities and challenges posed by AI and importance of collaboration between the private sector, the public sector, academia and civil society.
  - **Public sector**: public sector should act as a catalyst for growth and innovation By delivering services using AI
  - **Research and academia**: role of research and academia in understanding the emerging challenges and turning the development of AI towards the common good.

- In order to achieve "trustworthy" AI, the Recommendations also identify four key policy areas that will act as enablers:
  - **Data and infrastructure**: Importance of data and infrastructure in promoting "trustworthy" AI.
  - **Education and skills**: Importance of appropriate education and skills to build and maintain an AI-enabled world.
  - **Governance and regulation**: need for an appropriate governance framework
  - **Funding and investment**: propose steps to improve the availability of funding for AI-related projects.

General Data Protection Regulation (GDPR)

- In May 2018, The General Data Protection Regulation (GDPR) – a wide-ranging regulation intended to strengthen and unify data protection for all individuals within the EU – went into effect.
  - ✓ GDPR was approved by the EU Parliament on April 14, 2016 and replaces the Data Protection Directive 95/46/EC.
  - ✓ It extends the scope of the EU data protection law to all foreign companies processing data of EU residents.
  - ✓ **GDPR implicates AI** for several reasons including that it requires a certain amount of explainability, which can be challenging with "black box" AI systems.

ETSI Industry Specification Group on Securing Artificial Intelligence (ISG AI)

- Recently, ETSI announced the creation of a new **Industry Specification Group on Securing Artificial Intelligence (ISG AI)**.
- It will develop technical specifications to mitigate threats arising from the deployment of AI throughout multiple ICT-related industries.
- ISG SAI addresses 3 aspects of AI in the standards domain:
  - Securing AI from attack e.g. where AI is a component in the system that needs defending
  - Mitigating against AI e.g. where AI is the 'problem' or is used to improve and enhance other more conventional attack vectors
  - Using AI to enhance security measures against attack from other things e.g. AI is part of the 'solution' or is used to improve and enhance more conventional countermeasures.

- **Published standards:**
  - ETSI GR SAI 005 V1.1.1 (2021-03): Securing Artificial Intelligence (SAI); Mitigation Strategy Report
  - ETSI GR SAI 004 V1.1.1 (2020-12): Securing Artificial Intelligence (SAI); Problem Statement

ETSI Industry Specification group on Experiential Networked Intelligence (ETSI ISG ENI)

- **ETSI Industry Specification group (ISG)** was set up in Oct 2017 under the label ENI with aims to help operators facilitate their network deployment by using AI techniques.
- ETSI ENI ISG released followings as first deliverables:
  - **ETSI GS ENI 001**, specifies a set of use cases to be applied to the fixed network, the mobile network, or both, and defines the expected benefits operators can gain from using an ENI system.
  - **ETSI GS ENI 002** captures the requirements of how intelligence is applied to the network in different scenarios to improve operators' experience of service provision and network operation.
  - **ETSI GR ENI 003** analyses the work done in various Standards Developing Organisations and open source consortia on policy management in general, and context-aware policy management specifically.
  - **ETSI GR ENI 004** addresses terminology for the main concepts in ENI.
  - **ETSI GS ENI 005**: Experiential Networked Intelligence (ENI); System Architecture
  - **ETSI GS ENI 006**: ENI: **Proof of Concepts** framework
  - **ETSI GR ENI 007**: ENI Definition of Categories for AI Application to Networks
  - **ETSI GR ENI 008 V2.1.1 (2021-03):** Experiential Networked Intelligence (ENI); InTent Aware Network Autonomicity (ITANA)
  - **ETSI GR ENI 010 V1.1.1 (2021-03):** Experiential Networked Intelligence (ENI); Evaluation of categories for AI application to Networks

CEN-CENELEC Joint Technical Committee 21 'Artificial Intelligence'

- In March 2021, CEN and CENELEC launched a new **Joint TC on Artificial Intelligence** based on the recommendations presented in the **CEN-CENELEC response to the EC White Paper on AI** and the German Standardization Roadmap for AI.
- It is responsible for development and adoption of standards for AI and related data, as well as provide guidance to other TCs concerned with AI.
- It will proceed with the identification and adoption of international standards available or under development from other organisations like ISO/IEC JTC 1 and its subcommittees, such as SC 42 AI.
- It will also focus on producing standardization deliverables that address European market and societal needs, as well as underpinning EU legislation, policies, principles, and values.
- CEN-CENELEC Focus Group has published the **CEN-CENELEC Roadmap for AI standardisation**.
- CEN and CENELEC also have strong ties with their international standardization bodies, ISO and IEC, where work already kicked-off on AI in ISO/IEC JTC 1 SC 42, & IEC SEG 10

Smart Body Area Network (S-BAN)

Body Area Network (BAN) technology

- As the world's population ages, the need for solutions that help people live longer at home and with a better quality of life increases.
- Body Area Network (BAN) technology is the use of small, low power wireless devices which can be carried or embedded inside or on the body.
- **Applications include:**
  - health and wellness monitoring
  - sports training (e.g. to measure performance)
  - personalized medicine (e.g. heart monitors)
  - personal safety (e.g. fall detection)
- A number of wireless BAN communication technologies have been implemented, based on existing radio technologies, but there is a need for a more specific and dedicated technology, optimized for BAN
- BAN technology would need features such as:
  - ultra-low power radio, with a lower complexity Medium Access Control (MAC) protocol for extended autonomy
  - enhanced robustness in the presence of interference
  - interoperability when communicating over heterogeneous networks in the future IoT

ETSI TC SmartBAN

- European Telecommunication Standards Institute (ETSI), formed a technical committee SmartBAN in 2013.
- Responsible for development and maintenance ETSI Standards, Specifications, Reports, Guides etc…
- Support development and implementation of all Smart BAN technologies (Wireless BAN, Personal BAN, Personal Networks etc.) in the application areas: health, wellness, leisure, sport and other relevant domains.
- Its scope includes communication media, and associated physical layer, network layer, security, QoS and lawful intercept, and also provision of generic applications and services (e.g. web) for standardization.
- It contributions to various bodies both within ETSI (including SmartM2M and ERM TG 30), as well as external bodies including AIOTI (Alliance for the Internet of Things Innovation), IEC SyC AAL (Active Assisted Living), Bluetooth Special Interest Group (BT SIG), H2020 ACTIVAGE (Active & Healthy Ageing IoT based solutions and services) and the ITEA's CareWare project.

Standards published by ETSI TC SmartBAN

Standard	Title
ETSI TR 103 751 V1.1.1 (2021-04)	SmartBAN; Implant communications
ETSI TR 103 711 V1.1.1 (2020-10)	SmartBAN; Applying SmartBAN MAC (ETSI TS 103 325) for various use-cases
ETSI TS 103 327 V1.1.1 (2019-04)	SmartBAN; Service and application standardized enablers and interfaces, APIs and infrastructure for interoperability management
ETSI TR 103 394 V1.1.1 (2018-01)	SmartBAN; System Description
ETSI TR 103 395 V1.1.1 (2016-12)	SmartBAN; Measurements and modelling of SmartBAN Radio Frequency (RF) environment
ETSI TS 103 378 V1.1.1 (2015-12)	SmartBAN Unified data representation formats, semantic and open data model
ETSI TS 103 326 V1.1.1 (2015-04)	SmartBan; Enhanced Ultra-Low Power Physical Layer
ETSI TS 103 325 V1.1.1 (2015-04)	SmartBAN; Low Complexity Medium Access Control (MAC) for SmartBAN

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