

Latest Trends in Utilization of AI for Network Operations and Management at TMForum

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1. Introduction

In current business conditions for telecom operators, commoditization, particularly in the area of connectivity, is perceived as a challenge, but beyond simple competition between telecom operators, participation by enterprises from other fields, has increased rapidly in the past two or three years, with IT enterprises joining open-source community, and even agriculture and manufacturing enterprises participating with telecommunications technology standardization organizations like the 3GPP. As such, we can expect many, diverse new services to be implemented as 5G and IoT technologies spread in the future. To meet the needs of each of these services, networks will need to be flexible. However, maintaining operation automation is becoming increasingly complex due to the increase in managed resource components (e.g.: server, operation system, hypervisor, and network functions). An urgent issue for telecom operators is to implement “Automated operations tasks for maintenance and operations,” to reduce the costs of operations and facilities for these services in the future. The TMForum, which promotes standardization of a network operations and management framework for telecom operators, initiated the Open Digital Architecture (ODA) project in September, 2017, to create architectural reference models for next-generation operations

support systems (OSS) and business support systems (BSS). Around the same time, discussion of using AI for network operations and management also became more active at the TMForum, and discussion began on the need to consolidate operational knowledge on how to manage AI training data sets for each of the function blocks in the ODA architecture, and for a repository for storing this data.

The above process resulted in a new “AI & Data Analytics” project, established in February 2018, which is currently active in four work streams: “Service Management Standard for AI,” “AI Data model & Training Repository,” “AI Maturity Model,” and “AI User Stories” (Figure 1). This article gives an overall view of AI-related activities at TMForum, and introduces some specific AI-related initiatives in each of these work streams. It concludes by touching on some future prospects.

2. AI related initiatives at TMForum

2.1 Service management standards

At the February, 2019 TMForum meeting, the first edition of the document “IG1184: AI Management Standard” from this work stream was released^[2]. The document defined an AI management lifecycle and described the requirement of data models and interfaces for each of the phases: Development, Commissioning, Operation, and Decommissioning. It also describes an ODA mapping, and best-practices rules.

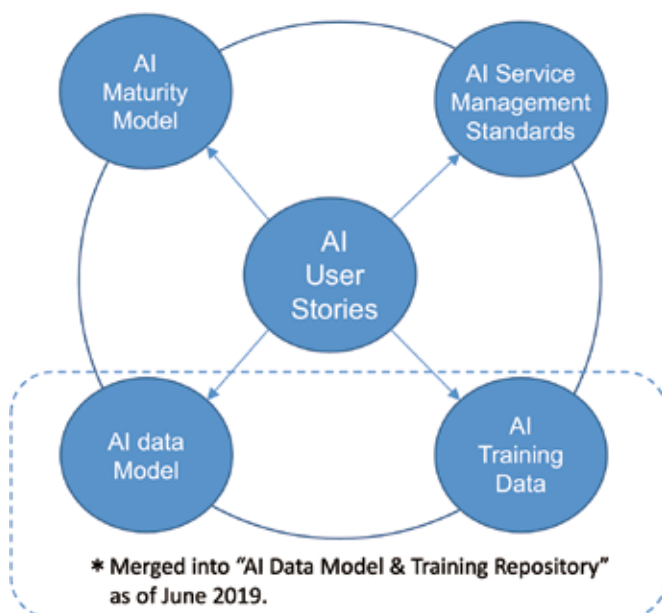
In the future, they plan to create a document that systematically organizes the AI data life cycle following the DAMA-DMBOK^[3] framework for data model definitions. However, issues have been raised regarding completing this document as a practical reference, including the need for Proof-of-Concept (PoC) and for standard formats from a business perspective.

2.2 AI Data Model & Training Repository

The TMForum has defined a data model standard called SID, but recently there has been an increase in AI and IoT-related “catalysts” (projects to demonstrate feasibility of advanced use cases from several telecom operators and vendors, facilitated by TMForum) and proposals for new data entities are expected, so this work stream was established.

At the February 2019 meeting, when defining data entities for each process in the AI management life cycle, as shown in Figure 2 below, each group decided on use cases and studied them to clarify the extent of issues that will require further study. KDDI is participating in the group handling Document Anonymization

■ Figure 1: TMForum “AI & Data Analytics” project work streams



use cases. Such cases involve using AI rather than people to remove personal information from collected information before archiving it, as required by GDPR to protect confidentiality of personal information. Major issues requiring study in such cases were discussed, included the following.

- What level of accuracy (%) is required?
- If AI is applied to the decision of whether a text constitutes personal information, what level of accuracy should be permitted?
- There will be a need for operators to provide feedback to improve accuracy. How can issues related to such costs be resolved?

At this meeting, also discussed was the state of catalyst activity and how the SID information model framework, which the TMForum is standardizing, can be modified to be better suited for AI. On the other hand, there were a total of 12 AI-related catalysts at the 2018 TMForum meeting, so by summarizing this knowledge in the future, we will promote creation of an AI training-data model reference and continue to discuss creation of data models that maintain compatibility with the operations and management system interface rules (Open APIs) being standardized by ODA and TMForum.

2.3 AI maturity-level model

After the September 2018 TMForum meeting, this work stream began activity to define an outline of steps for introducing AI, taking the role of analyzing the structure of telecom-operator AI strategies and providing benchmarks for understanding the plans and goals of their short and long term strategies. As of today, they have created a scoring sheet for understanding the strengths and weaknesses of companies in terms of six categories (Strategy, Culture and Organization, Engaged Party, Operations, Data, Technology)^[4].

2.4 AI user stories/use cases

This work stream discusses potential use cases, and released

the first edition of the document GB1002: Artificial Intelligence User Stories & Use Cases in February 2019^[5]. Its current level of completeness is indicated by the fact that it does not yet describe any real examples, and only sets templates and topics for describing use cases. For reference, some use cases corresponding to network operations and management are given below.

- “eTOM as a framework for CSP AI Applications”: Consolidates the definition and granularity of enhanced Telecom Operation Map (eTOM), a telecom operation process framework for use of AI that is regulated by TMForum.
- “Infrastructure Management Domain Use Cases”: Defines advanced use cases for network operations. Some concrete examples are as follows.
 - Reducing time related to troubleshooting and getting networks online.
 - Fault prediction and detection
 - Alarm monitoring and business-impact monitoring.
 - Service quality management

3. Conclusion

This article has summarized activities at the TMForum in various projects, from their initiation till now, as trends in use of AI for network operations and management. In the future, these projects will promote activity in two additional related work streams: “Data Governance,” and “Data Lifecycle Management,” as indicated in the latest meeting. This will initiate activities to organize data management processes, and is expected to result in practical data management rules for using AI in network operations and management at telecom operators.

References

- [1] <https://www.TMForum.org/resources/toolkit/ai-toolkit/>
- [2] TMForum, “IG1184 Service Management Standards for AI R18.5.1”, Feb. 2019.
- [3] <https://dama.org/content/body-knowledge>
- [4] TMForum, “GB1003 AI & Data Analytics Maturity Model R18.5”, Feb. 2019.
- [5] TMForum, “GB1002 Artificial Intelligence User Stories & Use Cases R18.5.1”, Feb. 2019.

■ Figure 2: Structure of AI maturity-level model (Created based on figures in Ref. [5])

