Artificial Intelligence

Overview of the AI Standards Program and Novel Ecosystem Approach

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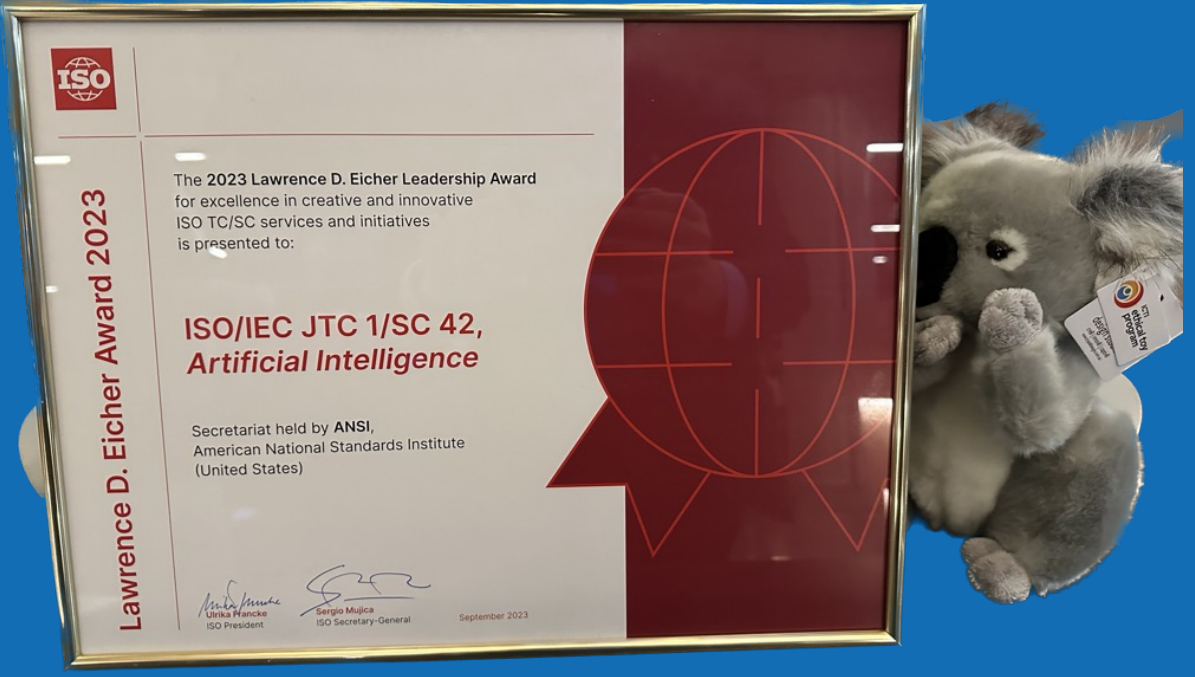

Prestigious ISO LDE Awarded to SC 42!!!

Read more about the award and how SC 42's international standards are enabling broad responsible AI adoption

Acknowledgement

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The Need for an Ecosystem Approach

Enabling the Digital Transformation

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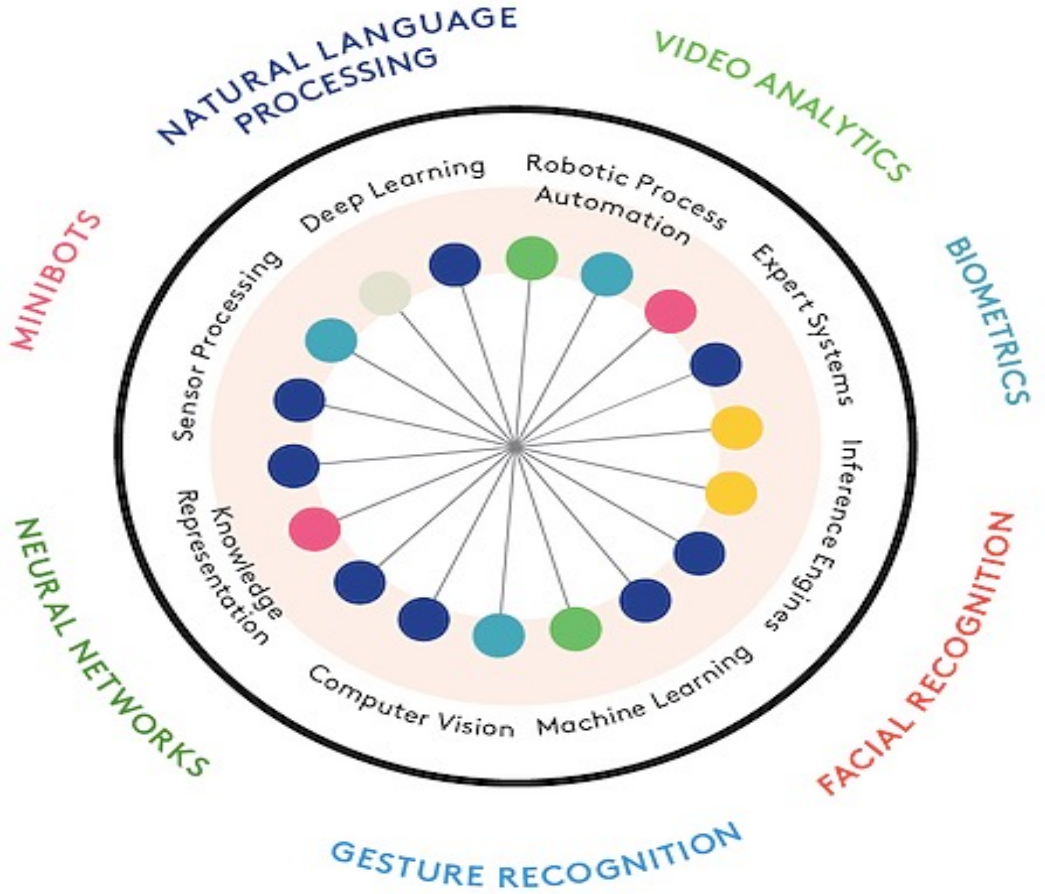

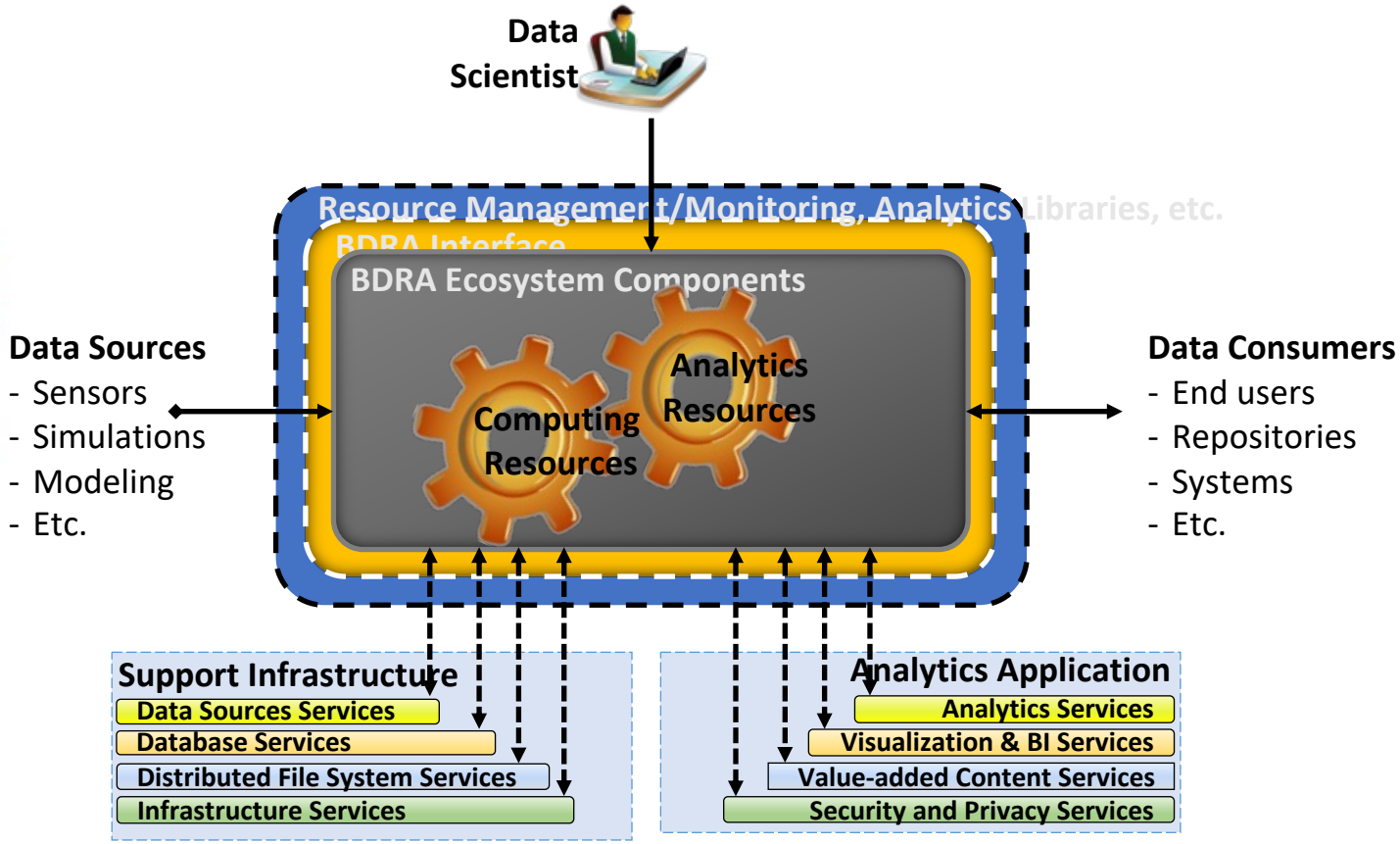

Artificial Intelligence
- not just one technology
- variety of SW / HW technologies applied in applications

Data Science and the Data Ecosystem
- **Big Data** ecosystem, **AI related data** and **analytics**
- includes BD reference architecture, data quality, AI data aspects

Changing how we live, work and paly…

AI Use Cases, Applicability and Growth

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Traditionally, AI had been focused on large scale problems that were either too hard and complex to solve with traditional compute methods or were in specialized emerging areas

This is no longer the case. Machine learning has widened the applicability of AI. Focus on the **digital transformation** has created a demand for services and more intelligent analytics. Examples:

- AI expert systems are helping **healthcare** professionals make better decisions for patients with proper trustworthiness measures designed into the system,
- AI deployment in the **smart manufacturing** sector where it is driving higher efficiencies by allowing robots to work alongside human workers with the proper safety measures designed into the system,
- AI deployment in the **financial ecosystem** where it is enabling applications that range from asset management that takes into account factors such as the clients risk to fraud detection that reduces false-positives

Emerging applications are numerous and diverse e.g. **consumer**, **retail**, **digital assistants**, **expert systems** such as smart grid, **marketing intelligence** tools, enterprise etc.

Thus, it is not surprising that IDC estimates **that 75% of enterprise applications will use AI.** The market is forecast to accelerate further in 2023 with 18.8% growth and remain on track to break the $500 billion mark by 2024.

Ecosystem is ripe for standardization

The Need for an Ecosystem Perspective

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Historically, IT systems and their governing standards were based on well understood environments

- Early approaches focused on performance for a specific problem definition
- As IT became ubiquitous, considerations such as cost, sustainability, security and privacy played a an increasingly important role in defining requirements

Digital transformation of industries has changed the landscape for IT standardization. For instance:

- Emerging non-technical requirements such as ethical and societal considerations and the ability to design trustworthy systems are key aspects
- Stakeholder diversity has increased considerably (eg. regulatory, social scientists etc.)
- Early engagement by the various stakeholders has become the norm
- The application domains and associated use cases have increased dramatically
- Understanding uses, proving business cases and developing standards are now concurrent
- The “data ecosystem” is as important as hardware, software and operational technologies
- Enabling certification, 3rd party audit and increasing end-user confidence increasingly important

SC 42 and the Holistic AI Ecosystem

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Technologies like AI, Big Data and associated analytics are anticipated to positively change how we live, work and play enabling the next wave of digital transformation

The anticipated broad use requires a new approach to standardization that

- Considers *context of use* of the technology
  - Looks at technology capability, non-technical requirements (e.g. business, regulatory, policy, ethics) and a wide cross section of application domain needs and representative use cases
- Translates the above into *technical requirements*
- Creates a platform of *foundational horizontal standards* that communities can leverage e.g. terminology, use cases, application guidance, MSS, frameworks and reference architectures
- Provides a *forum for innovation* and facilities *an ecosystem of partners* by bringing communities together (e.g. research, SDOs and open-source communities) and providing building blocks

The result simultaneously *accelerates technology adoption* while considering context of use to ensure *responsible adoption*

SC 42 has adopted this **holistic ecosystem approach** providing the glue between requirements and technical requirements through the platform of horizontal deliverables the committee develops

**For more information, a detailed article can be found here.*

Bridging the Gap – An Ecosystem Approach

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Example of Non-Technical Trends and Requirements

- **Application Domain Requirements**
- **Regulatory and Policy Requirements**
- **Emerging Societal Requirements**
- **Business Requirements / KPIs**

SC 42 Ecosystem Perspective

- **Assimilating Requirements for Context of Use of AI, Big Data and Analytics**

SC 42 Deliverables

- **Horizontal and Foundational Projects**
  Enabling and Accelerating Wide Adoption while Addressing Concerns
  - **Foundational Concepts**
  - **Data Stds**
  - **Reference Architectures**
  - **Use Cases**
  - **Application Guidelines**
  - **Frameworks**
  - **Guidance**
  - **Interop**
  - **MSS**

Ecosystem Deliverables & Implementations

- **Application Standards**
  Domain specific standards that build on SC 42 horizontal deliverables
- **Open Source Projects**
  OS projects including AI algorithms leveraging SC 42 ecosystem deliverables
- **Proprietary Solutions**
  Proprietary solutions leveraging SC 42 deliverables for requirements and guidance
- **Implementations Across Diverse Application Domains**
  E.g. AI-enabled Smart Manufacturing, Health Care, Financial Systems, Consumer Devices, ITS etc.

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SC 42 – Building the AI Global Ecosystem

Introduction and Overview of SC 42

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Part of the **ISO** and **IEC** Family

- Committee on AI standardization under the joint initiative on Information Technology (JTC 1)
- IEC and ISO produce international standards and with participation by country – one country one vote
- Collaboration with long established sister ISO and IEC committees covering broad range of app domains
- Works with JTC 1 committees producing horizontal stds in key areas such as security, cloud, IoT, governance

Scope

- Standardization in the area of Artificial Intelligence
  - Serve as the focus and proponent for JTC 1's standardization program on Artificial Intelligence
  - Provide guidance to JTC 1, IEC, and ISO committees developing Artificial Intelligence applications

Growing Program of Work and Stakeholders

- Projects: **35 active** (**15** added in last year). **25 published. 5 new project** ballots**.** New study items being discussed
- Participation: **64 nations** (39P/25O) with annual growth. New regions represented. **250+** delegates at plenaries
- SC 42 “customers” consuming our standards and participants are increasingly diverse e.g. from data scientists to regulators to application domain experts to social scientists

Extensive collaborations (internal and external) – over 60 liaisons including Cat A e.g. recently UNESCO, WTO

ISO/IEC AI Workshop series launched May 2022. Run biannually. Latest installment held December 2023

Structure of SC 42

WG 1 Foundational standards

WG 2 Data

WG 3 Trustworthiness

WG 4 Use cases and applications

WG 5 Computational approaches and computational characteristics of AI systems

JWG 2 (ISO/IEC JTC 1/SC 7) Testing of AI-based systems

JWG 3 (ISO TC 215) AI-enabled Health Informatics

JWG 4 (IEC TC 65/SC 65A) Functional Safety and AI Systems

JWG 5 (ISO TC 37) Natural language processing

AHG 4 Enhanced liaison with SC 27

AHG 7 CEN/CENELEC cooperation

Key Topics: Foundational Standards

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Overview and motivation

- AI has generated interest across a very diverse and growing set of stakeholders
- Introduce a **common language** that can be used across stakeholder groups
- **Building blocks** for other SC 42 projects and ISO/IEC TC application standards
- Addresses **unique AI requirements** to enable certification and audit via MSS

Current focus areas

- **Published** work
  - **AI Concepts and Terminology*** (ISO/IEC 22989:2022)
    - ISO/IEC 22989:2022 Information technology — Artificial intelligence — Artificial intelligence concepts and terminology is publicly available and can be freely downloaded here
  - **Framework for AI Systems Using Machine learning*** (ISO/IEC 23053:2022)
  - **Management System Standard** (ISO/IEC 42001:2023) – Published December 2023!
- **Current** work
  - **AI system impact assessment** (ISO/IEC 42005)
  - **Requirements for bodies providing audit and certification of AI management systems** (ISO/IEC 42006 based on scope of 42001 on basis of 17021-1)
  - **Taxonomy of AI system methods and capabilities** (ISO/IEC 42102)
  - Amendments of base documents, ISO/IEC 22989 and 23053, to add **generative AI**

* AI Standards Lifecycle contributions included in these projects

Key Topics: Data – AI, Big Data, Analytics

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Overview

- **Data ecosystem, characteristics, properties and quality** essential to **AI, Big Data and analytics** work
- **Big Data** deals with **extensive datasets** by considering **characteristics,** such as volume, variety, velocity, variability, which allows scalable technology to efficiently store, manipulate, manage and analyze these datasets
- **AI** systems acquire, process and apply **knowledge**, which relies on **data**, its **properties** and **quality**
- **Analytics** derives **insights** from data, which requires **data** acquisition, collection, validation and processing

History, motivation and current focus areas

- History
  - BD work initiated as JTC 1/WG 9 in 2015 and moved to SC 42 in 2018 creating SC 42/WG 2 (Big Data)
  - WG 2 **expanded** to data in context of AI, BD and analytics April 2020 focusing SC 42's data work in one WG
- **Published**
  - **Foundational Big Data** work completed and published: ISO/IEC 20546 and ISO/IEC BDRA 20547 series
  - **Process management framework for Big Data analytics** to leverage across the organization irrespective of industry
  - AI – **Data lifecycle** framework
- **Current** work
  - Multipart series **AI – data quality for analytics and ML** – **6 parts** covering terminology, measures, requirements, guidelines, process framework, governance framework and visualization
  - **Overview of synthetic data in the context of AI systems**

Key Topics: Trustworthiness

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Overview

- Looking at a wide range of issues related to AI trustworthiness, security and privacy to enable responsible adoption
- **Builds on** the robust and widely adopted **portfolio of ISO/IEC standards** related to trustworthiness and **extends** for AI

Motivation and current focus areas

- Essential for stakeholders across application domains to enable broad adoption. Key for regulatory landscape (e.g. EU AI act)
- **Published** work: **AI risk management framework (**based on **ISO 31000*),** AI **trustworthiness** overview, **overview** and **formal** methods of **robustness of neural networks,** overview of **bias** in AI systems, **SQuaRE** Quality Model for AI systems, **functional Safety and AI Systems, SQuaRE** Guidance for **quality evaluation** of AI systems
- Areas of current work
  - Systems and SW Quality Requirements and Evaluation
  - Objectives and approaches for **explainability** and **interpretability** of ML models and AI systems
  - **Controllability** of automated artificial intelligence systems
  - Treatment of **unwanted bias** in classification and regression machine learning tasks
  - **Transparency taxonomy** of AI systems
  - Overview of **differentiated benchmarking of AI system quality characteristics**
  - **Guidance** for **human oversight of AI systems**
  - Assessment of the robustness of neural networks part 3: **methodology for the use of statistical methods**
  - PWI on **Operational design domain (ODD)**

COMMON AI-RELATED ETHICAL AND SOCIETAL ISSUES*

*Source: Accenture (Liongosari)

Key Topics: Societal Concerns and Ethics

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Overview

- Adoption of transformative technologies like AI have impacts that go beyond the technology
  - AI-specific trustworthiness issues e.g. reliability, privacy, security, explainability, controllability
  - Emerging issues related to the **context of use of the technology**
    - e.g. algorithmic bias, safety directives in industrial AI, eavesdropping
- AI ethical considerations not limited to SC 42 but extend to ISO/IEC TCs in their applications

Motivation and current focus areas

- Standards can mitigate ethical issues allowing for broad **responsible adoption**. Stakeholders include
  - industry, regulatory, technologists, interest groups, app domain, society at large
- Ethical considerations and societal concerns **considered across entire SC 42 program**
  - **Dedicated** projects
    - **Published: Overview** of AI ethical and societal with tie-in to trustworthiness and exemplary use cases
    - **New**: Technical specification: **Guidance on addressing societal concerns and ethical considerations**
  - **Integrated into and enabled by entire SC 42 deliverables portfolio**. For instance,
    - governance, MSS, use cases, application guidelines, (with IEC SC 65A) safety etc.
- Positive societal implications and outcomes: WG 4 work on **beneficial AI** and articulating framework
- **Collaborating** with key orgs (e.g. UNESCO, OECD, EC, SMCC, ACOS) and represents IEC in OCEANIS

Key Topics: Risk

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Overview

- Learning nature of AI is a transformative capability allowing for otherwise unrealizable insights
- While AI shares a tremendous amount of commonalities with traditional IT, the learning aspect is unique and results in predictive outcomes
- To mitigate undesirable outcomes, incorrect insights etc., AI leverages proves approaches from other technologies dealing with predictive outcomes, namely the use of a risk-based approach

Motivation and current focus areas

- Standards provide the tools to mitigate undesired outcomes and allow for broad **responsible adoption**
- As with ethical considerations and societal concerns, **risk is considered across entire SC 42 program**
  - **Dedicated** project examples
    - **Risk management**
    - **Functional safety**
  - **Integrated into and enabled by entire SC 42 deliverables portfolio**. For instance,
    - Integrated: governance, MSS
    - Enabled by: data quality, classification, application guidelines etc.
- Verticals have taken different approaches to managing risk. SC 42 has projects that address the predominant approaches: **organizational approach to risk** (e.g. 31000) and the **product safety approach to risk** (e.g. 5469, 23282)
- SC 42 actively participates in the joint ISO/IEC task force on the concept of risk

Key Topics: Use Cases and Applications

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Overview

- Identify AI application domains, context of AI use in those domains and develop guidance for AI applications
- Collect representative use cases and analyze for derived requirements

Motivation and current focus areas

- Interest in AI continues to grow across application domains and use cases
- Use cases are the “currency” between SDO committees
  - By looking at different domains, ensures SC 42 deliverables are “broad enough to be horizontal”
  - Novel approach that includes trustworthiness, beneficial AI, ethics and societal concerns
- Published areas of work
  - ISO/IEC 24030:2021 with **over 130 use cases. Revision** initiated in 2022 and already has an **over 185** use cases
  - ISO/IEC 5338:2023 **AI system life cycle processes** – Published December 2023!
  - ISO/IEC 5339:2024 **Guidance for AI applications**
    - Application guidance **enables SDOs and OS communities** developing AI app projects **to leverage** SC 42’s work
    - **Macro-level** view of an application to facilitate its understanding, development and use amongst all stakeholders
    - Guidance on characteristics and considerations of an AI application
- Current and new areas of work
  - **AI Service Ecosystem** assigned to WG 4 and incorporated into the existing two projects above
  - **Environmental sustainability aspects of AI systems**
  - Conceptual framework to articulate **Beneficial AI** using variety of dimensions e.g. **environmental**, **social, societal, cultural**
  - PWIs on **human-machine teaming** and **evaluation metrics for AI use cases and applications**
  - Study item: **Guidance for Generative AI Applications**

Key Topics: Computational Methods

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Overview

- At the heart of AI looking at computational approaches and characteristics of AI systems

Motivation and current focus areas

- Published work
  - Overview project: **Overview of the state of the art of computational approaches for AI systems**, describing: a) main computational characteristics of AI systems; b) main algorithms and approaches used in AI systems, referencing use cases contained in ISO/IEC TR 24030
  - **Assessment of classification performance for machine learning models and algorithms:** Desire to have some key industry agreed tenants for classification performance of algorithms – currently no such internationally agreed upon tenants / norms. **Published October 2022!**
- Current work
  - **Reference architecture** of **knowledge engineering (KE).** Describes KE roles, activities, constructional layers, components and their relationships from user and functional views
  - **Overview of machine learning computing devices.** Surveys ML computing devices, including terminology and characteristics; existing approaches to optimizing performance
  - PWI on **guidance on model training efficiency optimization of machine learning system**
- Areas of current study and road-mapping
  - Input to JTC 1/AG 2 (JETI) on TTR related intelligent computing

Key Topics: Governance Implications of AI

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Overview

- Fueled by the digital transformation, AI technologies are being rapidly adopted across industries, cities, homes and infrastructures
- Thus, the need to address governance implications for the use of AI in organizations has become of paramount importance

Motivation and current focus areas

- Assists **organization boards and executives to ask and answer key questions about AI technologies**
- By **combining the expertise of SC 42, which is looking at the entire AI ecosystem, with that of SC 40, which is looking at IT governance, a joint working group has been established** to develop an ISO/IEC standard on the governance implications of AI
- Project published April 2022!

Key Topics: Testing of AI-Based Systems

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Overview

- As adoption and deployment across industry sectors of AI continues, a need to address testing of AI-based systems is key

Motivation and current focus areas

- AI testing is similar to conventional software testing, but it also faces AI-specific challenges. These challenges are discussed and approaches to mitigate are introduced.
- By **combining the expertise of SC 42, which is looking at the entire AI ecosystem, with that of SC 7, which is looking at software systems, a joint working group has been established** to develop the ISO/IEC standard
- 2 projects assigned to this group
  - **Testing of AI based systems**: Guidelines for the testing of AI systems across the AI system life cycle are provided. Guidelines related to AI testing useful for AI systems development in accordance with their specified functional and non-functional requirements
  - **Verification and validation analysis of AI systems:** approaches and guidance on processes for the verification and validation analysis of AI systems including formal methods, simulation and evaluation
- Both projects in Working Draft

Key Topics: AI Enabled Health Informatics

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Overview

- The application of AI in healthcare is an emerging area

Motivation and current focus areas

- The project will
  - overview of the state of the art of AI-enabled Health Informatics (AIHI)
  - describe the properties, factors, available methods and processes relating to the use of AI inside health informatics applications
  - identify use of AI concepts and terms for purposes of developing AIHI-related standards, such as mapping and categorization
  - reference relevant AIHI use cases.
- By **combining the expertise of SC 42, which is looking at the entire AI ecosystem, with that of ISO TC 215, which is looking at standardization in the field of health informatics, to facilitate capture, interchange and use of health-related data, information, and knowledge to support and enable all aspects of the health system, a joint working group has been established** to develop the ISO/IEC standard
- Project in Working Draft

Key Topics: Functional Safety and AI Systems

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Overview

- Functional safety is key to many application domains where AI will fuel the digital transformation
- SC 42 collaborated with IEC SC 65A to develop a technical report. This joint work builds on that

Motivation and current focus areas

- The project will provide requirements and guidance on the terminology, properties, risk factors, processes, methods, techniques and architectures relating to:
  - use of AI technology within a safety-related function;
  - use of safety-related function based on conventional technology to ensure safety of a system using AI technology;
  - use of AI technology to design, develop and verify safety-related functions
- This project includes general considerations on how security threats can affect safety of an AI system. It is applicable to all types of AI technologies and includes specific details on ML
- By **combining the expertise of SC 42, which is looking at the entire AI ecosystem, with that of IEC TC 65/SC 65A, which is develops standards regarding the generic aspects of systems used in industrial process measurement, control and manufacturing automation: operational conditions (including EMC), methodology for the assessment of systems, functional safety, etc. SC65A also has a safety pilot function to prepare standards dealing with functional safety of electrical/electronic/programmable electronic systems., a joint working group has been established** to develop the ISO/IEC standard
- Project in Working Draft

Key Topics: Natural language processing

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Overview

- AI enabled natural language processing (NLP) is a rapidly growing area

Motivation and current focus areas

- 2 projects assigned to this group
  - ISO/IEC 23281 Artificial Intelligence — Overview of AI tasks and functionalities related to natural language processing
    - Discusses the concept of task in the case of AI applied to natural language, and proposes a landscaping of the AI tasks related to the analysis or generation of natural language, as well as other language-related functionalities that are associated to those AI systems. It identifies existing and competing terminologies, co-existing variants of the same tasks and functionalities, and how specific tasks can be affected by language diversity in terms of their role or their challenges. This includes all languages, dialects and variants, whether official or not. The relations among tasks or functionalities, and their interactions within pipelines, are discussed and illustrated. In addition, the document provides references to existing standards and published guidelines associated to those tasks and functionalities, highlighting their differences in case of competing standards.
  - ISO/IEC 23282 Artificial Intelligence — Evaluation methods for accurate natural language processing systems
    - specifies evaluation of natural language processing systems, in the sense of measuring the quality of a system's results to assess its functional suitability
    - provides a definition of evaluation methods for those systems, together with guidance on how to select, implement and interpret them
    - covers quantitative metrics as well as other evaluation methods
    - includes requirements on the implementation of the described metrics, and further requirements on the technical resources involved in the evaluation process.
- By **combining the expertise of SC 42, which is looking at the entire AI ecosystem, with that of ISO TC 37, which is responsible for standardization of descriptions, resources, technologies and services related to terminology, translation, interpreting and other language-based activities in the multilingual information society, a joint working group has been established** to develop the ISO/IEC standard
- Projects in Working Draft

Key Topics: Strategic Management, Road-mapping

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Overview and motivation

Driven by the

- rapid technology advancement
- broad adoption
- evolution of AI landscape
- context of use of AI and increasing diversity of stakeholders
- growing program of work

Current focus areas

SC 42 subgroups go through annual strategic management and road-mapping

- SC 42 groups asked to look at their established areas for emerging new work

SC 42 completed a standardization landscape

SC 42 organizes a bi-annual workshop that brings insights to new areas of work

SC 42 conducts extensive outreach to identify new trends and work areas

Key Topics: Management Systems Standard

ISO/IEC 42001 and related series

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Motivation

- AI technologies bring **AI-specific concerns** beyond those of traditional IT systems. For example
  - ML based AI system may provide different results depending on the training data used
    - The choice of training data when using an AI system is an additional process that an organization needs to perform to ensure the intended overall system performance
  - Consumers of AI products and services may lack trust in the AI supplier organization
    - Assurance that the organization considered for fairness, inclusiveness, accountability etc. of AI system

MSS Enables Assessment of **Conformance** and **Auditability** of the Process

- MSS designed with AI-specific process requirements
  - Allows organizations to check how well it meets their objectives in the use of an AI system
  - For trusted 3rd party performing a check or audit, a certificate of conformance can be issued

MSS Brings Benefits to the **Application Domains** Deploying AI Applications

- MSS **extendable to application domains**. Sector-specific implementations expand the applicability of the MSS, which in turn enable conformance/audit and broadens AI adoption

ISO/IEC 42001 **pulls together all** the SC 42 AI platform work from a management systems perspective

Key Topics: Supporting UN SDGs

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Projects support of the majority of UN SDGs

- Currently 12 of the 17 (1, 3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 16) directly supported
- New projects anticipated to continue to support these SDGs as well as other ones
- Not surprising as AI is a key enabler to digital transformation. Broad responsible adoption helping improve the way we live, work and play
- AI enables all stakeholders to make prompt and assist better decisions as they get adopted into vertical domains. From that perspective all UN SDGs would be supported through application domain standards that leverage SC 42 work

Examples of How SC 42 is Supporting the UN SDGs

- Foundational (WG 1) supporting goals 5, 7, 8, 9, 10, 12, 14 via ISO/IEC 42001 and goals 5, 8, 9, 10, 12 through 42005
- Data (WG 2) directly and indirectly (applications of the AI data and Big Data projects) supporting goals 3, 4, 6, 7, 8, 9, 11, 12, 13, 14, 15. ISO/IEC 5259 data quality series provides standard tools and methods to organizations in management and operation to assess and improve the quality of data used for analytics and ML via the data life cycle
- AI use cases and applications (WG 4) a relevant SDG is indicated for each of the use cases included in TR 24030:2021 (and TR 24030 ed.2). Most of the goals are covered by the use cases. “Industry, Innovation and Infrastructure” has the highest number of use cases and “Good Health and Well-Being” the second
- Computational are (WG 5) support for UN SDG Goal 8: Decent Work and Economic Growth and Goal 9: Industry, Innovation and Infrastructure by providing practical methodologies and theoretical reference architecture that leverage performance of AI computational approaches and computing devices to support industrialized implementation

Concluding Remarks

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SC 42 is the first of its kind international standards committee looking at the full AI ecosystem

- AI, Big Data and related analytics are **key technologies enabling the digital transformation**

SC 42 has a rapidly growing work program

Strong **growth** and execution. **25** published projects and **35** active projects in **9** working groups. **5** new project ballots

- Robust **study** program for anticipated new work addressing AI ecosystem and system level concerns with AI

SC 42 engaging in extensive outreach and global collaboration

- Tremendous outreach via ISO, IEC and national bodies/national committees. Extensive and diverse liaison network
- Direct support for most UN SDGs through SC 42 projects and all goals indirectly through applications of AI

Part of the ISO, IEC and JTC 1 families

- Access to broad, diverse and numerous committees that range from horizontal to vertical areas
- System integration committee providing guidance to ISO, IEC and JTC 1 committees looking at AI applications

Opportunity for international standards to fuel AI market growth and accelerate adoption

ISO/IEC AI Workshop series launched May 2022. Run biannually. Latest held December 2023

Excellent opportunity to engage – if you are interested, please contact your national body

The First Meeting of ISO/IEC JTC 1/SC 42
Hosted by

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China Electronics Standardization Institute

SC 42 Secretariat
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United Kingdom

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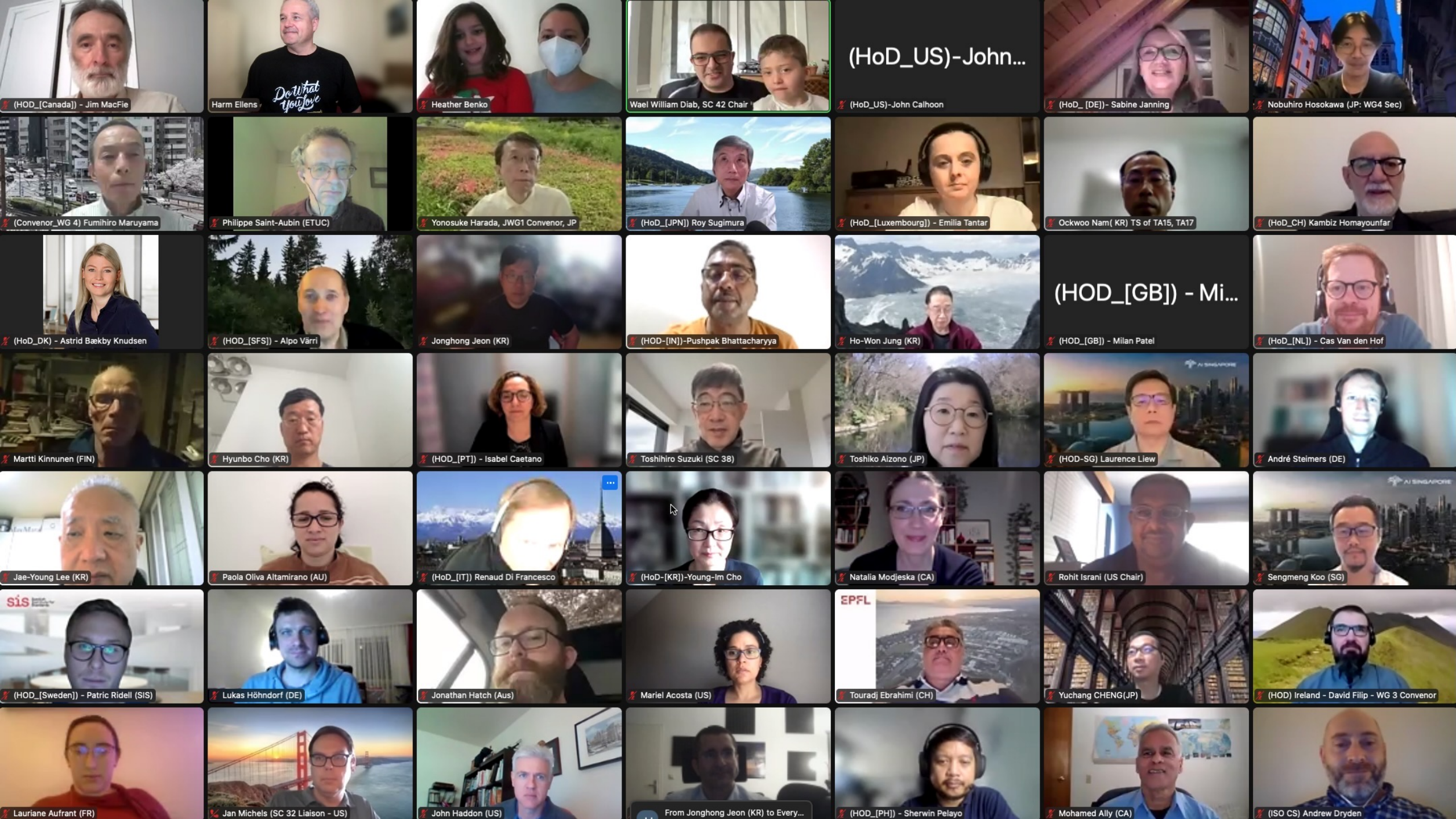
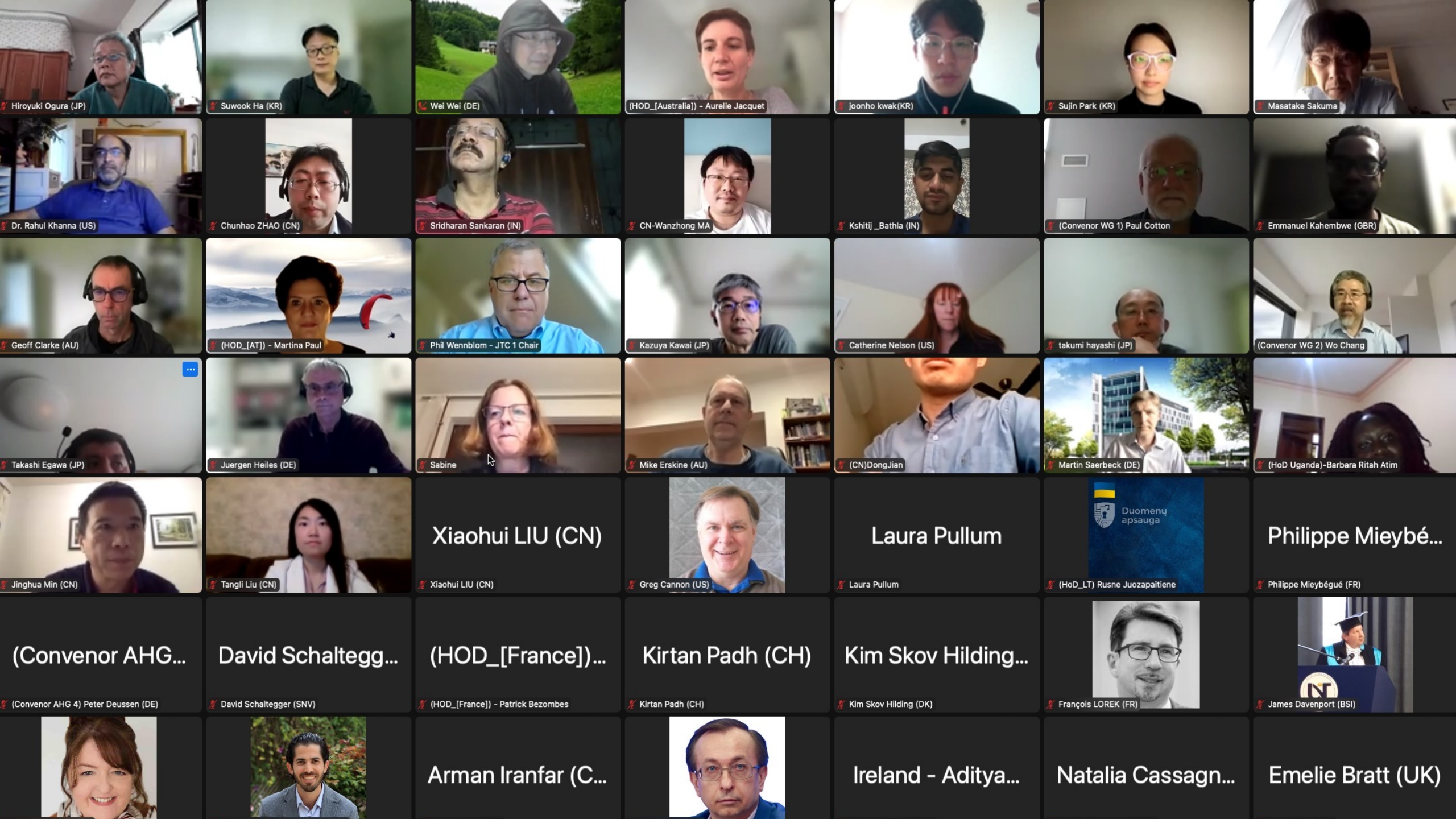
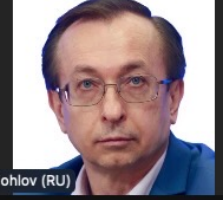

(HOD_[Canada]) - Jim MacFie
Harm Ellens
Heather Benko
Wael William Diab, SC 42 Chair
(HoD_US)-John...
(HoD_US)-John Calhoon
(HoD_ [DE])- Sabine Janning
Nobuhiro Hosokawa (JP: WG4 Sec)
(Convenor_WG 4) Fumihiro Maruyama
Philippe Saint-Aubin (ETUC)
Yonosuke Harada, JWG1 Convenor, JP
(HoD_[JPN]) Roy Sugimura
(HoD_[Luxembourg]) - Emilia Tantar
Ockwoo Nam(KR) TS of TA15, TA17
(HoD_CH) Kambiz Homayounfar
(HoD_DK) - Astrid Bækby Knudsen
(HOD_[SFS]) - Alpo Värri
Jonghong Jeon (KR)
(HOD-[IN])-Pushpak Bhattacharyya
Ho-Won Jung (KR)
(HOD_[GB]) - Mi...
(HOD_[GB]) - Milan Patel
(HoD_[NL]) - Cas Van den Hof
Martti Kinnunen (FIN)
Hyunbo Cho (KR)
(HOD_[PT]) - Isabel Caetano
Toshihiro Suzuki (SC 38)
Toshiko Aizono (JP)
(HOD-SG) Laurence Liew
André Steimers (DE)
Jae-Young Lee (KR)
Paola Oliva Altamirano (AU)
(HoD_[IT]) Renaud Di Francesco
(HoD-[KR])-Young-Im Cho
Natalia Modjeska (CA)
Rohit Israni (US Chair)
Sengmeng Koo (SG)
(HOD_[Sweden]) - Patric Ridell (SIS)
Lukas Höhndorf (DE)
Jonathan Hatch (Aus)
Mariel Acosta (US)
Touradj Ebrahimi (CH)
Yuchang CHENG(JP)
(HOD) Ireland - David Filip - WG 3 Convenor
Lauriane Aufrant (FR)
Jan Michels (SC 32 Liaison - US)
John Haddon (US)
From Jonghong Jeon (KR) to Every...
(HOD_[PH]) - Sherwin Pelayo
Mohamed Ally (CA)
(ISO CS) Andrew Dryden


Hiroyuki Ogura (JP)
Suwook Ha (KR)
Wei Wei (DE)
(HOD_[Australia]) - Aurelie Jacquet
joonho kwak(KR)
Sujin Park (KR)
Masatake Sakuma
Dr. Rahul Khanna (US)
Chunhao ZHAO (CN)
Sridharan Sankaran (IN)
CN-Wanzhong MA
Kshitij _Bathla (IN)
(Convenor WG 1) Paul Cotton
Emmanuel Kahembwe (GBR)
Geoff Clarke (AU)
(HOD_[AT]) - Martina Paul
Phil Wennblom - JTC 1 Chair
Kazuya Kawai (JP)
Catherine Nelson (US)
takumi hayashi (JP)
(Convenor WG 2) Wo Chang
Takashi Egawa (JP)
Juergen Heiles (DE)
Sabine
Mike Erskine (AU)
(CN)DongJian
Martin Saerbeck (DE)
(HoD Uganda)-Barbara Ritah Atim
Jinghua Min (CN)
Tangli Liu (CN)
Xiaohui LIU (CN)
Xiaohui LIU (CN)
Greg Cannon (US)
Laura Pullum
Laura Pullum
Duomenų apsauga
(HoD_LT) Rusne Juozapaitiene
Philippe Mieybé...
Philippe Mieybégué (FR)
(Convenor AHG...
(Convenor AHG 4) Peter Deussen (DE)
David Schaltegg...
David Schaltegger (SNV)
(HOD_[France])...
(HOD_[France]) - Patrick Bezombes
Kirtan Padh (CH)
Kirtan Padh (CH)
Kim Skov Hilding...
Kim Skov Hilding (DK)
François LOREK (FR)
James Davenport (BSI)
Arman Iranfar (C...
Ireland - Aditya...
Natalia Cassagn...
Emelie Bratt (UK)

Kim Skov Hilding...					Arman Iranfar (C...		
Kim Skov Hilding (DK)	François LOREK (FR)	James Davenport (BSI)	Dr Jacqui Taylor (UK)	(HoD_[ISRAEL]) - Evenstein Yoav	Arman Iranfar (CH)	Yuri Hohlov (RU)	
Ireland - Aditya...	Natalia Cassagn...	Emelie Bratt (UK)	Luoming ZHAN...	Irma Poder(UK)	Peter Dickman (...	Prabodh Varshne...	
Ireland - Aditya Mohan	Natalia Cassagnes, ILNAS	Emelie Bratt (UK)	Luoming ZHANG （CH）	Irma Poder(UK)	Peter Dickman (CH)	Prabodh Varshney (US)	
	Anantha Desik P...	Soojong Lim (KR)	Seong hwan Cho...	Yoshi Enomoto (...	Kangchan Lee (K...	TaeHoon Cho(KR)	
C. Anantaram (IN)	Anantha Desik P H (IND)	Soojong Lim (KR)	Seong hwan Choi(KR)	Yoshi Enomoto (JP)	Kangchan Lee (KR)	TaeHoon Cho(KR)	
Jaeho Lee (KR)	Chang-Seuk Ok...	S	Kihun Kim (KR)	Yaeseul Park (KR)	Shizuo Sakamot...	BogRyong Park(...	
Jaeho Lee (KR)	Chang-Seuk Ok (KR)	Sung Joon Lim (KR)	Kihun Kim (KR)	Yaeseul Park (KR)	Shizuo Sakamoto (Japan)	BogRyong Park(KR)	
Kyoungsook Kim...	Seokbo Hong (KR)	Mike Erskine (AU...	Garry Taylor	Ali Akbari (AU)	David Wotton		
Kyoungsook Kim (JP)	Seokbo Hong (KR)	Mike Erskine (AU) (PC Screen)	Garry Taylor	Ali Akbari (AU)	David Wotton	Rosalind Wang	
	Haitao Liu （CN）	Xiaoqi Cao （C...	(HOD_China)-Ni...	XU Yang （CN）	Michael Wong (...	Xiaocui LI （CN）	
Ferenc Birloni (Phi Inst, US)	Haitao Liu （CN）	Xiaoqi Cao （CN）	(HOD_China)-Ning Sun	XU Yang （CN）	Michael Wong (CA)	Xiaocui LI （CN）	
Jingqing MEI(CN)	(HOD_[PL]) - Ew...	Lenora Zimmerm...	진석	Sunghan Kim (KR)	Dr Gargi Keeni (I...		
Jingqing MEI(CN)	(HOD_[PL]) - Ewelina Szczekocka	Lenora Zimmerman (US)	From Geoff Clarke (AU) to Everyone	Sunghan Kim (KR)	Dr Gargi Keeni (IN)	Norbert Bensalem (AG 14 SIF Convener)	

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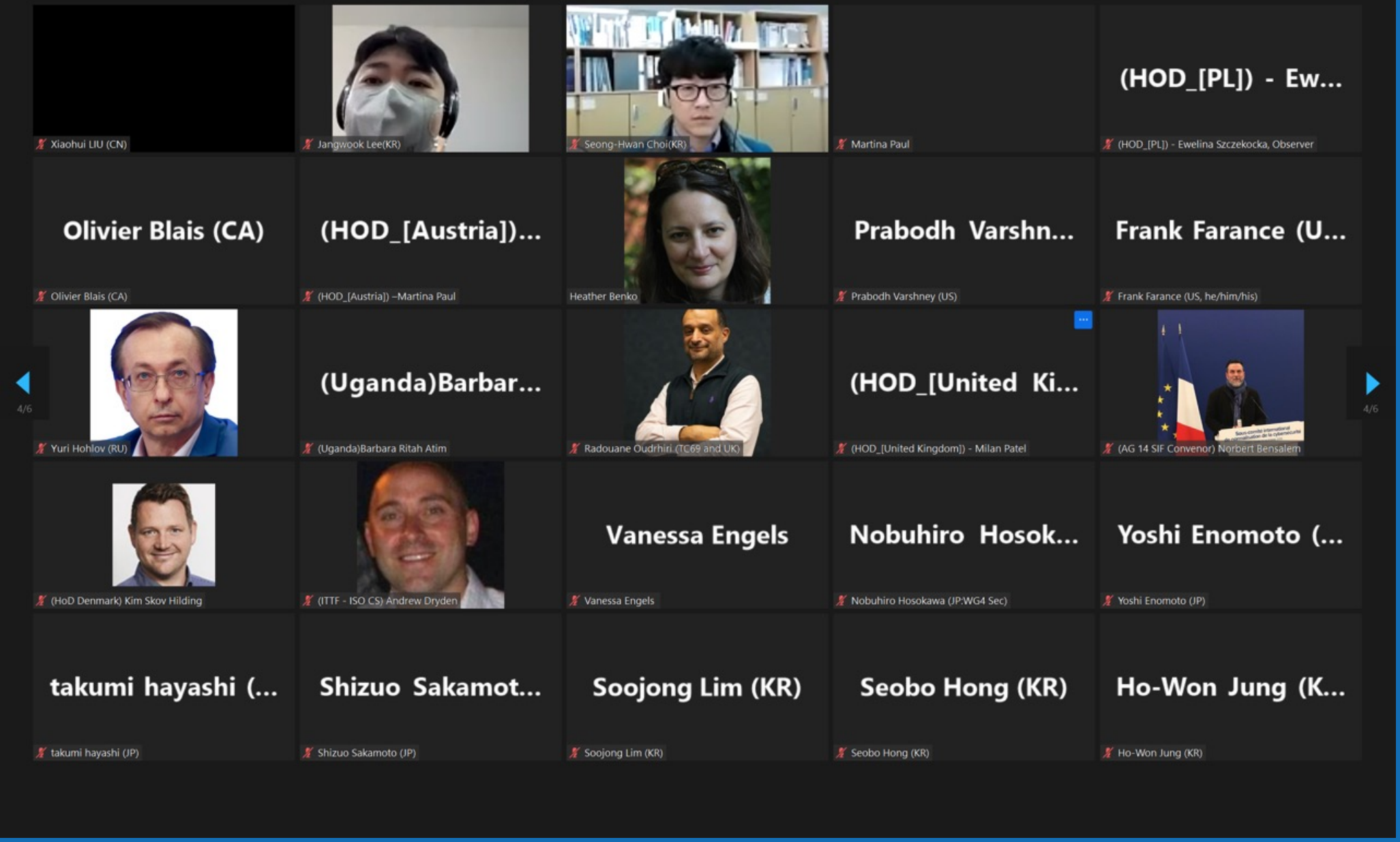

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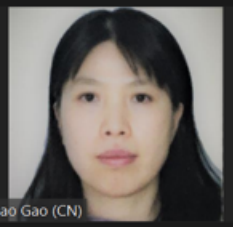
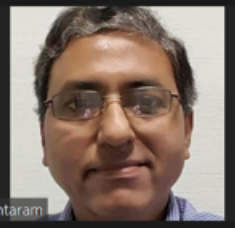
INFORMATION TECHNOLOGY STANDARDS

SC 42 – Artificial Intelligence

Ho-Won Jung (K...	Victoria (Vicky)...	Xiaocui LI（CN）		Wanzhong MA (...
Ho-Won Jung (KR)	Victoria (Vicky) Hailey (CA)	Xiaocui LI (CN)	Yongchao Gao (CN)	Wanzhong MA (CN)
Lydia Xu(CN)			Ireland, Aditya...	ChangSeuk Ok (...
Lydia Xu(CN)	Jinghua Min (CN)	Dan Grois (IL)	Ireland, Aditya Mohan, WG3 Secretary	ChangSeuk Ok (KR)
	Scott Orr (US/Xa...	Ajay Panse (IN)	CA - Suzuki, Tak...	Luiza Akhmadov...
C. Anantaram	Scott Orr (US/Xator)	Ajay Panse (IN)	CA - Suzuki, Takashi	Luiza Akhmadova (RU)
Allison Gardner...	Yang Xu (CN)	Philippe Mieybé...	Rasika Rajapaks...	Grace Wei (US)
Allison Gardner Cohort 5	Yang Xu (CN)	Philippe Mieybégué (FR)	Rasika Rajapakshe (CA)	Grace Wei (US)
Horie, Takeshi	(KR) Park Bogry...	Kerry Sheehan U...	Suwook Ha KR	Lenora Zimmer...
Horie, Takeshi	(KR) Park Bogryong	Kerry Sheehan UK British Standards Institute	Suwook Ha KR	Lenora Zimmerman (US)

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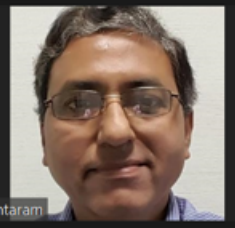
Lydia Xu(CN)	Jinghua Min (CN)	Dan Grois (IL)	Ireland, Aditya...	ChangSeuk Ok (...
 C. Anantaram	Scott Orr (US/Xa...	Ajay Panse (IN)	CA - Suzuki, Tak...	Luiza Akhmadov...
Yang Xu (CN)	Philippe Mieybé...	Rasika Rajapaks...	Grace Wei (US)	Horie, Takeshi
(KR) Park Bogry...	Kerry Sheehan U...	Suwook Ha KR	Lenora Zimmer...	Hai-Xu Cheng (C...
TaeHoon CHO(KR)	Michael Thieme...	Kangchan Lee(KR)	Kihun Kim (KR)	Emelie Bratt (UK)

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Intelligence

Annex A

Additional Links and Information

Additional Links and Information

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

- SC 42 Committee website
- ISO/IEC AI LinkedIn page
- ISO/IEC AI Workshop Series website
- ISO/IEC AI Wikipedia page
- ISO/IEC AI Committee wins prestigious ISO award and accompanying SC 42 Chair's op-ed
- Press Coverage Related to SC 42 Overview and Program of Work
  - IEC news Building trust in AI applications (Jan 18th 2024)
  - IEC news New standard to increase safety of AI (Jan 16th 2024)
  - IEC news Creating a strong foundation for trusted AI applications (Jan 5th 2024)
  - ISO/IEC 42001 – Publication of a first-of-its kind international AI management systems standard
    - IEC news Novel AI international standard that enables certification and responsible adoption (Dec 12th 2023)
      - IEC video ISO/IEC JTC 1/SC 42 experts tell us about 42001:2023, the new management system standard for AI
    - ISO news AI management systems: What businesses need to know (Dec 2023)
    - ANSI news Using AI Responsibly (Dec 27th 2023)
  - IEC blog Artificial intelligence: why terminology matters (Dec 15th 2023)
  - ISO/IEC 4th AI Workshop
    - IEC news Standardization work of joint IEC and ISO committee highly relevant to EU AI Act (Dec 21st 2023)
    - IEC news ISO/IEC workshop hears how AI is saving lives through early disease detection (Dec 13th 2023)
    - IEC news AI experts explore global trends and applications: register to participate! (Nov 29th 2023)

Additional Links and Information

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

- Press Coverage Related to SC 42 Overview and Program of Work
  - IEC news The importance of sustainable AI (Dec 7th 2023)
  - IEC news IEC and ISO joint committee for AI expand programme of work (Nov 1st 2023)
  - IEC news IEC and ISO launch working group to advance functional safety of AI systems (Oct 19th 2023)
  - IEC news Global experts meet to address AI standardization opportunities and challenges (Oct 17th 2023)
  - IEC news The importance of functional safety (October 11th 2023)
  - ISO news Forging a positive AI mindset (September 21st 2023)
  - ISO news ISO/IEC JTC 1/SC 42 (AI) wins prestigious ISO award (September 12th 2023)
  - IEC news Artificial intelligence: enhancing the trustworthiness of neural networks (August 10th 2023)
  - IEC news Essential guidance on AI data lifecycle management (August 1st 2023)
  - IEC e-tech The promise of synthetic data for AI (July 6th 2023)
  - IEC news New international standard for ensuring the quality of AI systems (July 4th 2023)
  - IEC news UN Digital Compact Deep Dive on AI: Standards are part of the solution (June 8th 2023)
  - IEC news ISO/IEC workshop hears how AI is saving babies (June 16th 2023)

Additional Links and Information

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

- Press Coverage Related to SC 42 Overview and Program of Work
  - IEC news ISO/IEC AI Workshop to explore cutting-edge AI applications and responsible standardization (June 7th 2023)
  - IEC e-tech ISO/IEC AI plenary expands programme of work (May 12th 2023)
  - IEC e-tech Understanding the potential of synthetic data for artificial intelligence (May 15th 2023)
  - IEC e-tech Essential guidance on AI-related risk management (February 14th 2023)
  - ANSI Article AI and the Importance of Standardization (December 19th 2022)
  - RAPS Article Transforming industry and society through beneficial AI (December 2022)
    - HTML version of the article
  - IEC e-tech ISO/IEC AI meeting discusses sustainability, ethics and emerging regulation (November 7th 2022)
  - IEC e-tech New international standard provides process framework for managing big data analytics (November 24th 2022)
  - IEC e-tech Artificial intelligence: getting ML classification models right (October 19th 2022)
  - IEC e-tech New ISO/IEC report offers guidance on the responsible adoption of AI (August 23rd 2022)
  - IEC e-tech International standards for artificial intelligence (August 16th 2022)
  - IEC e-tech Foundational building blocks for AI systems (July 19th 2022)

Additional Links and Information

ISO JTC 1 IEC
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- Press Coverage Related to SC 42 Overview and Program of Work
  - IEC video A governance framework for organizations deploying AI systems (June 7th 2022)
  - IEC news SC 42 plenary: bringing stakeholders together to address the challenges of artificial intelligence (June 3rd 2022)
  - IEC e-tech IEC and ISO work on artificial intelligence – Covering the entire AI ecosystem (May 20th 2022)
  - IEC news A governance framework for organizations deploying AI systems (Apr 29th 2022)
  - IEC news New report focuses on convergence of AI and Industrial IoT (Mar 10th 2022)
  - ISO innovation article on Information technology growth and the role of AI and associated AI standards (Jan 2022)
  - IEC e-tech Computational approaches for AI systems (Jan 25th 2022)
  - ISO news Enabling An AI-Ready Culture - SC 42's Novel MSS Approach (Nov 2021)
  - IEC e-tech Standards help address bias in artificial intelligence technologies (Nov 8th 2021)
  - IEC news Growing AI standards committee concludes plenary (Oct 22nd 2021)
  - IEC news IEC and ISO artificial intelligence plenary begins (Oct 22nd 2021)
  - ISO publication White Paper on Smart Manufacturing (Oct 2021)

Additional Links and Information

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- Press Coverage Related to SC 42 Overview and Program of Work
  - RAPS Article Enabling the digital transformation of industry: The roles of AI, big data, analytics, and related data ecosystem (June 1st 2021)
    - IEC news International standards instill confidence in artificial intelligence technologies (July 22nd 2021)
  - IEC news IEC and ISO artificial intelligence committee broadens standards work programme (May 17th 2021)
  - IEC e-tech IEC and ISO publish over 130 emerging AI use cases (May 17th 2021) IEC news IEC/ISO standards committee for artificial intelligence begins spring plenary (Apr 30th 2021)
  - IEC e-tech New standard to enhance trustworthiness of artificial intelligence systems (March 15th 2021)
  - ISO news article on Getting Big on Data (Nov 5th 2020)
  - IEC e-tech article on International standards committee for AI ecosystem expands into new areas (Sep 15th 2020)
  - IEC e-tech article on IEC and ISO publish TR which provides overview of big data framework and reference architecture (Aug 24th 2020)
  - IEC e-tech article on Achieving trustworthy AI with standards (June 8th 2020)
  - ISO news SC 42 virtual plenary as an example of standards innovation during COVID-19 (May 15th, 2020)
  - IEC news announcing the key outcomes of the 5th plenary and added focus on data ecosystem (May 7th, 2020)

Additional Links and Information

- Press Coverage Related to SC 42 Overview and Program of Work
  - IEC e-tech article on SC 42's holistic ecosystem approach to AI standardization (Feb 2020)
  - IEC e-tech article on New IEC and ISO Standard will enable big data adoption across industry sectors (Feb 15th 2020)
  - IEC e-tech article on IEC and ISO AI committee (SC 42) expands programme of work (Jan 2020)
  - ISO focus Nov/Dec 2019 magazine on AI and the SC 42 program of work (November 2019)
    - ISO focus landing page for edition including links to download PDF (above in English) in various languages and individual articles
  - IEC news AI standards help accelerate digitalization of smart manufacturing (Dec 2019)
  - IEC news announcing the key outcomes of the 4th plenary (Nov 11th, 2019)
  - IEC e-tech article on Establishing trustworthiness is vital in our human-machine world (July 15th 2019)
  - IEC e-tech article on Artificial intelligence and big data: a paradigm shift in healthcare (May 15th 2019)
  - IEC news announcing the key outcomes of the 3rd plenary (April 23rd, 2019)
  - IEC news announcing the start of the 3rd plenary (April 9th 2019)

Additional Links and Information

- Press Coverage Related to SC 42 Formation
  - ISO news article (18th October 2018)
  - JTC 1 press committee article (30th May 2018)
  - IEC e-tech article (17th May 2018). Additional circulations
    - ISO retweeted the article (September 2018)
    - Published on ANSI (US National Body) website
    - Published on UNE (Spain National Body) website (September 2018)
    - Published on ILNAS (Luxemburg National Body) website (27th April 2018)
      - Note: not a direct reprint but used the photo
    - Published on Robotics Automation and News Magazine
  - ANSI news article on the formation of SC 42 (16th January 2018)
  - Introduction of SC 42 in the IEC MSB White Paper on Artificial Intelligence

Additional Links and Information

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- Press Coverage Related to SC 42 Participation at Key Industry and International Events
  - G20: International Standards Summit (October 2022)
    - G20 International Standards Summit 2022 hosted a number of panels. SC 42 presented on its work relative to the session on accelerating the digital transformation. The session focused on how international standards can promote digital transformation across many industries, sectors and cities, which enables a circular, inclusive and people-centric approach that empowers everyone, regardless of gender, age or ability, to benefit equally and equitably from new technologies.
  - World Trade Organization (October 2022)
    - WTO October 2022 event: SC 42 participated in an engaging panel hosted by the World Trade Organization. The SC 42 program of work as it relates to digitalization was presented
  - World Standards Day (October 2022)
    - World Standards Day, supported by JTC 1: SC 42 participated in the World Standards Day event that was supported by ISO/IEC/JTC 1 along with a number of other JTC 1 groups covering topics that included AI, IoT, cloud computing, trustworthiness, digital transformation and others. The focus was on the relation of the program of work to the UN SDGs (Sustainable Development Goals)

Additional Links and Information

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- Press Coverage Related to SC 42 Participation at Key Industry and International Events
  - IEC Medium Publications
    - IEC news on How standardization can contribute to an international framework for AI (Oct 20th 2021)
    - IEC news Young Professionals learn about international standards for artificial intelligence (Oct 15th 2021)
    - IEC blog on Webinar on regulations and artificial intelligence technologies (Dec 10th 2020)
    - IEC blog on AI standards on the agenda at IOT Solutions World Congress (Dec 8th 2020)
    - IEC blog on IEC and ISO present AI standardization work during event by European Commission (Oct 28th 2020)
    - IEC blog on Trustworthiness is key to services and products using AI and IoT technologies (Mar 3rd, 2020)
    - IEC blog on AI standards on the agenda at IOT Solutions World Congress (Nov 21st 2019)
    - IEC blog on AI and IoT industry leaders to consider a digital trust framework at Berlin forum (May 15th 2019)
  - Global Standards Collaboration (GSC-22) 2019 Session on Artificial Intelligence
    - ISO news on Standards cooperation is key to making AI and smart cities a reality (April 4th 2019)
    - IEC blog on 22nd Global Standards Collaboration meeting discusses need for standards to accelerate AI technology innovation and adoption (April 3rd 2019)
  - JTC 1 Info
    - JTC 1 info article on IEC and ISO present on the AI Ecosystem Standardization Program at the European Commission Workshop (Oct 16th 2020)
  - Industrial Internet Consortium (IIC)
    - IIC blog on from IEC on Standards for AI on the Agenda at IoT Solutions World Congress
  - IoT Solutions World Congress (IoTSWC)
    - IoTSWC promotion of the IEC blog on AI standards on the agenda at IOT Solutions World Congress

Additional Links and Information

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SC 42 – Artificial Intelligence

- Other media coverage
  - Twitter
    - ISO (@isostandards)
      - Tweet Chat on standards on Artificial Intelligence with Chair of SC 42 (25th October). Hashtags: #ISOchat #Standards4AI
    - IEC (@IECStandards)
      - Article on New international standard will help organization boards and executive managers ask and answer key questions about AI technologies (12th February 2019)
      - Article on International standards play a key role in addressing the ethical, technical, safety and security aspects (6th February 2019)
      - Article and video on Standardization can help eliminate data bias in AI (4th February 2019)
      - Article and video on Chair of SC 42 explains the growing influence of AI in Smart Manufacturing (4th February 2019)
      - Article on Chair of SC 42 will lead a session at the CEN/CENELEC workshop on Trustworthy Artificial Intelligence (10th Aug 2018)
  - IEC Medium Publications
    - IEC blog on New IEC and ISO Standard will enable big data adoption across industry sectors (Mar 15th, 2020)
    - IEC blog on Trustworthiness is key to services and products using AI and IoT technologies (Mar 3rd, 2020)
    - IEC blog on How standards help people trust AI (Jan 15th, 2020)
    - IEC blog on Important questions around AI technologies in smart manufacturing (Jan 8th, 2020)
    - IEC blog on Establishing trustworthiness is vital in our human-machine world (Sep 9th 2019)

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- Other media coverage
  - IEC Medium Publications
    - IEC blog on The need for Big Data Standards (April 24th 2019)
    - IEC blog on New international standard will offer risk management framework for AI (March 18th 2019)
    - IEC blog on Helping organization boards and executives ask and answer key questions about AI technologies (Feb 12th 2019)
    - IEC e-tech article on AI in healthcare: keeping data safe and building trust (January 25th 2019)
    - IEC blog on Making AI safe (January 23rd 2019)
    - IEC e-tech article on Healthcare needs doctors and machines (December 10th, 2018)
    - IEC e-tech article on Eliminating data bias from machine learning systems (November 13th 2018)
    - IEC e-tech article on Smart homes are getting smarter (November 6th 2018)
    - IEC e-tech article on Machine learning is not a synonym for AI (October 17th 2018)
    - IEC e-tech article on Rethinking the healthcare ecosystem (reference to SC 42)
    - IEC e-tech article on Standards development organizations play key role in enabling remote daily life
  - Publications referencing SC 42 work
    - IEC blog on Generative AI for genetics? (August 3rd 2023)
    - ISO Article on AI in Healthcare (April 16th 2023)
    - IEC e-tech on Luxembourg highlights role of technical standardization in adoption of artificial intelligence (Sep 21st 2021)
    - ILNAS white paper on AI and technical standardization
    - IEC e-tech article on How Standards Australia contributes to the global artificial intelligence ecosystem (Jan 20th 2021)

Additional Links and Information

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- Other media coverage
  - ISO Multimedia
    - ISO video interview with Chair of SC 42 on Standards and Artificial Intelligence (November 14th 2018)
      - Artificial Intelligence and the role of International Standards in the implementation of this technology
    - ISO video interview with Chair of SC 42 on Standards and Artificial Intelligence Continued (November 14th 2018)
      - Artificial Intelligence and easing the mind of end-users including AI trustworthiness, ethics and societal concerns
  - IEC Multimedia
    - IEC video A governance framework for organizations deploying AI systems (June 7th 2022)
    - IEC video interview with SC 42 Chair, SC 42/WG 3 Connvenor and ISO/IEC 24368 Editor on AI Ethics (Nov 2019)
    - IEC video interview with Chair of SC 42 on How can we ensure AI is safe for Healthcare? (April 6th 2019)
    - IEC video interview with Chair of SC 42 on Is it too early to use machine learning for cybersecurity? (April 5th 2019)
    - IEC video interview with Chair of SC 42 on To what extent is AI ready for standardization? (April 5th 2019)
    - IEC video interview with Chair of SC 42 on What are some of the challenges you see with AI? (March 26th 2019)
    - IEC video interview with Chair of SC 42 on How to Define Artificial Intelligence (March 26th 2019)
    - IEC video interview with Chair of SC 42 on Why do we need standards for AI? (March 26th 2019)
    - IEC video interview with Chair of SC 42 on Artificial Intelligence (February 4th 2019)
      - The growing influence of AI in Smart Manufacturing and the important role of standards
    - IEC video interview with Chair of SC 42 on Artificial Intelligence (February 4th 2019)
      - Standardization can help eliminate data bias in AI

Additional Links and Information

- ISO Foresight
  - The world around us is changing and the pace of change is faster than ever before. The future has begun and those who do not want to get left behind must ensure their ability to look ahead. That is why ISO has developed a Standardization Foresight Framework; to help us look more systematically at the long-term and to encourage discussion and exchange within the ISO system about future opportunities for International Standardization. The following areas relate to the work of SC 42:
    - AI
    - Ethics

Annex B

Details of Publications, SC 42 WGs, Liaisons and Program of Work

Published Standards – AI – 2024

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

ISO/IEC TS 25058:2024 Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Guidance for quality evaluation of artificial intelligence (AI) systems

- Publication date: 2024-01

This document provides guidance for evaluation of artificial intelligence (AI) systems using an AI system quality model.

The document is applicable to all types of organizations engaged in the development and use of AI.

Published Standards – AI – 2024

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

ISO/IEC 5339:2024 Artificial intelligence (AI) — Guidance for AI applications

- Publication date: 2024-01

This document provides guidance for identifying the context, opportunities and processes for developing and applying AI applications. The guidance provides a macro-level view of the AI application context, the stakeholders and their roles, relationship to the life cycle of the system, and common AI application characteristics and considerations.

ISO/IEC 5469:2024 Information technology — Artificial intelligence — Functional safety and AI systems

- Publication date: 2024-01

This document describes the properties, related risk factors, available methods and processes relating to:

— use of AI inside a safety related function to realize the functionality;

— use of non-AI safety related functions to ensure safety for an AI controlled equipment;

— use of AI systems to design and develop safety related functions.

Published Standards – AI – 2023

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

ISO/IEC 42001:2023 Information technology — Artificial intelligence — Management system

- Publication date: 2023-12
- What is ISO/IEC 42001?

ISO/IEC 42001 is an international standard that specifies requirements for establishing, implementing, maintaining, and continually improving an Artificial Intelligence Management System (AIMS) within organizations. It is designed for entities providing or utilizing AI-based products or services, ensuring responsible development and use of AI systems.

- Why is ISO/IEC 42001 important?

ISO/IEC 42001 is the world's first AI management system standard, providing valuable guidance for this rapidly changing field of technology. It addresses the unique challenges AI poses, such as ethical considerations, transparency, and continuous learning. For organizations, it sets out a structured way to manage risks and opportunities associated with AI, balancing innovation with governance.

- Who is ISO/IEC 42001 for?

Organizations of any size involved in developing, providing, or using AI-based products or services. It is applicable across all industries and relevant for public sector agencies as well as companies or non-profits.

Published Standards – AI – 2023

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

ISO/IEC 5338:2023 Information technology — Artificial intelligence — AI system life cycle processes

- Publication date: 2023-12

This document defines a set of processes and associated concepts for describing the life cycle of AI systems based on machine learning and heuristic systems. It is based on ISO/IEC/IEEE 15288 and ISO/IEC/IEEE 12207 with modifications and additions of AI-specific processes from ISO/IEC 22989 and ISO/IEC 23053.

This document provides processes that support the definition, control, management, execution and improvement of the AI system in its life cycle stages. These processes can also be used within an organization or a project when developing or acquiring AI systems. When an element of an AI system is traditional software or a traditional system, the software life cycle processes in ISO/IEC/IEEE 12207 and the system life cycle processes in ISO/IEC/IEEE 15288 can be used to implement that element.

Published Standards – AI – 2023

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

ISO/IEC 24029-2:2023 Artificial intelligence (AI) — Assessment of the robustness of neural networks — Part 2: Methodology for the use of formal methods

- Publication date: 2023-08

This document provides methodology for the use of formal methods to assess robustness properties of neural networks. The document focuses on how to select, apply and manage formal methods to prove robustness properties.

ISO/IEC 8183:2023 Information technology — Artificial intelligence — Data life cycle framework

- Publication date: 2023-07

This document defines the stages and identifies associated actions for data processing throughout the artificial intelligence (AI) system life cycle, including acquisition, creation, development, deployment, maintenance and decommissioning. This document does not define specific services, platforms or tools. This document is applicable to all organizations, regardless of type, size or nature, that use data in the development and use of AI systems.

Published Standards – AI – 2023

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

ISO/IEC 25059:2023 Software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Quality model for AI systems

- Publication date: 2023-06

This document outlines a quality model for AI systems and is an application-specific extension to the standards on SQuaRE. The characteristics and sub-characteristics detailed in the model provide consistent terminology for specifying, measuring and evaluating AI system quality. The characteristics and sub-characteristics detailed in the model also provide a set of quality characteristics against which stated quality requirements can be compared for completeness.

ISO/IEC 23894:2023 Information technology — Artificial intelligence — Guidance on risk management

- Publication date: 2023-02

This document provides guidance on how organizations that develop, produce, deploy or use products, systems and services that utilize artificial intelligence (AI) can manage risk specifically related to AI. The guidance also aims to assist organizations to integrate risk management into their AI-related activities and functions. It moreover describes processes for the effective implementation and integration of AI risk management.

The application of this guidance can be customized to any organization and its context.

Published Standards – AI – 2022

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

ISO/IEC TS 4213:2022 Information technology — Artificial intelligence — Assessment of machine learning classification performance

- Publication date: 2022-10

This document specifies methodologies for measuring classification performance of machine learning models, systems and algorithms.

ISO/IEC TR 24368:2022 Information technology — Artificial intelligence — Overview of ethical and societal concerns

- Publication date: 2022-08

This document provides a high-level overview of AI ethical and societal concerns.

In addition, this document:

— provides information in relation to principles, processes and methods in this area;

— is intended for technologists, regulators, interest groups, and society at large;

— is not intended to advocate for any specific set of values (value systems)

Published Standards – AI – 2022

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

ISO/IEC 22989:2022 Information technology — Artificial intelligence — Artificial intelligence concepts and terminology

- Publication date: 2022-07

This document establishes terminology for AI and describes concepts in the field of AI. This document can be used in the development of other standards and in support of communications among diverse, interested parties or stakeholders. This document is applicable to all types of organizations (e.g. commercial enterprises, government agencies, not-for-profit organizations).

ISO/IEC 22989:2022 is publicly available and can be freely downloaded here

ISO/IEC 23053:2022 Framework for Artificial Intelligence (AI) Systems Using Machine Learning (ML)

- Publication date: 2022-06

This document establishes an Artificial Intelligence (AI) and Machine Learning (ML) framework for describing a generic AI system using ML technology. The framework describes the system components and their functions in the AI ecosystem. This document is applicable to all types and sizes of organizations, including public and private companies, government entities, and not-for-profit organizations, that are implementing or using AI systems.

Published Standards – AI – 2022

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

ISO/IEC 38507 — Information technology — Governance of IT — Governance implications of the use of artificial intelligence by organizations

- Publication date: 2022-04

This document provides guidance for members of the governing body of an organization to enable and govern the use of Artificial Intelligence (AI), in order to ensure its effective, efficient and acceptable use within the organization.

This document also provides guidance to a wider community, including:

— executive managers;

— external businesses or technical specialists, such as legal or accounting specialists, retail or industrial associations, or professional bodies;

— public authorities and policymakers;

— internal and external service providers (including consultants);

— assessors and auditors.

This document is applicable to the governance of current and future uses of AI as well as the implications of such use for the organization itself.

This document is applicable to any organization, including public and private companies, government entities and not-for-profit organizations. This document is applicable to an organization of any size irrespective of their dependence on data or information technologies.

Published Standards – AI – 2021

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

ISO/IEC TR 24372:2021 Information technology — Artificial Intelligence — Overview of computational approaches for AI systems

- Publication date: 2021-12

This document provides an overview of the state of the art of computational approaches for AI systems, by describing: a) main computational characteristics of AI systems; b) main algorithms and approaches used in AI systems, referencing use cases contained in ISO/IEC TR 24030.

ISO/IEC TR 24027:2021 Information technology — Artificial Intelligence — Bias in AI systems and AI aided decision making

- Publication date: 2021-11

This document addresses bias in relation to AI systems, especially with regards to AI-aided decision-making. Measurement techniques and methods for assessing bias are described, with the aim to address and treat bias-related vulnerabilities. All AI system lifecycle phases are in scope, including but not limited to data collection, training, continual learning, design, testing, evaluation and use.

ISO/IEC TR 24030:2021 Information technology — Artificial Intelligence — Use cases

- Publication date: 2021-05

This document provides a collection of representative use cases of AI applications in a variety of domains.

ISO/IEC TR 24029-1:2021 Artificial Intelligence — Assessment of the robustness of neural networks — Part 1: Overview

- Publication date: 2021-03

This document provides background about existing methods to assess the robustness of neural networks.

Published Standards – AI – 2020

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

ISO/IEC TR 24028:2020 Information technology — Artificial Intelligence — Overview of trustworthiness in artificial intelligence

- Publication date: 2020-05

This document surveys topics related to trustworthiness in AI systems, including the following:

— approaches to establish trust in AI systems through transparency, explainability, controllability, etc.;

— engineering pitfalls and typical associated threats and risks to AI systems, along with possible mitigation techniques and methods; and

— approaches to assess and achieve availability, resiliency, reliability, accuracy, safety, security and privacy of AI systems.

The specification of levels of trustworthiness for AI systems is out of the scope of this document.

Published Standards – Big Data – 2022

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

ISO/IEC 24668:2022 Information technology — Artificial intelligence — Process management framework for big data analytics

- Publication date: 2022-11

This document provides a framework for developing processes to effectively leverage big data analytics across the organization irrespective of the industries or sectors.

This document specifies process management for big data analytics with its various process categories taken into account along with their interconnectivities. These process categories are organization stakeholder processes, competency development processes, data management processes, analytics development processes and technology integration processes. This document describes processes to acquire, describe, store and process data at an organization level which provides big data analytics services

Published Standards – Big Data – 2020

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

ISO/IEC 20547-1:2020 Information technology — Big data reference architecture — Part 3: Framework and application process

- Publication date: 2020-08

The ISO/IEC 20547 series is intended to provide users with a standardized approach to developing and implementing big data architectures and provide references for approaches.

This document describes the framework of the big data reference architecture and the process for how a user of the document can apply it to their particular problem domain.

ISO/IEC 20547-3:2020 Information technology — Big data reference architecture — Part 3: Reference architecture

- Publication date: 2020-03

The ISO/IEC 20547 series is intended to provide users with a standardized approach to developing and implementing big data architectures and provide references for approaches.

This document describes the reference architecture in terms of User and Functional views.

The reference architecture presented in this document provides an architecture framework for describing the big data components, processes, and systems to establish a common language for the various stakeholders named as big data reference architecture (BDRA).

Published Standards – Big Data – 2018, 2019

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

ISO/IEC TR 20547-2:2018 Information technology — Big data reference architecture — Part 2: Use cases and derived requirements

- Publication date: 2018-01

ISO/IEC TR 20547-2:2018 provides examples of big data use cases with application domains and technical considerations derived from the contributed use cases.

ISO/IEC TR 20547-5:2018 Information technology — Big data reference architecture — Part 5: Standards roadmap

- Publication date: 2018-02

ISO/IEC TR 20547-5:2018 describes big data relevant standards, both in existence and under development, along with priorities for future big data standards development based on gap analysis.

ISO/IEC 20546:2019 Information technology — Big Data — Overview and Vocabulary

- Publication date: 2019-02

This document provides a set of terms and definitions needed to promote improved communication and understanding of this area. It provides a terminological foundation for big data-related standards.

This document provides a conceptual overview of the field of big data, its relationship to other technical areas and standards efforts, and the concepts ascribed to big data that are not new to big data.

SC 42 Projects, Status and Leadership

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

SC 42/WG 1 Foundational standards

- Terms of reference: Development of foundational standards for Artificial Intelligence
- Convenor: Paul Cotton (Canada)
- ISO/IEC 42005: Information technology — Artificial intelligence — AI system impact assessment
  - Editor: Peter Deussen (Germany)
  - Status: CD
- ISO/IEC 42006: Information technology — Artificial intelligence — Information technology — Artificial intelligence — Requirements for bodies providing audit and certification of artificial intelligence management systems
  - Editor: Susanne Kuch (Germany)
  - Status: DIS Comment Resolution
- ISO/IEC 42102: Information technology — Artificial intelligence — Taxonomy of AI system methods and capabilities
  - Editor: Taras Holoyad (Germany)
  - Status: Working Draft

SC 42 Projects, Status and Leadership

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

SC 42/WG 1 Foundational standards

- ISO/IEC 22989:2022/Amd 1: Information technology — Artificial Intelligence — Artificial intelligence concepts and terminology — Amendment 1
  - Editor: Wei Wei (Germany)
  - Status: Working Draft
- ISO/IEC 23053:2022/Amd 1: Framework for Artificial Intelligence (AI) Systems Using Machine Learning (ML) — Amendment 1
  - Editor: Milan Patel (United Kingdom)
  - Status: Working Draft

SC 42 Projects, Status and Leadership

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

SC 42/WG 2 Data

- Terms of reference: Standardization in relation to data in the context of artificial intelligence, big data, and data analytics
- Convenor: David Boyd (United States)
- Past Convenors:
  - Kyoung-Sook Kim (Japan) interim from January 2023 through March 2023
  - Wo Chang (United States) until December 30th 2022
- ISO/IEC 5259-1: Artificial intelligence — Data quality for analytics and machine learning (ML) — Part 1: Overview, terminology, and examples
  - Editor: Suwook Ha (Korea)
  - Status: FDIS
- ISO/IEC 5259-2: Artificial intelligence — Data quality for analytics and machine learning (ML) — Part 2: Data quality measures
  - Editor: Kyoung-Sook Kim (Japan)
  - Status: DIS
- ISO/IEC 5259-3: Artificial intelligence — Data quality for analytics and machine learning (ML) — Part 3: Data quality management requirements and guidelines
  - Editor: Martin Saerbeck (Germany)
  - Status: FDIS

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ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

SC 42/WG 2 Data

- ISO/IEC 5259-4: Artificial intelligence — Data quality for analytics and machine learning (ML) — Part 4: Data quality process framework
  - Editor: Wanzhong Ma (China)
  - Status: FDIS
- ISO/IEC 5259-5: Artificial intelligence — Data quality for analytics and machine learning (ML) — Part 5: Data quality governance
  - Editor: Gyeung-Min Kim (Korea)
  - Status: Working draft
- ISO/IEC TR 5259-6: Artificial intelligence — Data quality for analytics and machine learning (ML) — Part 6: Visualization framework for data quality
  - Editor: Stephen Kwan (United States)
  - Status: Working draft
- ISO/IEC TR 42103: Information technology — Artificial intelligence — Overview of synthetic data in the context of AI systems
  - Editor: Asif Malik (United Kingdom)
  - Status: Editor draft

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ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

SC 42/WG 3 Trustworthiness

- Terms of reference: Standardization in the area of AI Trustworthiness
- Convenor: David Filip (Ireland)
- Secretariat: Aditya Mohan (Ireland)
- ISO/IEC TS 6254: Information technology — Artificial intelligence — Objectives and approaches for explainability and interpretability of ML models and AI systems
  - Editor: Jaeho Lee (Korea)
  - Status: CD Comment Resolution
- ISO/IEC TS 8200: Artificial intelligence — Controllability of automated artificial intelligence systems
  - Editor: Xiaoqi Cao (China)
  - Status: CD Comment Resolution
- ISO/IEC TS 12791: Information technology — Artificial Intelligence (AI) — Treatment of unwanted bias in classification and regression machine learning tasks
  - Editor: Adam Leon Smith (United Kingdom)
  - Status: DTS
  - Parallel development with CEN/CENELEC JTC 21 with ISO lead

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ISO JTC 1 IEC
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SC 42 – Artificial Intelligence

SC 42/WG 3 Trustworthiness

- ISO/IEC TS 12792: Information technology — Artificial Intelligence (AI) — Transparency taxonomy of AI systems
  - Editor: Rania Wazir (Austria)
  - Status: CD Comment Resolution
- ISO/IEC TR 42106: Artificial Intelligence (AI) — Overview of differentiated benchmarking of AI system quality characteristics
  - Editor: Nisheeth Srivastava (India)
  - Status: Working draft
- ISO/IEC 42105: Information technology — Artificial intelligence — Guidance for human oversight of AI systems
  - Editor: Takashi Egawa (Japan)
  - Status: Working Draft
- ISO/IEC 24029-3: Artificial Intelligence (AI) — Assessment of the robustness of neural networks — Part 3: Methodology for the use of statistical methods
  - Editor: Arnault Ioualalen (France)
  - Status: Working Draft

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SC 42/WG 3 Trustworthiness

- ISO/IEC 22443: Information technology — Artificial Intelligence (AI) — Guidance on addressing societal concerns and ethical considerations
  - Editor: Viveka Bonde (Sweden)
  - Status: Working Draft
- ISO/IEC PWI 42108: Artificial intelligence — Operational design domain (ODD)
  - Editor: Patrick Bezombes (France)
  - Status: PWI

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ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

SC 42/WG 4 Use cases and applications

- Terms of reference: Use cases and applications for AI standardization
- Convenor: Fumihiro Maruyama (Japan)
- Secretariat: Nobuhiro Hosokawa (Japan)
- ISO/IEC TR 24030:2021 Revision: Information technology — Artificial Intelligence (AI) – Use cases
  - Editor: Yuchang Cheng (Japan)
  - Status: DTR
- ISO/IEC TR 20226: Information technology — Artificial intelligence — Environmental sustainability aspects of AI
  - Editor: Harm Ellens (Australia)
  - Status: Working Draft
- ISO/IEC TR 21221: Information technology — Artificial intelligence — Beneficial AI systems
  - Editor: Stephen Kwan (United States)
  - Status: Working Draft

SC 42 Projects, Status and Leadership

SC 42/WG 4 Use cases and applications

- ISO/IEC PWI 42109: Information technology — Artificial intelligence — Human-machine teaming
  - Editor: Yuchang Cheng (Japan)
  - Status: PWI
- ISO/IEC PWI 42113: Artificial intelligence — Evaluation metrics for AI use cases and applications
  - Editor: Yugyung Na (Korea)
  - Status: PWI

SC 42 Projects, Status and Leadership

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

SC 42/WG 5 Computational approaches and computational characteristics of AI systems

- Terms of reference: Standardization in the area of computational approaches and computational characteristics of AI systems
- Convenor: Ning Sun (China)
- Past Convenor: Tangli Liu (China) until April 29th 2022
- ISO/IEC 5392: Information technology — Artificial Intelligence (AI) — Reference architecture of knowledge engineering
  - Editor: Ruiqi Li (China)
  - Status: FDIS
- ISO/IEC TR 17903: Information technology — Artificial intelligence — Overview of machine learning computing devices
  - Editor: Xiaoqi Cao (China)
  - Status: CD
- ISO/IEC PWI 42112: Information technology – Artificial intelligence – Guidance on model training efficiency optimization of machine learning system
  - Editor: Juan Deng (China)
  - Status: PWI

SC 42 Projects, Status and Leadership

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

SC 42/JWG 2 Testing of AI-based Systems

[Joint WG with SC 7. Administered by SC 42]

- Co-Convenor: Adam Leon Smith (United Kingdom)
- Co-Convenor: Stuart Reid (United Kingdom)
- ISO/IEC TS 29119-11: Software and systems engineering — Software testing — Part 11: Testing of AI systems
  - Editor: Jonghong Jeon (Korea), Stuart Reid (United Kingdom)
  - Status: Working Draft
- ISO/IEC TS 17847: Information technology — Artificial intelligence — Verification and validation analysis of AI systems
  - Editor: Raghavendra Bhat (India), Michael Theime (United States)
  - Status: Working Draft

SC 42 Projects, Status and Leadership

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

SC 42/JWG 3 AI-enabled Health Informatics

[Joint WG with ISO/TC 215. Administered by SC 42]

- Convenor: Shusaku Tsumoto (Japan)
- ISO/IEC TR 18988: Artificial intelligence — Application of AI technologies in health informatics
  - Editor: Peter Williams (Australia), Takeshi Imai (Japan)
  - Status: Working Draft

SC 42/JWG 4 Functional Safety and AI Systems

[Joint WG with IEC/TC 65/SC 65A. Administered by SC 42]

- Convenor: Riccardo Mariani (Italy)
- ISO/IEC TS 22440: Artificial intelligence — Functional Safety and AI systems — Requirements
  - Editors: Riccardo Mariani (Italy)
  - Status: Working Draft

SC 42 Projects, Status and Leadership

SC 42/JWG 5 Natural language processing systems

[Joint WG with ISO/TC 37. Administered by SC 42]

- Co-Convenor: Lauriane Aufrant (France, SC 42)
- Co-Convenor: Avashlin Moodley (South Africa, TC 37)
- ISO/IEC 23281: Artificial Intelligence — Overview of AI tasks and functionalities related to natural language processing
  - Status: Working Draft
  - Parallel development with CEN/CENELEC JTC 21 with ISO lead
- ISO/IEC 23282: Artificial intelligence — Evaluation methods for accurate natural language processing systems
  - Editor: Rania Wazir (Austria)
  - Status: Working Draft
  - Parallel development with CEN/CENELEC JTC 21 with ISO lead

SC 42 Projects, Status and Leadership

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

SC 42/JWG 1 Governance implications of AI (Completed)

[Joint WG with SC 40. Administered by SC 42]

- Convenor: Yonosuke Harada (Japan)
- Past Convenor: Janna Lingenfelder (Germany)
- Past Secretary: Katharina Sehnert; Past Support: Sobhi Mahmoud (Germany)
- Co-Convenor: Gyeung-Min Kim (Republic of Korea)
- ISO/IEC 38507: Information technology — Governance of IT — Governance implications of the use of artificial intelligence by organizations
  - Editor: Peter Brown (United Kingdom)
  - Status: Published!

SC 42 Active AGs/AHGs on Specific Topics

- AHG 7 to consider potential JTC 21 projects for joint development under the VA – Convenors: Paul Cotton (Canada) and Kim Skov Hilding (Denmark)
- AHG 4 on Liaison with JTC 1/SC 27 – Convenor: Peter Duessen (Germany)

SC 42 Projects, Status and Leadership

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

SC 42 Completed AGs on Specific Topics

- AG 3 on AI standardization roadmap – Convenor: Patrick Bezombes (France)
- AG 2 on AI Systems engineering – Convenor: Luigi Troiano (Italy)
- AG 1 on AI Management Systems Standard – Convenor: Jim McFie (Canada)

SC 42 Completed AHGs

- AHG 6 to logistics relative to Comment Resolutions – CD/DIS Ballots – Convenor: Paul Cotton (Canada)
- AHG 5 on AI standardization landscape and roadmap – Convenor: Patrick Bezombes (France)
- AHG 3 on Intelligent systems engineering – Convenor: Luigi Troiano (Italy)
- AHG 2 on Liaison with JTC 1/SC 38 – Convenor: Peter Duessen (Germany)
- AHG 1 on Dissemination and outreach – Convenor: Wael William Diab (SC 42 Chair), Secretariat: Heather Benko (SC 42 CM)
- Societal concerns
- Study groups terms of reference
- Business plan review 2018, 2019, 2020 and 2021
- Ethical and sustainable AI proposal

SC 42 Projects, Status and Leadership

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

SC 42 Completed Study Groups

- SC 42/SG 1 Computational approaches and characteristics of artificial intelligence systems
  - Convenor: Tangli Liu (China)
  - Secretariat: Qun Zhang (China)
  - Status
    - SG report to be submitted by the SG leadership team to SC 42 by May 31st for consideration
    - NWIPs under discussion in the SG have been assigned to WG 5 to continue discussion and consideration
- SC 42/SG 2: Trustworthiness
  - Convenor: David Filip (Ireland)
  - Secretariat: Barry Smith (Ireland)
  - Status
    - Study group report on robustness completed and accepted by SC 42
    - Remaining items of study from terms of reference assigned as tasks to SC 42/WG 3
- SC 42/SG 3: Use cases and applications
  - Convener: Fumihiro Maruyama (Japan)
  - Secretariat: Nobuhiro Hosokawa (Japan)
  - Status: Remaining items of study from terms of reference assigned as tasks to SC 42/WG 4

SC 42 Liaisons

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

SC 42 has established an extensive and comprehensive set of liaisons for collaboration

- SC 42 provides guidance to ISO, IEC and JTC 1 committees on AI applications
- Reflects strong internal and external interest in the AI standardization program of work

Approved Category A External Liaisons

- World Trade Organization (WTO)
  - SC 42 liaison officers: Wael William Diab
- EC – European Commission
  - SC 42 liaison officer: Ray Walshe
  - EC liaison officers: Antoine André, Thierry Boulangé, Tatjana Evas, Josep Soler-Garrido
- OECD – Organization for Economic Co-operation and Development
  - OECD liaison officers: Karine Perset, Luis Aranda
  - SC 42 liaison officer: Rohit Israni
- Consumers International (CI)
  - CI liaison officer: Antonio Serra Cambaceres
- ETUC – European Trade Union Confederation
  - ETUC liaison officers: Natalia Giorgi, Philippe Saint-Aubin
- euRobotics AISBL
  - euRobotics AISBL officers: Paolo Barattini, Matteo Bonasso
- Big Data Value Association (BDVA)
  - SC 42 liaison officers: Abdellatif Touimi, Ray Walshe
  - BDVA liaison officers: Ana Garcia Robles, Abdellatif Touimi

Approved Category A External Liaisons

- UNESCO
  - UNESCO liaison officers: Irakli Khodeli, Mariagrazia Squicciarini
  - SC 42 liaison officers: Wael William Diab, Antonio Kung
- EUROCAE – The European Organization for Civil Aviation Equipment
  - EUROCAE liaison officers: Anna Guégan, Tri Thuc Nguyen, Anna Von Groote
  - SC 42 liaison officer: Lukas Hoehndorf
- Small Business Standards (SBS)
- Open Geospatial Consortium (OGC)
  - OGC liaison officers: George Percivall, Ingo Simonis
- Independent International Organization for Certification (IIOC)
  - IIOC liaison officers: Willy Fabritius, Nanda Kumar
- IEEE
  - IEEE liaison officers: Alpesh Shah, Srikanth Chandrasekaran, Jean-Philippe Faure, Jodi Haasz, Moira Patterson
- Partnership on AI (PAI)
  - SC 42 liaison officer: Tarek Besold
  - PAI liaison officers: Terah Lyons, Peter Eckersley, Steven Adler
- ITU
  - SC 42 liaison officer: Yoav Evenstein, Paul Cotton
  - ITU liaison officers: Reinhard Scholl, Bilel Jamoussi, Simão Ferraz de Campos Neto

SC 42 Liaisons

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

Approved Internal Liaisons to SC 42

- JTC 1/SC 7 – Software and systems engineering
  - Officers: Stuart Reid (United Kingdom), Shuji Kinoshita (Japan), Alec Dorling (Sweden), Ho-Won Jung (Korea) and Domenico Natale (Italy)
- JTC 1/SC 24 – Computer graphics, image processing and environmental data representation
- JTC 1/SC 27 – Information security, cybersecurity and privacy protection
  - Officers: Antonio Kung, François Lorek
- JTC 1/SC 29 – Coding of audio, picture, multimedia and hypermedia information
  - Officers: João Ascenso, Abdellatif Benjelloun Touimi, Vladyslav Zakharchenko
- JTC 1/SC 31 – Automatic identification and data capture techniques
  - Officers: Sun Ho Ahn
- JTC 1/SC 32 – Data management and interchange
  - Officers: Dowson Liu, Jan Michels
- JTC 1/SC 34 – Document description and processing languages
  - Officers: Jaeho Lee
- JTC 1/SC 36 – Information technology for learning, education and training
  - Officer: Yong-Sang Cho, Jaeho Lee
- JTC 1/SC 37 – Biometrics
  - Officer: Markku Metsämäki (Finland)
- JTC 1/SC 38 – Cloud computing and distributed platforms
  - Officer: Toshiro Suzuki (Japan)

Approved Internal Liaisons to SC 42

- JTC 1/SC 39 – Sustainability, IT and data centers
  - Officer: Phil Isaak
- JTC 1/SC 40 – IT Service Management and IT Governance
  - Officer: Gargi Keeni (India)
- JTC 1/SC 41 – Internet of things and related technologies
  - Officers: Erin Bournival (United States)
- JTC 1/SC 43 – Brain computer interface
- JTC 1
  - (WG 11) – Smart Cities – Officer: Howard Choe
- ISO/CASCO
  - Officers: Victoria Hailey, Edward Humphreys, Martina Paul
- ISO/PC 317 – Consumer protection: privacy by design for consumer goods and services
  - Officer: Jacqueline Zoest
- ISO/TC 20 – Aircraft and space vehicles
  - Officer: Karim Benmeziane
- ISO/TC 20/SC 16 – Unmanned aircraft
  - Officer: Kenzo Nonami
- ISO/TC 37 – Language and terminology
  - Officer: David Filip
- ISO/TC 37/SC 3 – Management of terminology resources
  - Officer: Sabine Mahr

SC 42 Liaisons

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

Approved Internal Liaisons to SC 42

- ISO/TC 42 – Photography
  - Officer: Scott Foshee (United States)
- ISO/TC 46/SC 11 – Archives/records management
- ISO/TC 68 – Financial services
  - Officer: Jim Northey
- ISO/TC 69 – Applications of statistical methods
  - Officer: Radouane Oudrhiri (United Kingdom)
- ISO/TC 172/SC 5 – Microscopes and endoscopes
- ISO/TC 204 – Intelligent transport systems
- ISO/TC 210 – Quality management and corresponding general aspects for medical devices
- ISO/TC 211 – Geographic information/Geomatics
- ISO/TC 215 – Health infomatics
- ISO/TC 225 – Market, opinion and social research
- ISO/TC 260 – Human resource management
- ISO/TC 261 – Additive manufacturing
- ISO/TC 262 – Risk management
- ISO/TC 268 – Sustainable cities and communities
- ISO/TC 269 – Railway applications

Approved Internal Liaisons to SC 42

- ISO/TC 279 – Innovation management
- ISO/TC 307 – Blockchain and distributed ledger technologies
  - Officer: Janna Lingenfelder (Germany)
- ISO/TC 309 – Governance of organizations
  - Officer: Michael Kayser
- IEC/SyC AAL
  - Officer: Ulrike Haltrich
- IEC/SyC SM
  - Officer: Alexander McMillan
- IEC/SC 45A – Instrumentation, control and electrical power systems of nuclear facilities
- IEC/TC 62 – Electrical equipment in medical practice
  - Officers: Oliver Christ, Regina Geierhofer, Martin Meyer
- IEC/SC 62C – Equipment for radiotherapy, nuclear medicine and radiation dosimetry
- IEC/TC 65 – Industrial – Process measurement, control and automation
  - Officers: Rudy Belliardi (TC 65 Secretary) and Wael William Diab (SC 42 Chair)
- IEC/SC 65A – System aspects
- IEC/TC 100 – Audio, video and multimedia systems and equipment

SC 42 Liaisons

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

Approved Internal Liaisons from SC 42

- IEC/SyC AAL – Active Assisted Living
  - SC 42 Officer: David Martin (United States)
- IEC/SyC Smart Cities
  - SC 42 Officer: Tangli Liu (China)
- IEC/SyC SM – Smart Manufacturing
  - SC 42 Officer: Wael William Diab (SC 42 Chair)
- IEC/TC 62 – Electrical equipment in medical practice
- IEC/TC 65 – Industrial – Process measurement, control and automation
  - SC 42 Officers: Wei Wei (Germany), Rudy Belliardi (TC 65 Secretary) and Wael William Diab (SC 42 Chair)
- IEC/TC 65/SC 65A – System Aspects
  - SC 42 Officer: Takashi Egawa (Japan)
- IEC/TC 100 – Audio, video and multimedia systems and equipment
- JTC 1/SC 7 – Software and systems engineering
  - SC 42 Officers: Yuchang Cheng (Japan), Adam Leon Smith (UK), Antonio Kung (France)
- JTC 1/SC 24 – Computer graphics, image processing and environmental data representation
- JTC 1/SC 27 – IT security techniques
  - SC 42 Officers: Peter Deussen (Germany), Sun Yan (China)

Approved Internal Liaisons from SC 42

- JTC 1/SC 29 – Coding of audio, picture, multimedia and hypermedia information
  - SC 42 Officers: Abdellatif Benjelloun Touimi (UK) JTC 1/SC 32 – Data management and interchange
  - SC 42 Officers: Guang Liang (China)
- JTC 1/SC 32 – Data management and interchange
- JTC 1/SC 34 – Document description and processing languages
  - SC 42 Officers: Jaeho Lee (Korea)
- JTC 1/SC 36 – Information technology for learning, education and training
  - SC 42 Officer: Bruce Peoples (United States)
- JTC 1/SC 37 – Biometrics
  - SC 42 Officers: Brianna Brownell (Canada), Frank Rudzicz (Canada)
- JTC 1/SC 38 – Cloud computing and distributed platforms
  - SC 42 Officers: Peter Deussen (Germany), David Filip (Ireland)
- JTC 1/SC 39 – Sustainability for and by Information Technology
  - SC 42 Officer: Harm Ellens (Australia)
- JTC 1/SC 40 – IT Service Management and IT Governance
  - SC 42 Officer: François Lorek (France)
- JTC 1/SC 41 – Internet of things and related technologies
  - SC 42 Officer: Wei Wei (Germany)

SC 42 Liaisons

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

Approved Internal Liaisons from SC 42

- JTC 1/SC 43 – Brain computer interface
- JTC 1
  - WG 11 – Smart cities – SC 42 Officer: Tangli Liu (China)
  - WG 15 – Terminology – SC 42 Officer: Wei Wei (Germany)
- ISO CASCO
  - SC 42 Officer: Martina Paul (Austria)
- ISO/TC 20/SC 16 – Unmanned aircraft systems
  - SC 42 Officer: Fumihiro Maruyama (Japan)
- ISO/TC 22/SC 32 – Electrical and electronic components and general system aspects
- ISO/TC 37 – Language and terminology
  - SC 42 Officer: David Filip (Ireland)
- ISO/TC 37/SC 3 – Management of terminology resources
  - SC 42 Officer: David Filip (Ireland)
- ISO/TC 46/SC 11 – Archives/records management
  - SC 42 Officer: Adam Leon Smith (UK)
- ISO/TC 68 – Financial services
  - SC 42 Officer: Aurélie Jacquet (Australia)

Approved Internal Liaisons from SC 42

- ISO/TC 69 – Applications of statistical methods
  - SC 42 Officer: Radouane Oudrhiri (UK)
- ISO/TC 106 – Dentistry
- ISO/TC 172/SC 5 – Microscopes and endoscopes
- ISO/TC 204 – Intelligent Transport Systems
  - SC 42 Officer: Wael William Diab (Chair)
- ISO/TC 210 – Quality management and corresponding general aspects for medical devices
  - SC 42 Officer: Alpo Värri (Finland)
- ISO/TC 215 – Health informatics
  - SC 42 Officer: Paolo Alcini (Italy)
- ISO/TC 225 – Market, opinion and social research
- ISO/TC 260 – Human resource management
- ISO/TC 262 – Risk management
  - SC 42 Officer: Pat Baird (United States)
- ISO/TC 268 – Sustainable cities and communities
- ISO/TC 299 – Robotics
  - SC 42 Officer: David Dubois (Canada)

SC 42 Liaisons

Approved Internal Liaisons from SC 42

- ISO/TC 307 – Blockchain and distributed ledger technologies
  - SC 42 Officers: Li Bin (China) and Dapeng Zhang (China)
- ISO/TC 309 – Governance of organizations
  - SC 42 Officer: Victoria Hailey (Canada)

Approved Category C Liaisons

- European Center for Not-for-Profit Law (ECNL)

Annex C

Additional Information on SC 42 Meeting Schedule

Upcoming Meetings

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

13th Plenary meeting

- April 22nd – 26th, 2024
- Seoul, South Korea
- Confirmed

14th Plenary meeting

- October 7th – 11th, 2024
- Versailles, France
- Confirmed

15th Plenary meeting

- April, 2025
- India
- Tentative

16th Plenary meeting

- October, 2025
- Sydney, Australia
- Confirmed

Past Meetings

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

12th Plenary meeting
- October 16th – 20th, 2023
- Vienna, Austria*

11th Plenary meeting
- Apr 24th to Apr 28th, 2023
- Berlin, Germany*

10th Plenary meeting
- Oct 21st to Nov 2nd, 2022
- Virtual

9th Plenary meeting
- April 18th to 29th, 2022
- Virtual

8th Plenary meeting
- October 18th to 29th, 2021
- Virtual

7th Plenary meeting
- April 26th – May 7th, 2021
- Virtual

6th Plenary meeting
- October 19th – 30th, 2020
- Virtual

5th Plenary meeting
- April 6th – 20th, 2020
- Virtual

* Note: with remote participation

4th Plenary meeting
- October 7th – 11th, 2019
- Tokyo, Japan

3rd Plenary meeting
- April 8th – 12th, 2019
- Dublin, Ireland

2nd Plenary meeting
- October 18th – 20th, 2018
- Sunnyvale, CA, USA

1st Plenary meeting
- April 18th – 20th, 2018
- Beijing, China

Annex D

SC 42 Member National Bodies

SC 42 Member National Bodies

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

The following national bodies are participating members of SC 42 (P-members)

- Australia (SA), Austria (ASI), Azerbaijan (AZSTAND), Belgium (NBN), Canada (SCC), China (SAC), Cyprus (CYS), Denmark (DS), Egypt (EOS), Finland (SFS), France (AFNOR), Germany (DIN), India (BIS), Ireland (NSAI), Israel (SII), Italy (UNI), Japan (JISC), Kazakhstan (KAZMEMST), Kenya (KEBS), Korea, Republic of (KATS), Luxembourg (ILNAS), Malaysia (DSM), Malta (MCCAA), Netherlands (NEN), Norway (SN), Philippines (BPS), Portugal (IPQ), Russian Federation (GOST R), Rwanda (RSB), Saudi Arabia (SASO), Singapore (SSC), Spain (UNE), Sweden (SIS), Switzerland (SNV), Türkiye (TSE), Uganda (UNBS), United Kingdom (BSI), United States (ANSI), Zimbabwe (SAZ)

The following national bodies are observing members of SC 42 (O-members)

- Argentina (IRAM), Belarus (BELST), Benin (ANM), Brazil (ABNT), Congo, The Democratic Republic of the (OCC), Côte d'Ivoire (CODINORM), Czech Republic (UNMZ), Estonia (EVS), Hong Kong (ITCHKSAR), Hungary (MSZT), Indonesia (BSN), Iran, Islamic Republic of (INSO), Lithuania (LST), Mexico (DGN), New Zealand (NZSO), North Macedonia (ISRSM), Peru (INACAL), Poland (PKN), Romania (ASRO), Slovakia (UNMS SR), Slovenia (SIST), South Africa (SABS), Sri Lanka (SLSI), Ukraine (SE UkrNDNC), United Arab Emirates (MoIAT-STR)

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS

SC 42 – Artificial Intelligence

Annex E

Overview of Guidelines for AI Applications (ISO/IEC 5339)

ISO/IEC 5339 Guidelines for AI Applications

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

- Macro-level view
  - The document provides a macro-level view of an AI application to facilitate its understanding, development and use amongst all stakeholders
- Document includes
  - motivation and objectives;
  - an approach to identifying an AI application's stakeholders, context, functional characteristics and non-functional characteristics;
  - an AI application framework that can be used to answer the question: "What are the characteristics and considerations of an AI application?";
  - guidelines for AI applications based on the make, use and impact perspectives
- Progress
  - submitted for an eight-week CD ballot starting May 2nd, 2022

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS

SC 42 – Artificial Intelligence

Annex F

Big Data Trends and Emerging Projects

Key Topics: Big Data Background

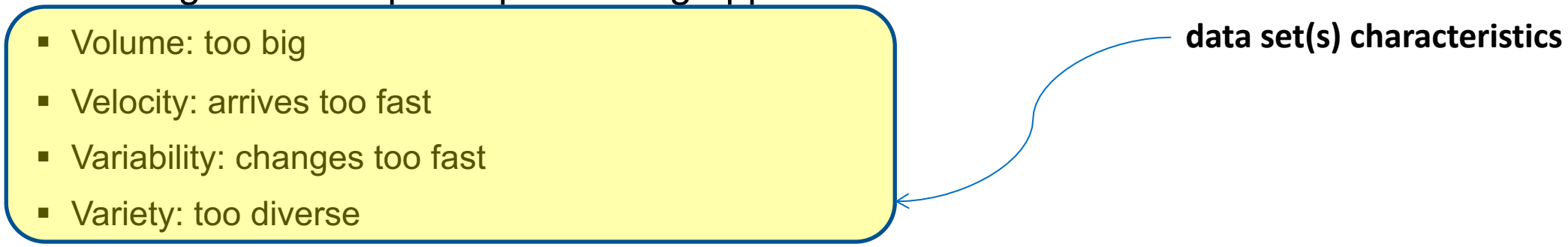
ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

Overview

- Big Data is extensive datasets — primarily in the data characteristics of volume, variety, velocity, and/or variability — that require a scalable technology for efficient storage, manipulation, management, and analysis. Note: Big data is commonly used in many different ways, for example as the name of the scalable used to handle big data extensive datasets.
- Big Data deals with ***characteristics*** that for an application domain ***cannot be efficiently processed*** using ***traditional technologies*** and techniques in order to ***extract value***

Key Drivers of Big Data

- Key drivers in understanding the Big Data paradigm – how this is different from traditional data storage and compute / processing applications



- The applications ***generating*** this data or requiring its ***analysis*** may have one more of the above aspects present

Emerging applications are creating a **paradigm shift** and enabling predictive analytics

Big Data Analysis and Predictions

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

Tremendous market growth and job creation

Strong support that Big Data adoption is happening, cross-cutting and has significant implications and potential

Paradigm shift and predictive analytics

IDC – Predictions from the IDC FutureScape for Big Data and Analytics

1. Visual data discovery tools will be growing 2.5 times faster than rest of the business intelligence (BI) market. By 2018, investing in this enabler of end-user self service will become a requirement for all enterprises.
2. Over the next five years spending on cloud-based Big Data and analytics (BDA) solutions will grow three times faster than spending for on-premise solutions. Hybrid on/off premise deployments will become a requirement.
3. Shortage of skilled staff will persist. In the U.S. alone there will be 181,000 deep analytics roles in 2018 and five times that many positions requiring related skills in data management and interpretation.
4. By 2017 unified data platform architecture will become the foundation of BDA strategy. The unification will occur across information management, analysis, and search technology.
5. Growth in applications incorporating advanced and predictive analytics, including machine learning, will accelerate in 2015. These apps will grow 65% faster than apps without predictive functionality.
6. 70% of large organizations already purchase external data and 100% will do so by 2019. In parallel more organizations will begin to monetize their data by selling them or providing value-added content.

Big Data Analysis and Predictions

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

Emerging Applications and Trends for BD

IDC – Predictions from the IDC FutureScape for Big Data and Analytics

7. Adoption of technology to continuously analyze streams of events will accelerate in 2015 as it is applied to Internet of Things (IoT) analytics, which is expected to grow at a five-year compound annual growth rate (CAGR) of 30%.
8. Decision management platforms will expand at a CAGR of 60% through 2019 in response to the need for greater consistency in decision making and decision making process knowledge retention.
9. Rich media (video, audio, image) analytics will at least triple in 2015 and emerge as the key driver for BDA technology investment.
10. By 2018 half of all consumers will interact with services based on cognitive computing on a regular basis.

Gartner

Bid Data Motivators within ICT Space

- On weather or not “Big data hype or substance?”
  - Beyond all the discussions, adoption of big data is simply inevitable

- Within key IT trends
  - Identifies Big Data expertise as essential
  - Identifies Big Data expertise as needed within Web-scale I, IoT and others
- Benefits of big data are not limited solely to better decision making
  - fewer than half of big data projects focus on direct decision making
  - most big data projects are geared to generating deeper business insights and optimizing, automating or even designing new processes

Process Management Framework – Big Data Analytics

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

The proposed standard provides a framework for developing processes to effectively leverage big data analytics across the organization irrespective of the industries/sectors. It specifies process management for big data analytics with the five process categories as listed below with help of Process Reference Model, Measurement Framework and Assessment Model:

Process Reference Model

Context
Purpose
Outcomes

Process Measurement Framework

Attributes
Attribute Outcomes
Rating Scale

Process Assessment Model

Process Capability by processes from Process groups

Progress Categories & Processes

Organization Stakeholder processes:

OSP1: Business analytics policy
OSP2: Stakeholders decision rights and accountabilities
OSP3: Alignment with organizational objectives
OSP4: Change management
OSP5: Data driven culture

Competency Development processes:

CDP1: Workforce planning
CDP2: Capability development
CDP3: Functional knowledge
CDP4: Capability renewal

Data Management processes:

DMP1: Data identification
DMP2: Data normalization
DMP3: Data governance
DMP4: Big data infrastructure

Analytics Development processes:

ADP1: Analytics activity definition
ADP2: Analytics practices
ADP3: Success criteria definition
ADP4: Risk identification

Technology Intergration processes:

TIP1: Enterprise data mart
TIP2: System integration

Annex G

Overview of JTC 1

Part of the ISO, IEC and JTC 1 Family

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

JTC 1

- Jointly established under ISO and IEC covering the field of Information Technology
  - ICT building blocks for global markets
  - Standards for business and consumer applications
- 38 P-members and 63 O-members
- About 5000 active participants developing 450+ standards; over 3400 published
- Technical areas within JTC 1 include
  - Coded character sets – Telecommunications and information exchange between systems – Software and systems engineering – Cards and security devices for personal identification – Programming languages – Digitally recorded media – Computer graphics, image processing – IT security techniques – Office equipment (printing) – Coding of audio, picture, multimedia (JPEG, MPEG) – Automatic ID and data capture (RFID) – Data management – Document description, processing – User interfaces, IT for learning, education, training – Biometrics – Cloud computing – IT Sustainability – IT governance – Internet of Things – Artificial Intelligence – Smart cities – 3D printing and scanning – Quantum Computing – Brain-computer Interfaces
- Strategic topics covered within JTC 1 include
  - Digital transformation
    - Increased cooperation with other ISO and IEC TCs
    - Working with policy makers: standards and regulations
  - Systems integration
  - Cooperation with consortia
  - Trustworthiness
  - Emerging technologies
  - Open source

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS

SC 42 – Artificial Intelligence

Annex H

ISO/IEC AI Workshop Series

ISO/IEC AI Workshop Series Overview

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

Overview, Goals and Stakeholders

- SC 42 organizes a bi-annual ISO/IEC AI Workshop series that is freely available
- The goal is to have a dialogue about the AI ecosystem including emerging trends, technology, requirements and applications as well as the role of standards
- The workshop brings together innovators at the frontier of AI development, research, deployment, standardization, startups, applications and oversight
- The workshop speakers represent a diverse set of stakeholders geographically, across industry sectors and backgrounds.

Insights and SC 42 Strategic Planning

- Insights gained from the workshop are made available to SC 42 for its strategic planning and road-mapping of the work program
- Several new projects have been started based on such insights

ISO/IEC AI Workshop Series

Fourth Workshop on 4th and 6th December 2023 (Online)

ISO JTC1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

4 Content Tracks

AI Applications Applications Roundtable – Streams, screens and synthetic dreams: how AI is transforming media and photography

This track will look at emerging AI applications, public projects, use cases and case studies with the goal of identifying insights relating to AI application requirements, providing an overview of supporting horizontal standardization work and discuss roadmaps of application domain verticals.

This installment of the workshop will focus on AI's transformative effect on media and photography

Beneficial AI

AI promises to change how we live, work and play for the better. Moreover, some applications of AI stand to have an unprecedent societal impact. This track will focus on advances to humanity that would otherwise not be possible without AI

Novel AI Standardization Approaches (Horizontal and Vertical)

In addition to building on well established information and operational technologies, standards and open-source efforts, AI introduces technology-specific challenges through its learning nature. This track will look at such challenges and discuss the innovative standards approaches to address them

Emerging AI Technology Trends and Requirements

AI technology and capability is evolving at a rapid pace. This track will look the combination of emerging technology trends and requirements through a diverse set of perspectives ranging from those luminaries driving innovation to those looking to ensure responsible adoption

Benefits

Innovation

workshop will focus on state of the art, priorities and requirements

Market Intelligence

identify emerging trends, requirements, insights and opportunities

Thought Leadership

participating in this interactive event will help to position your organization as an industry leader

Enhanced

Enhanced networking opportunities

Stakeholders

Attract new stakeholders to join standardization activities

Information

Gain insight into alternative POVs and needs through Q&A and panel discussion

ISO/IEC AI Workshop Sessions

ISO JTC1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

4th 1400 – 1800 Pacific

Overview of SC 42

Beneficial AI

Novel AI Standardization Approaches

6th 0900 – 1300 Pacific

AI Applications Roundtable – Streams, screens and synthetic dreams: how AI is transforming media and photography

Emerging Tech Trends and Requirements

Closing Remarks

Registration and Website

Upcoming workshop programme

Upcoming workshop registration

Prior Workshop Archives

Workshop series landing page that includes prior workshop archives, recordings and programs

Program

SESSION 1

(4th December 14:00 – 18:00 PST)

- Overview of ISO/IEC JTC 1/SC 42
- Beneficial AI
- Novel AI Standardization Approaches

SESSION 2

(6th December 9:00 – 13:00 PST)

- AI Applications - Streams, screens and synthetic dreams: how AI is transforming media and photography
- Emerging AI Technology Trends and Requirements
- Closing Remarks

Session 1

Program	Presentation Title
Session 1 (4th December 14:00 – 18:00 Pacific Standard Time)	
Kickoff	
Wael William Diab	
Opening Remarks	
Silvio Dulinsky	Opening Message from ISO and IEC
Overview of ISO/IEC JTC 1/SC 42	
Wael William Diab	
Beneficial AI	
Khoa Le	Bridging Gaps: How AI is Solving the Dental Industry's Biggest Challenges
Stefano Sedola	An artificial intelligence diagnostic assistant for gastric inflamation
Harm Ellens	Environmental sustainability aspects and impacts of AI systems
Q&A	
Break	
Novel AI Standardization Approaches	
Adam Smith	Operationalizing treatment of unwanted bias
Olivier Blais	How Standards Can Guide the Quality Evaluation of AI Systems
Ruiqi Li	Knowledge engineering reference architecture in the context of artificial intelligence
Yuchang Cheng	Introduction of AI system life cycle processes
Shrikant Bhat	ISO 5339: Revisiting Context to Understand Intelligence!
Fumihiro Maruyama, Nobuhiro Hosokawa, Yuchang Cheng, Shrikant Bhat, Harm Ellens, Stephen Kwan	International standards portfolio to enable AI applications
Q&A	
End of Session 1	

Session 2

Session 2 (6th December 9:00 – 13:00 Pacific Standard Time)	
Kickoff	
Wael William Diab	
AI Applications - Streams, screens and synthetic dreams: how AI is transforming media and photography	
Edy Liongosari	Impact of AI on media and photography
Andy Maltz	Everything Everywhere All at Once: AI and the Movies
Thomas Bause Mason	AI Media Creation – Promise and Threat
Maxime Rosello	AI's Impact on Metaverse
Gary Sullivan	AI in the Multimedia Compression Technologies of ISO/IEC JTC 1/SC 29
Q&A	
Break	
Emerging AI Technology Trends and Requirements	
Tatjana Evas	
Wan Sie	Singapore's approach to AI governance
Srivastava Anshumali	Democratization of AI
Chris Meserole	Introduction to the Frontier Model Forum
Q&A	
Closing Remarks	
Program Committee	Insights from the workshop
End of Session 2	

ISO/IEC AI Workshop Series

Third Workshop on 12th and 14th June 2023 (Online)

ISO JTC1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

4 Content Tracks

AI Applications – Financial Applications Roundtable

This track will look at emerging AI applications, public projects, use cases and case studies with the goal of identifying insights relating to AI application requirements, providing an overview of supporting horizontal standardization work and discuss roadmaps of application domain verticals.

This installment of the workshop will focus on AI in financial applications bringing experts from AI and Finance in a roundtable format

Beneficial AI

AI promises to change how we live, work and play for the better. Moreover, some applications of AI stand to have an unprecedent societal impact. This track will focus on advances to humanity that would otherwise not be possible without AI

Novel AI Standardization Approaches (Horizontal and Vertical)

In addition to building on well established information and operational technologies, standards and open-source efforts, AI introduces technology-specific challenges through its learning nature. This track will look at such challenges and discuss the innovative standards approaches to address them

Emerging AI Technology Trends and Requirements

AI technology and capability is evolving at a rapid pace. This track will look the combination of emerging technology trends and requirements through a diverse set of perspectives ranging from those luminaries driving innovation to those looking to ensure responsible adoption

Benefits

Innovation

workshop will focus on state of the art, priorities and requirements

Market Intelligence

identify emerging trends, requirements, insights and opportunities

Thought Leadership

participating in this interactive event will help to position your organization as an industry leader

Enhanced

Enhanced networking opportunities

Stakeholders

Attract new stakeholders to join standardization activities

Information

Gain insight into alternative POVs and needs through Q&A and panel discussion

ISO/IEC AI 3rd Workshop Sessions

ISO JTC1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

12th June 2023 0900 – 1300 Pacific

Overview of SC 42

Beneficial AI

Novel AI Standardization Approaches

14th June 2023 1400 – 1800 Pacific

AI Applications – Financial Applications

Emerging Tech Trends and Requirements

Closing Remarks

Registration and Website

Upcoming workshop programme

Upcoming workshop registration

Prior Workshop Archives

Workshop series landing page that includes prior workshop archives, recordings and programs

Program

SESSION 1

(12th June 9:00 – 13:00 PST)

- Overview of ISO/IEC JTC 1/SC 42
- Beneficial AI
- Novel AI Standardization Approaches

SESSION 2

(14th June 14:00 – 18:00 PST)

- AI Applications - Financial Roundtable
- Emerging AI Technology Trends and Requirements
- Closing Remarks

Session 1

Program	Presentation Title
Session 1 (12th June 09:00 – 13:00 Pacific Standard Time)	
Kickoff	
Wael William Diab	
Opening Remarks	
Gilles Thonet	Opening Message from IEC and ISO
Overview of ISO/IEC JTC 1/SC 42	
Wael William Diab	
Beneficial AI	
Lauro Locks	Digital trade in the WTO TBT Committee: overview and trends
Marc Fiammante	Machine aided detection Newborn Infant Hypoxic Ischemic Encephalopathy (HIE) on EEGs f
Stephen Kwan	Beneficial AI systems
Michael Blumenstein	Frontiers of Artificial Intelligence — how AI is transforming humanity for the global good
Q&A	
Break	
Novel AI Standardization Approaches	
Adam Smith	Integrating systems and software best practice with AI
Arnault Ioulalen	From being robust to being trustworthy, an AI challenge
Colin Crone	Overarching data life cycle framework for AI systems
Kim Lucy, Paul Cotton, Susanne Kuch, Marta Janczraski	International standards portfolio to enable responsible and certifiable AI systems
Q&A	
End of Session 1	

Session 2

Session 2 (14th June 14:00 – 18:00 Pacific Standard Time)	
Kickoff	
Wael William Diab	
AI Applications - Financial Applications Roundtable	
Qiang Zhang	Sharing of MAS Responsible AI Journey
Florian Ostmann	AI in Financial Services: Applications, benefits & risks, and governance considerations
Dan Jermyn	Building a Customer Obsessed, AI-Driven Organisation
Jim Northey	AI and Financial Services
Aurelie Jacquet	Responsible AI-enabled Financial Services: Leveraging the SC 42 Work Program for Financi
Q&A	
Break	
Emerging AI Technology Trends and Requirements	
Edy Liongosari	Responsible Democratization of AI
Jen Gennai	Responsible AI Governance
Owen Larter	Emerging trends and considerations on how to govern AI
Q&A	
Closing Remarks	
Program Committee	Insights from the workshop
End of Session 2	

ISO/IEC AI Workshop Series

Second Workshop on 29th and 30th November 2022 (Online)

ISO JTC1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

4 Content Tracks

AI Applications – Healthcare Roundtable

This track will look at emerging AI applications, public projects, use cases and case studies with the goal of identifying insights relating to AI application requirements, providing an overview of supporting horizontal standardization work and discuss roadmaps of application domain verticals.

This installment of the workshop will focus on AI in Healthcare applications bringing experts from AI and Healthcare in a roundtable format

Beneficial AI

AI promises to change how we live, work and play for the better. Moreover, some applications of AI stand to have an unprecedent societal impact. This track will focus on advances to humanity that would otherwise not be possible without AI

Novel AI Standardization Approaches (Horizontal and Vertical)

In addition to building on well established information and operational technologies, standards and open-source efforts, AI introduces technology-specific challenges through its learning nature. This track will look at such challenges and discuss the innovative standards approaches to address them

Emerging AI Technology Trends and Requirements

AI technology and capability is evolving at a rapid pace. This track will look the combination of emerging technology trends and requirements through a diverse set of perspectives ranging from those luminaries driving innovation to those looking to ensure responsible adoption

Benefits

Innovation

workshop will focus on state of the art, priorities and requirements

Market Intelligence

identify emerging trends, requirements, insights and opportunities

Thought Leadership

participating in this interactive event will help to position your organization as an industry leader

Enhanced

Enhanced networking opportunities

Stakeholders

Attract new stakeholders to join standardization activities

Information

Gain insight into alternative POVs and needs through Q&A and panel discussion

ISO/IEC AI 2nd Workshop Sessions

ISO JTC1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

29th Nov 2022 0900 – 1300 Pacific

Overview of SC 42

AI Applications – Healthcare

Beneficial AI

30th Nov 2022 1400 – 1800 Pacific

Novel AI Standardization Approaches

Emerging Tech Trends and Requirements

2nd Workshop Registration and Website

Workshop series landing page and 2nd workshop registration

Inaugural Workshop Archive

Website including recording of event and program can be found here

Program

SESSION 1

(29th November 9:00 – 13:00 PST)

- Overview of ISO/IEC JTC 1/SC 42
- AI Applications - Healthcare Roundtable
- Beneficial AI

SESSION 2

(30th November 14:00 – 18:00 PST)

- Novel AI Standardization Approaches
- Emerging AI Technology Trends and Requirements
- Closing Remarks

Session 1

Kickoff
Wael William Diab

Overview of ISO/IEC JTC 1/SC 42
Wael William Diab

AI Applications - Healthcare Roundtable

Mike Glickman	The Role of Health informatics in AI
Patty Krantz-Zuppan	ISO/TC 210's AI standards activities
Regina Geierhofer	Medical Device Standards - Focus: AI/ML enabled medical devices
Kim Lucy	AI Applications Healthcare Roundtable: ISO/IEC 42001 and Medical Devices
Roundtable	
Break	

Beneficial AI

Alpo Värri	Beneficial AI - AI in health care
Andrew Stanford-Clark	Mayflower Autonomous Ship - the future of autonomous marine exploration
Hajime Yamada	Use of AI and Cooperative Safety for AAL Care Recipients
Fumihiro Maruyama	Applications of AI and Their Benefits to Humanity
Q&A	

Session 2

Kickoff & Overview of ISO/IEC JTC 1/SC 42

Wael William Diab

Novel AI Standardization Approaches

Peter Deussen	Risk Management and ISO/IEC 23894
Takashi Egawa, Riccardo Mariani	Functional Safety and AI technologies: background, standardization landscape and overview of ISO/TR 5469
Gautam Banerjee	ISO/IEC 24668: Process Management Framework - Big Data Analytics

Q&A

Break

Emerging AI Technology Trends and Requirements

Jordan Crenshaw	Update on U.S. Chamber's AI Commission on Competitiveness, Inclusion, and Innovation
Bogdana Rakova	Sustainable AI: Algorithms and Social Justice
Steve Kommrusch	Neurosymbolic learning on activity summarization of video data

Q&A

Closing Remarks

Program Committee

ISO/IEC AI Workshop Series

Inaugural Workshop on 24th and 25th May 2022 (Online)

ISO JTC1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

4 Content Tracks

AI Applications

This track will look at emerging AI applications, public projects, use cases and case studies with the goal of identifying insights relating to AI application requirements, providing an overview of supporting horizontal standardization work and discuss roadmaps of application domain verticals

Emerging AI Technology Trends

AI technology and capability is evolving at a rapid pace. This track will look at emerging AI technology areas and trends with the goal of discussing new areas and looking at the interplay of research, industry activity and standardization

Novel AI Standardization Approaches

In addition to building on well established information and operational technologies, standards and open-source efforts, AI introduces technology-specific challenges through its learning nature. This track will look at such challenges and discuss the innovative standards approaches to address them

Emerging AI Requirements

Viewed as a digital transformation enabler or through its potential to deliver transformative insights for the betterment of society, AI is expected to become a ubiquitous technology. Thus, requirements to ensure responsible adoption continue to emerge from a diverse set of perspectives. This track will look at the context of use (e.g. ethics) and emerging requirements highlighting the role standards can play to complement other efforts such as industry, regulatory etc.

Benefits

Innovation

workshop will focus on state of the art, priorities and requirements

Market Intelligence

identify emerging trends, requirements, insights and opportunities

Thought Leadership

participating in this interactive event will help to position your organization as an industry leader

Enhanced

Enhanced networking opportunities

Stakeholders

Attract new stakeholders to join standardization activities

Information

Gain insight into alternative POVs and needs through Q&A and panel discussion

ISO/IEC AI Workshop Sessions

ISO JTC1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

24th May 2022 1300 – 1600 UTC

Opening Remarks

AI Applications A

Novel AI Standardization A

25th May 2022 0500 – 0800 UTC

Emerging AI Requirements

Emerging Tech Trends

25th May 2200 – 26th 0100 UTC

AI Applications B

Novel AI Standardization B

Closing Remarks

Workshop Website including recording of event and program

Presentations can be found here

Program

SESSION 1

(24th May 13:00 – 16:00 UTC)

- Opening Remarks
- AI Applications
- Novel AI Standardization

SESSION 2

(25th May 05:00 – 08:00 UTC)

- Opening Remarks
- Emerging AI Requirements
- Emerging AI Technology Trends

SESSION 3

(25th May 22:00 – 26th 01:00 UTC)

- AI Applications
- Novel AI Standardization
- Closing Remarks

Session 1

Program	Talk Title	Track Chairs	Aprox Start Time (UTC)
Kickoff			13:00
Wael William Diab			
Opening Remarks			13:05
Gilles Thonet			
Phil Wennblom			
AI Applications		Rohit Israni Catherine Nelson	13:15
Mike Glickman	Health informatics and AI, the road to Interoperability		
Neil Frost	AI potential Applications in Transport		
Christophe Preube	AI finds awareness in standardization work – the White paper of ISO/TMB SMCC		
Novel AI Standardization Approaches		Peter Deussen Norbert Bensalem	14:25
Kimberly Lucy	Creating Trust in AI Through Standards: A Management System Approach		
Wo Chang	Data Quality for Analytics and Machine Learning		
Tim McGarr / Florian Ostmann	AI Standards Hub (UK)		
Viveka Bonde	Novel Standerdization Approach to AI Ethics		

Session 2

Program	Talk Title	Track Chairs	Aprox Start Time (UTC)
Kickoff		N/A	5:00
Wael William Diab			
Opening Remarks		N/A	5:05
Silvio Dulinsky			
Emerging AI Requirements		Catherine Nelson and Peter Deussen	5:10
Elham Tabassi	NIST AI Risk Management Framework		
Mariagrazia Squicciarini	The UNESCO Recommendation on the Ethics of AI - Setting the standards for a better and more inclusive future		
Liz Coll	Can standards deliver consumer trust and confidence in AI		
Daniel Loevenich	Evaluation Standards for Conformity Assessment of Trustworthy Cloud-based AI Applications		
Emerging AI Technology Trends		Norbert Bensalem and Rohit Israni	6:30
Shubhashis Sengupta	Emerging AI Trends – as seen by an Industry Practitioner		
Tilak Kasturi	How specialized AI drives value for Automotive Service Organizations		
William Uppington	AI Quality: The Next Big Challenge in AI		
Babak Hodjat	From Data to Decisions, and Back		

Session 3

Program	Talk Title	Track Chairs	Aprox Start Time (UTC)
Kickoff			22:00
Wael William Diab			
AI Applications		Rohit Israni and Catherine Nelson	22:05
Charalambos Freed	Safety considerations in autonomous products		
Hajime Yamada	Development of SRD 63416 “Ethical Considerations of AI when Applied in the AAL Context”		
Kenzo Nonami	AI Powered UAV and Future Prospects		
Fumihiro Maruyama	Use cases and AI application guidelines in international standardization		
Novel AI Standardization Approaches		Norbert Bensalem and Peter Deussen	23:30
Jochen Friedrich	AI Standardisation supporting regulatory needs		
Linzhing Meng / Mike Thieme	Developing a TS on assessment of machine learning classification performance		
Yonosuke Harada	Introduction of Governance Implications of AI Systems		
Paul Cotton / Milan Patel / Wei Wei	The foundational standards for AI – ISO/IEC 22989 and ISO/IEC 23053		
Closing Remarks		Wael William Diab	0:55
Wael William Diab	Overview and introduction of SC 42		
Program Committee	Insights from the workshop		

Annex I

Current Ballots for New Proejcts

Current Ballots for New Projects

ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS
SC 42 – Artificial Intelligence

- Revision of ISO/IEC 25059 “Software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Quality models for AI systems”
- ISO/IEC NP 42110 Technical specification “Information technology – Artificial intelligence – AI inference framework for AI systems”
- ISO/IEC NP 42111 “Information technology – Artificial intelligence — Guidance on artificial intelligence (AI) lightweight modelling”
- ISO/IEC NP 24970 “Artificial intelligence — AI system logging”
- ISO/IEC NP 25029 “Artificial Intelligence – AI-enhanced nudging”

Annex J

Collaboration

Key Topics: Collaboration

SC 42 – Artificial Intelligence

SC 42 develops AI horizontal IT standards. SC 42 works closely with several ISO, IEC and JTC 1 committees enabling AI apps

Examples include

- ISO/IEC JTC 1/SC 40
  - Governance implications of AI. Status: JWG. Completed
- ISO/IEC JTC 1/SC 7
  - Testing of AI-based based systems. Status: JWG. Ongoing
- ISO TC 215
  - AI-Enabled Health Informatics. Status: JWG. Ongoing
- IEC SC 65A
  - Functional safety for AI Systems. Status: Collaboration on TR. Publications. Status: JWG. Ongoing
- ISO TC 37
  - Natural Language Processing. Status: JWG. Ongoing
- ISO/IEC JTC 1/SC 27
  - Information security, cybersecurity and privacy protection for AI. Status: Enhanced liaison. Ongoing
- Supports a variety of IEC, ISO and JTC 1 committees on projects related to AI through liaison e.g. JTC 1/SC 29, JTC 1/SC 38, JTC 1/SC 41, ISO TC 204, IEC SyC AAL, IEC ACOS Collaborative Safety TF, ISO SMCC etc.

Examples of discussions for future collaboration

- ISO TC 68. JWG for Financial Services

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ISO JTC 1 IEC
INFORMATION TECHNOLOGY STANDARDS

SC 42 – Artificial Intelligence