TRAI Consultation Paper on Leveraging AI&BD in Telecom Sector

- Qualcomm Response

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Dear Sir,

This is with reference to the TRAI consultation paper on Leveraging Artificial Intelligence and Big Data in Telecommunication Sector released on Aug 5, 2022. In our submission, we have tried to provide you with adequate and relevant information in the limited time that was given to provide our inputs to facilitate your consultation on this important topic. We shall be more than happy to provide further inputs on these or any other aspects of use of AI & BD in Telecom sector.

(Q1) What may be the most appropriate definition of Artificial Intelligence (AI)?

Please refer to "ISO/IEC 22989:2022 - Information technology — Artificial intelligence — Artificial intelligence concepts and terminology"[1] for the definition of AI. Reproducing the definitions below from the aforesaid standard for quick reference:

3.1.3 Artificial Intelligence

The discipline of research and development of mechanisms and applications of AI systems

Research and development can take place across any number of fields such as computer science, data science, natural sciences, humanities, mathematics and natural sciences.

3.1.4 artificial intelligence system

An AI system is an engineered system that generates outputs such as content, forecasts, recommendations or decisions for a given set of human-defined objectives.

The engineered system can use various techniques and approaches related to artificial intelligence (3.1.3) to develop a model (3.1.23) to represent data, knowledge (3.1.21), processes, etc. which can be used to conduct tasks (3.1.35).

(Q2) For efficient and effective handling of big data, whether there is a need for adoption of special programming models or software frameworks?

This concept is well explained in the ISO/IEC 20547-3[2] - Big Data Reference Architecture.

This document specifies the big data reference architecture (BDRA). The reference architecture includes the different concepts being considered and the corresponding architectural views.

[1] https://www.iso.org/standard/74296.html
[2] https://www.iso.org/standard/71277.html

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(Q4) Do you think that a number of terminologies such as Trustworthy AI, Responsible AI, Explainable AI etc. have evolved to describe various aspects of AI but they overlap and do not have any standardized meanings? If yes, whether there is a need to define or harmonize these terms? Please justify your response with rationale and global practices, if any.

The following technical report describes a standardized technical approach to Trustworthy, Responsible and Explainable AI:

ISO/IEC TR 24028:2020[3] Information technology — Artificial intelligence — Overview of trustworthiness in artificial intelligence

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 157 mitigation techniques and methods; and
- approaches to assess and achieve availability, resiliency, reliability, accuracy, safety, security, 159 privacy, maintainability, and durability of AI systems.

Since there remains divergent views on the 'levels' needed to characterize the trustworthiness for AI systems, this is not addressed in that document.

Q10A. What measures do you suggest to instill trust and confidence regarding a robust and safe AI system among customers, TSPs and other related entities/stakeholders? Please justify your response with rationale and suitable examples, if any.

This topic is dealt in the following ISO Technical Standards on Trust Worthiness and we assume that these would be able to address it:

ISO/IEC AWI 12792[4] Transparency taxonomy of AI systems

[3] https://www.iso.org/standard/77608.html
[4] https://www.iso.org/standard/84111.html

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ISO/IEC AWI TS 12791[5] Treatment of unwanted bias in classification and regression machine learning tasks

ISO/IEC AWI TS 8200[6] Controllability of automated artificial intelligence systems

ISO/IEC AWI TS 5471[7] Quality evaluation guidelines for AI systems

ISO/IEC TR 24029-1:2021[8] Assessment of the robustness of neural networks — Part 1: Overview

ISO/IEC DIS 24029-2[9] Assessment of the robustness of neural networks — Part 2: Methodology for the use of formal methods

ISO/IEC TR 24028:2020[10] Overview of trustworthiness in artificial intelligence

ISO/IEC TR 24027:2021[11] Bias in AI systems and AI aided decision making

ISO/IEC FDIS 23894[12] Guidance on risk management

ISO/IEC PWI 18966[13] Oversight of AI systems

ISO/IEC PWI 17866[14] Best practice guidance for mitigating ethical and societal concerns

ISO/IEC AWI TS 6254[15] Objectives and approaches for explainability of ML models and AI systems

ISO/IEC DTR 5469[16] Functional safety and AI systems

Q10B. Whether adopting general principles such as Responsible AI and ethical principles at the time of designing and operationalizing the AI models will help in developing ethical solutions and instilling trust and confidence in the users? Please justify your response with rationale and suitable examples, if any.

[5] https://www.iso.org/standard/84110.html
[6] https://www.iso.org/standard/83012.html
[7] https://www.iso.org/standard/82570.html
[8] https://www.iso.org/standard/77609.html
[9] https://www.iso.org/standard/79804.html
[10] https://www.iso.org/standard/77608.html
[11] https://www.iso.org/standard/77607.html
[12] https://www.iso.org/standard/77304.html
[13] https://www.iso.org/committee/45306.html
[14] https://genorma.com/en/project/show/iso:proj:83757
[15] https://www.iso.org/standard/82148.html
[16] https://www.iso.org/standard/81283.html

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This topic is well covered and is addressed by : ISO/IEC TR 24368:2022[17] Overview of ethical and societal concerns

Q10C What may be such principles and who should formulate these and how compliance can be ensured?

This is a well understood topic and the following standard addresses this need: ISO/IEC TR 24368:2022[18] Overview of ethical and societal concern

[17] https://www.iso.org/standard/78507.html
[18] https://www.iso.org/standard/78507.html