|  |  |  |
| --- | --- | --- |
| ITU logo | INTERNATIONAL TELECOMMUNICATION UNION**TELECOMMUNICATIONSTANDARDIZATION SECTOR**STUDY PERIOD 2017-2020 | SG20-LS198 |
| **STUDY GROUP 20** |
| **Original: English** |
| **Question(s):** | 4/20 | Virtual, 17-27 May 2021 |
| **Ref.: SG20-TD2279** |
| **Source:** | ITU-T Study Group 20 |
| **Title:** | LS/r on invitation to review Artificial Intelligence Standardization Roadmap and provide missing or updated information (reply to SG13-LS196 and SG13-LS174)  |
| **LIAISON STATEMENT** |
| **For action to:** | ITU-T Study Group 13 |
| **For comment to:** | - |
| **For information to:** | ISO/IEC JTC1/SC29, ITU-R SG 6, ITU-R WP 6C, IEEE, W3C, DMG, ITU-T SG2, SG3, SG5, SG11, SG12, SG15, SG16, SG17, ISO/IEC JTC1/SC42, FG-AI4H, FG-AI4EE, FG-AI4AD, Khronous Group, FG-AI4NDM, EUOS, TWG-AI |
| **Approval:** | ITU-T Study Group 20 meeting (Virtual, 27 May 2021) |
| **Deadline:** | 1 September 2021 |
| **Contact:**  | Nasser Saleh Al MarzouqiChairman SG20 | Tel: +97 6118 468Fax: +97 6118 484E-mail: nasser.almarzouqi@tdra.gov.ae  |
| **Contact:** | Gyu Myoung LEEKAIST Korea (Rep. of) | Tel: +82-42-866-6828Fax: +82-42-866-6226E-mail: gmlee@kaist.ac.kr  |

|  |  |
| --- | --- |
| **Keywords:** | Artificial Intelligence (AI); Machine learning (ML); Standardization Roadmap |
| **Abstract:** | This liaison is a reply to ITU-T Study Group 13 on invitation to review Artificial Intelligence Standardization Roadmap and provide missing or updated information. |

This liaison answers [SG13-LS196](http://handle.itu.int/11.1002/ls/sp16-sg13-oLS-00196.zip) and [SG13-LS174](http://handle.itu.int/11.1002/ls/sp16-sg13-oLS-00174.zip).

ITU-T Study Group 20 would like to thank ITU-T Study Group 13 for the information and the opportunity to review the attached version of draft Recommendation ITU-T Y.sup.aisr ([SG13-TD688/WP2](https://www.itu.int/md/T17-SG13-210301-TD-WP2-0688/en)).

ITU-T SG20 would like to provide an update to be added in clause 7.6 as follows (see red text):

--start--

Table 7-6 – ITU-T SG20 deliverables and work items

|  |  |  |  |
| --- | --- | --- | --- |
| Study group | **Reference** | Title | Status |
| SG20 | Y.4470 (ex Y.SSC-AISE-arc) ~~[ITU-T~~~~Y.SSC-AISE-arc]~~ | Reference architecture of artificial intelligence service exposure for smart sustainable cities | Approved on 2020-08-29 ~~4Q 2019~~ |
| SG20 | [ITU-TY.Sup.AI4IoT] | Unlocking Internet of things with artificial intelligence | 4Q 2019 |
| SG20 | ITU-T Y.CDML-arc | Reference architecture of collaborative decentralized machine learning for intelligent IoT services | Under study |
| SG20 | ITU-T Y.RA-FML | Requirements and reference architecture of IoT and smart city & community service based on federated machine learning | Under study  |
| SG20 | ITU-T Y.AI-DECCS | Functional architecture of AI enabled device-edge-cloud collaborative services for IoT and smart city | Under study  |

* [**Draft Recommendation ITU-T Y.CDML-arc**](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=16865)**：**A collaborative decentralized machine learning (CDML) architecture can support ML model distributed training and inference across highly heterogeneous and resource-constrained IoT devices, which results in less latency, higher reliability, lower energy consumption, and saving bandwidth resources. With using CDML, spare resources across decentralized IoT devices can be fully used to perform computation-intensive ML tasks collaboratively with high performance. This recommendation introduces collaborative decentralized machine learning (CDML) for intelligent IoT services, and provides the characteristics and reference architecture of CDML for intelligent IoT services.
* [**Draft Recommendation ITU-T Y.RA-FML**](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=16676)**:** Federated machine learning (FML) is an emerging distributed AI framework that enables collaborative model training, learning, and construction from a large number of decentralized datasets. With the fast growing demand on data-driven services in large IoT and Smart City & Community (SC&C) systems, collaborative data analysis, learning, and synthesis across highly diverse and decentralized data owners, e.g., cities, communities, buildings, devices, government and business entities, etc., are expected to be quite popular. This recommendation defines the reference architectural framework and requirements of IoT and Smart City & Community services based on federated machine learning, including: overview of FML-based IoT and SC&C services, architectural framework and component functionality of FML-based SC&S services, requirements of FML-based SC&C services, and use cases.
* [**Draft Recommendation ITU-T Y.AI-DECCS**](https://www.itu.int/ITU-T/workprog/wp_item.aspx?isn=16856)**:** The maturity of Internet of things technology and the widespread deployment of network provide good infrastructure conditions to the application of AI at the device, edge and cloud for IoT and smart city. The requirements of AI models in IoT and smart city are dynamic, thus how to make AI system continuously and dynamically update, as well as infer and predict in real-time is essential to the application of AI in IoT and smart city. The device-edge-cloud collaborative service enables collaborative inference, and dynamic learning and updating of AI models on the device-edge-cloud architecture, so as to meet the needs of various current and future application scenarios. This recommendation specifies the functional architecture of AI enabled device-edge-cloud collaborative services for IoT and smart city.
* [**Recommendation Y.4470 (ex ITU-T Y.SSC-AISE-arc):**](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=14503) This Recommendation introduces the artificial intelligence service exposure (AISE) for smart sustainable cities (SSC), analyses common characteristics and high-level requirements of AISE, brings a reference architecture of AISE and relevant common capabilities. The AISE is one of the bases, supporting functional entities for smart sustainable cities, with which the SSC services can use the uniform interfaces (exposed by the AISE) to integrate and access the AI capabilities (functionalities) of AI services (e.g., machine learning services for video/audio/picture recognition, natural language processing services, traffic prediction services etc.). The AISE can leverage the AI capabilities developed and exposed by AI service providers for SSC services, and can support the SSC service providers to integrate and access the exposed AI capabilities. The AISE can provide security and privacy mechanism on the SSC data. The AISE can support the AI service providers to design and train AI capabilities with local SSC data on AISE in SSCs, and can support the SSC services to integrate and access AI capabilities.

* **[Draft Supplement ITU-T Y.Sup.AI4IoT](https://www.itu.int/itu-t/workprog/wp_item.aspx?isn=14103)**: As the IoT system seeks to spread within the urban realm in keeping with smart and sustainable city aspirations, the need to manage the burgeoning big data and establishing a self-sustaining urban ecosystem is at the fore-front. Accordingly, this Technical Report examines how artificial intelligence could step in as the saviour and bolster the intent of urban stakeholders to deploy IoT technologies and eventually transition to smart cities. This Technical Report includes:
	+ The various technologies from AI which will help cater to urbanization and facilitate smart city transformations;
	+ The role played by AI in managing the data generated within the IoT realm;
	+ The main benefits of adopting AI and delving into how this technology could be leveraged to attain the targets stipulated in the recently established Sustainable Development Goals (SDGs).

--end--

ITU-T SG20 looks forward to further collaboration in this area. ITU-T SG20 would be pleased to be kept updated on the development of this Supplement.

\_\_\_\_\_\_\_\_\_\_\_\_